COLORADO RIVER STORAGE PROJECT

HEARINGS

BEFORE THE

SUBCOMMITTEE ON
IRRIGATION AND RECLAMATION

OF THE

COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS
HOUSE OF REPRESENTATIVES

EIGHTY-FOURTH CONGRESS

FIRST SESSION

ON

H. R. 270, H. R. 2836, H. R. 3383,
H. R. 3384, and H. R. 4488

TO AUTHORIZE THE SECRETARY OF THE INTERIOR TO CONSTRUCT, OPERATE, AND MAINTAIN THE COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS, AND FOR OTHER PURPOSES

PART 1

MARCH 9 AND 10, APRIL 18, 20, AND 22, 1955

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COLORADO RIVER STORAGE PROJECT

WEDNESDAY, MARCH 9, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to call, at 10:05 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will now be in session for the consideration of five bills for authorizing the Colorado River storage project and participating projects. These bills are H. R. 3383 and H. R. 3384, by Aspinall; H. R. 270, by Dawson; H. R. 2836, by Fernandez; and H. R. 4488, by Rogers of Colorado.

(H. R. 3383, H. R. 3384, H. R. 270, H. R. 2836, and H. R. 4488 read as follows:)

[H. R. 3383, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin. the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the Upper Basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project, consisting of dams, reservoirs, powerplants, transmission facilities and appurtenant works: Curecanti, Echo Park, Flaming Gorge and Glen Canyon: *Provided,* That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high waterline located at seven thousand five hundred and twenty feet above mean sea level and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the economic justification of such unit and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceed its costs; and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase); Emery County, Florida, Hammond, La Barge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy

Creek just above its confluence with the North Fork of the Gunnison River, and other necessary works); Pine River extension, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo: *Provided*, That (a) no appropriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been approved and authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single off stream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River System the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phase thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probably engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) irrigation repayment contracts shall be entered into which, except as otherwise provided for the Paonia and Eden projects, provide for repayment of the obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to assist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d), as to Indian lands within, under or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the Upper and Lower Basins of the Colorado River and among the States of the Upper Basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States (Treaty Series 994).

SEC. 4. (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the "Basin Fund"), which shall remain available until expended, as hereafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriation acts, (2) payment as required by subsection (d) of this section, (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act, and (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277): *Provided*, That revenues credited to the Basin Fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act, within a period of years not exceeding the expected economic life of such unit or participating project but not to exceed one hundred years;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to municipal water supply pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act in equal annual installments within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit, participating project, or separable feature thereof, or, in the cases of the Paonia project and of Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initiating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bid quotations during the month of June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project or separable feature thereof the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation, and maintenance costs to authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1956, upon the status of the revenues from and the cost of constructing, operating, and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with

other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, or any contract lawfully entered into under said Acts without the consent of the other contracting parties. Neither the impounding nor the use of water for the generation of power and energy at the plants of the Colorado River storage project shall preclude or impair the appropriation for domestic or argicultural purposes, pursuant to applicable State law, of waters apportioned to the States of the Upper Colorado River Basin.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) facilities to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public interest. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shal be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty with the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Flaming Gorge, Glen Canyon, Curecanti, and Echo Park initial units of the Colorado River storage project may be made without regard to the soil survey and land classification requirements of the Interior Department Appropriation Act, 1954.

SEC. 10. Construction of the projects herein authorized shall proceed as rapidly as is consistent with budgetary requirements and the economic needs of the country.

SEC. 11. There are hereby authorized to be appropriated, out of any moneys in the Treasury not otherwise appropriated, such sums as may be required to carry out the purpose of this Act but not to exceed $1,055,000,000.

SEC. 12. In planning the additional development necessary to the full consumptive use in the Upper Basin of the waters of the Colorado River system allocated to the Upper Basin and in planning the use of and in using credits from net power revenues available for the purpose of assisting in the pay-out of costs of participating projects herein and hereafter authorized in the States of Colorado, New Mexico, Utah, and Wyoming, the Secretary shall have regard for the achievement within each of such States of the fullest practicable consumptive use of the waters of the Upper Colorado River system consistent with the apportionment thereof among such States.

SEC. 13. In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits.

SEC. 14. The Secretary of the Interior is directed to institute studies and to make a report to the Congress and to the States of the Colorado River Basin of the effect upon the quality of water of the Colorado River, of all transmountain

diversions of water of the Colorado River system and of all other storage and reclamation projects in the Colorado River Basin.

SEC. 15. As used in this Act—

The terms "Colorado River Basin", "Colorado River Compact", "Colorado River System", "Lee Ferry", "States of the Upper Division", "Upper Basin", and "domestic use" shall have the meaning ascribed to them in article II of the "Upper Colorado River Basin Compact";

The term "States of the Upper Colorado Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming.

The term "Upper Colorado River Basin" shall have the same meaning as the term "Upper Basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785);

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understanding recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof; and

The term "economic life," as used herein in relation to repayment of costs allocated to power, shall mean the period during which the unit or project is expected to continue to provide the power and energy contemplated from the design and construction of the power facilities of the unit or project, due regard being given to historical experience with similar types of works, allowances included in "replacement costs" for replacing major items of equipment, and other pertinent factors which may affect the useful life.

[H. R. 3384, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the Upper Basin to utilize consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project, consisting of dams, reservoirs, powerplants, transmission facilities, and appurtenant works: Curecanti, Echo Park, Flaming Gorge, Glen Canyon, Juniper, and Navajo: *Provided*, That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high waterline located at seven thousand five hundred and twenty feet above mean sea level, and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase); Emery County, Florida, Gooseberry, Hammond, LaBarge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy Creek just above its confluence with the North Fork of the Gunnison River,

and other necessary works), Pine River Extension, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo, Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone, Battlement Mesa, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwick Park, Grand Mesa, Dallas Creek, Savery-Pot Hook, Dolores, Fruit Growers Extension, Elkhorn, Kendall: *Provided*, That (a) construction of the participating projects set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law. Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama, Navajo, Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone, Battlement Mesa, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwick Park, Grand Mesa, Dallas Creek, Savery-Pot Hook, Dolores, Fruit Growers Extension, Elkhorn, and Kendall participating projects, not be applicable to such supplemental reports; and, (b) that no appropriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single off-stream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission: *Provided further*, That no appropriation for or construction of the Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone, Battlement Mesa, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwick Park, Grand Mesa, Dallas Creek, Savery-Pot Hook, Dolores, Fruit Growers Extension, Elkhorn, and Kendall participating projects shall be made or begun until reports thereon shall have been submitted to the affected States, pursuant to the Act of December 22, 1944, and said projects shall have been authorized by the Congress.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) irrigation repayment contracts shall be entered into which, except as otherwise provided for the Paonia and Eden projects, provide for repayment of the obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to assist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d), as to Indian lands within, under or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the Upper and Lower Basins of the Colorado River and among the States of the Upper Basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States (Treaty Series 994).

SEC. 4. (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the "Basin Fund"), which shall remain available until expended, as hereinafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriation Acts, (2) payment as required by subsection (d) of this section, (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act, and (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277): *Provided*, That revenues credited to the Basin Fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to municipal water supply pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit,

participating project, or separable feature thereof, or in the cases of the Paonia project and of Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initiating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bid quotations during the month of June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project or separable feature thereof the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation and maintenance costs to authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1956, upon the status of the revenues from and the cost of constructing, operating and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) facilities to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public interest. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty with the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Flaming Gorge, Glen Canyon, Navajo, and Echo Park initial units of the Colorado River storage project may be made without regard to the soil survey and land classification requirements of the Interior Department Appropriation Act, 1954.

SEC. 10. There are hereby authorized to be appropriated such sums as may be required to carry out the purposes of this Act.

SEC. 11. (a) In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits. No right to impound or use water for the generation of power or energy, created or established by the building, operation or use of any of the powerplants authorized by this Act, shall be deemed to have priority over or otherwise operate to preclude or impair any use, regardless of the date of origin of such use, of the waters of the Colorado River and its tributaries for domestic or agricultural purposes within any of the States of the Upper Colorado River Basin.

(b) In the operation of works under his jurisdiction for the storage and release of waters of the Colorado River System and in programing the storage and release of such waters, the Secretary of the Interior shall consult from time to time with an Integrating Committee consisting of one representative from each of the Colorado River Basin States, one representative of the Colorado River Board of California, one representative of the Upper Colorado River Commission, and one representative of the United States Section of the International Boundary Commission, United States and Mexico.

SEC. 12. As used in this Act—

The terms "Colorado River Basin," "Colorado River Compact," "Colorado River System," "Lee Ferry," "States of the Upper Division," "Upper Basin," and "domestic use" shall have the meaning ascribed to them in article II of the Upper Colorado River Basin Compact;

The term "States of the Upper Colorado River Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming;

The term "Upper Colorado River Basin" shall have the same meaning as the term "Upper Basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by Commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785); and

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understandings recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof.

[H. R. 270, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the Upper Basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation

of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project, consisting of dams, reservoirs, powerplants, transmission facilities, and appurtenant works: Cross Mountain, Curecanti, Echo Park, Flaming Gorge, Glen Canyon, and Navaho: *Provided*, That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high waterline located at seven thousand five hundred and twenty feet above mean sea level and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the economic justification of such unit and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceed its costs; and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase), Emery County, Florida, Gooseberry, Hammond, LaBarge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy Creek just above its confluence with the North Fork of the Gunnison River, and other necessary works), Pine River Extension, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo: *Provided*, That (a) construction of the participating projects set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law. Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama and the Navajo participating projects, not be applicable to such supplemental reports; and, (b) that no appropriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single off stream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, or additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) irrigation repayment contracts shall be entered into which, except as otherwise provided for the Paonia and Eden projects, provide for repayment of the obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to asist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d) as to Indian lands within, under, or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the Upper and Lower Basins of the Colorado River and among the States of the Upper Basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States (treaty series 994).

SEC. 4. (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the Basin Fund), which shall remain available until expended, as hereafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriations acts; (2) payment as required by subsection (d) of this section; (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act; and (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277): *Provided*, That revenues credited to the Basin Fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to municipal water supply pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water-supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit, participating project, or separable feature thereof, or, in the cases of the Paonia project and of Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initiating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bid quotations during the month of June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project, or separable feature thereof the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project, or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation, and maintenance costs to authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1956, upon the status of the revenues from and the cost of constructing, operating, and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) facilities to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public interest. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty with the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Cross Mountain, Flaming Gorge, Glen Canyon, Navaho, and Echo Park initial units of the Colorado River storage project may be made without regard to the soil-survey and land-classification requirements of the Interior Department Appropriation Act, 1954.

SEC. 10. There are hereby authorized to be appropriated such sums as may be required to carry out the purposes of this Act.

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver: *Provided*, That any such transfer shall be so limited as not to preclude the use of the property other than water rights for the necessary functions of the United States Government.

SEC. 12. (a) In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin.

(b) In the operation of works under his jurisdiction for the storage and release of waters of the Colorado River System and in programing the storage and release of such waters, the Secretary of the Interior shall consult from time to time with an integrating committee consisting of one representative from each of the Colorado River Basin States, one representative of the Colorado River Board of California, one representative of the Upper Colorado River Commission, and one representative of the United States Section of the International Boundary Commission, United States and Mexico.

SEC. 13. As used in this Act—

The terms "Colorado River Basin," "Colorado River Compact," "Colorado River System," "Lee Ferry," "States of the Upper Division," "Upper Basin," and "domestic use" shall have the meaning ascribed to them in article II of the Upper Colorado River Basin Compact;

The term "States of the Upper Colorado River Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming;

The term "Upper Colorado River Basin" shall have the same meaning as the term "Upper Basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by Commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785); and

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understandings recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof.

[H. R. 2836, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and

to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the upper basin to utilize, consistently with the provisions of the Colorado River compact, the apportionments made to and among them in the Colorado River compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project, consisting of dams, reservoirs, powerplants, transmission facilities and appurtenant works: Cross Mountain, Curecanti, Echo Park, Flaming Gorge, Glen Canyon, and Navajo: *Provided*, That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high waterline located at seven thousand five hundred and twenty feet above mean sea level and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the economic justification of such unit and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceeds its costs; and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase); Emery County, Florida, Gooseberry, Hammond, La Barge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy Creek just above its confluence with the North Fork of the Gunnison River, and other necessary works), Pine River Extension, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo: *Provided*, That (a) construction of the participating projects set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the non-direct benefits of the project; and (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law. Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama and the Navajo participating projects, not be applicable to such supplemental reports; and (b) that no appropriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been approved and authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single off-stream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado Rivert storage project, of additional phases of participating proj-

ects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 338, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) irrigation repayment contracts shall be entered into which, except as otherwise provided for the Paonia and Eden projects, provide for repayment of the obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to assist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d), as to Indian lands within, under or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the Upper and Lower Basins of the Colorado River and among the States of the Upper Basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States (Treaty Series 994).

SEC. 4. (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the Basin Fund), which shall remain available until expended, as hereafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriation acts, (2) payment as required by subsection (d) of this section, (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act, and (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277): *Provided*, That revenues credited to the Basin Fund shall not be available for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act,

within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to municipal water supply pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof:

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit, participating project, or separable feature thereof, or, in the cases of the Paonia project and of Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initiating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bid quotations during the month on June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project, or separable feature thereof, the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project, or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation, and maintenance costs to authorize nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1955, upon the status of the revenues from and the cost of constructing, operating, and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential, so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) facilities to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public in-

terest. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty With the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Cross Mountain, Flaming Gorge, Glen Canyon, Navajo and Echo Park initial units of the Colorado River storage project may be made without regard to the soil survey and land classification requirements of the Interior Department Appropriation Act, 1954.

SEC. 10. There are hereby authorized to be appropriated such sums as may be required to carry out the purposes of this Act.

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver, and provided that any such transfer shall be so limited as not to preclude the use of the property other than water rights for the necessary functions of the United States Government.

SEC. 12. In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits. No right to impound or use water for the generation of power or energy, created or established by the building, operation or use of any of the powerplants authorized by this Act, shall be deemed to have priority over or otherwise operate to preclude or impair any use, regardless of the date of origin of such use, of the waters of the Colorado River and its tributaries for domestic or agricultural purposes within any of the States of the Upper Colorado River Basin.

SEC. 13. As used in this Act—

The terms "Colorado River Basin", "Colorado River Compact", "Colorado River System", "Lee Ferry", "States of the Upper Division", "Upper Basin", and "domestic use" shall have the meaning ascribed to them in article II of the Upper Colorado River Basin Compact;

The term "States of the Upper Colorado River Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming;

The term "Upper Colorado River Basin" shall have the same meaning as the term "Upper Basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785); and

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understandings recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof.

[H. R. 4488, 84th Cong., 1st sess.]

A BILL To authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, the Congress, in the exercise of its constitutional authority to provide for the general welfare, to regulate commerce among the States and with the Indian tribes, and to make all needful rules and regulations respecting property belonging to the United States, and for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the upper basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods and for the improvement of navigation, and the generation of hydroelectric power, as an incident of the foregoing purposes, hereby authorizes the Secretary of the Interior (1) to construct, operate, and maintain the following initial units of the Colorado River storage project consisting of dams, reservoirs, powerplants, transmission facilities and appurtenant works: Curecanti, Echo Park, Flaming Gorge, Glen Cayon, Juniper, and Navajo: *Provided*, That the Curecanti Dam shall be constructed to a height which will impound not less than nine hundred and forty thousand acre-feet of water or a reservoir of such greater capacity as may be acceptable to local interests in the vicinity of the city of Gunnison, Colorado, and that construction thereof shall not be undertaken until the Secretary has, on the basis of further engineering and economic investigations, reexamined the economic justification of such unit and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceed its costs; and (2) to construct, operate, and maintain the following additional reclamation projects (including power-generating and transmission facilities related thereto), hereinafter referred to as participating projects: Central Utah (initial phase); Cliff-Divide (consisting of eight project units), Dolores, Emery County, Elkhorn, Florida, Gooseberry, Gunnison River (consisting of eight project units), Hammond, Kendall, La Barge, Lyman, Paonia (including the Minnesota unit, a dam and reservoir on Muddy Creek just above its confluence with the North Fork of the Gunnison River, and other necessary works), Pine River Extension, Savery-Pot Hook, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navajo: *Provided*, That (a) construction of a participating project set forth in this clause (2) shall not be undertaken until the Secretary has reexamined the economic justification of such project and, accompanied by appropriate documentation in the form of a supplemental report, has certified to the Congress, through the President, that, in his judgment, the benefits of such project will exceed its costs, and that the financial reimbursability requirements set forth in section 4 of this Act can be met. The Secretary's supplemental report for each such project shall include, among other things, (i) a reappraisal of the prospective direct agricultural benefits of the project made by the Secretary after consultation with the Secretary of Agriculture; (ii) a reevaluation of the nondirect benefits of the project; and (iii) allocations of the total cost of construction of each participating project or separable features thereof, excluding any expenditures authorized by section 7 of this Act, to power, irrigation, municipal water supply, flood control or navigation, or any other purpose authorized under reclamation law. Section 1 (c) of the Flood Control Act of 1944 shall, except as hereinafter provided for the San Juan-Chama and the Navajo participating projects, not be applicable to such supplemental reports; and, (b) that no appropriation for or construction of the San Juan-Chama project or the Navajo participating project shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including (but without limiting the generality of the foregoing) the State of Texas, pursuant to the Act of December 22, 1944, and said projects shall have been approved and authorized by the Congress: *Provided further*, That with reference to the San Juan-Chama project, it shall be limited to a single off-stream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation

of the Department of the Interior in strict compliance with the Rio Grande Compact as administered by the Rio Grande Compact Commission.

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized herein or in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law. Furthermore, participating projects authorized in the future shall be on a full equality with participating projects authorized herein with respect to all considerations including economic justification, appraisal of agricultural and other benefits, irrigation repayment contracts and obligations, interest charges, financial reimbursability requirements and payment, allocation of costs of construction to power, irrigation, municipal water supply, flood control and any other purpose or benefit authorized under reclamation law.

SEC. 3. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto): *Provided*, That (a) contracts shall be entered into which (except as otherwise provided for the Paonia and Eden projects) provide for repayment of the irrigation obligation assumed thereunder with respect to any project contract unit over a period of not more than fifty years exclusive of any development period authorized by law; (b) prior to construction of irrigation distribution facilities, repayment contracts shall be made with an "organization" as defined in paragraph 2 (g) of the Reclamation Project Act of 1939 (53 Stat. 1187) which has the capacity to levy assessments upon all taxable real property located within its boundaries to assist in making repayments, except where a substantial proportion of the lands to be served are owned by the United States; (c) contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9 (c) of the Reclamation Project Act of 1939; and (d), as to Indian lands within, under or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564). All units and participating projects shall be subject to the apportionments of the use of water between the upper and lower basins of the Colorado River and among the States of the upper basin fixed in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, and to the terms of the treaty with the United Mexican States (Treaty Series 994).

SEC. 4 (a) There is hereby authorized a separate fund in the Treasury of the United States to be known as the Upper Colorado River Basin Fund (hereinafter referred to as the Basin Fund), which shall remain available until expended, as hereafter provided, for carrying out provisions of this Act other than section 7.

(b) All appropriations made for the purpose of carrying out the provisions of this Act, other than section 7, shall be credited to the Basin Fund as advances from the general fund of the Treasury, and such funds shall be available for expenditures within the limitations of the provisions of this Act and of the provisions of the appropriations.

(c) All revenues collected in connection with the operation of the Colorado River storage project and participating projects shall be credited to the Basin

Fund, and shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the Colorado River storage project and participating projects, within such separate limitations as may be included in annual appropriation acts, (2) payment as required by subsection (d) of this section, (3) payment of the reimbursable construction costs of the Paonia project which are beyond the ability of the water users to repay within the period prescribed in the Act of June 25, 1947 (61 Stat. 181), said payment to be made within fifty years after completion of that portion of the project which has not been constructed as of the date of this Act, (4) payment in connection with the irrigation features of the Eden project as specified in the Act of June 28, 1949 (63 Stat. 277), and (5) any remaining surplus to be available only for appropriation for construction of the units and participating projects authorized by or pursuant to this Act.

(d) Revenues in the Basin Fund in excess of operating needs shall be paid annually to the general fund of the Treasury to the extent required to return for that year—

(1) the costs of each unit, participating project, or any separable feature thereof which are allocated to power pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(2) the costs of each unit, participating project, or any separable feature thereof which are allocated to municipal water supply pursuant to section 5 of this Act, within a period not exceeding fifty years from the date of completion of such unit, participating project, or separable feature thereof;

(3) interest on the unamortized balance of the investment (including interest during construction) in the power and municipal water supply features of each unit, participating project, or any separable feature thereof, at a rate determined by the Secretary of the Treasury as provided in subsection (e), and interest due shall be a first charge; and

(4) the costs of each unit, participating project, or any separable feature thereof which are allocated to irrigation pursuant to section 5 of this Act within a period not exceeding fifty years, in addition to any development period authorized by law, from the date of completion of such unit, participating project, or separable feature thereof, or, in the cases of the Paonia project and of the Indian lands, within a period consistent with other provisions of law applicable thereto.

(e) The interest rate applicable to each unit of the storage project and each participating project shall be determined by the Secretary of the Treasury as of the time the first advance is made for initiating construction of said unit or project. Such interest rate shall be determined by calculating the average yield to maturity on the basis of daily closing market bid quotations during the month of June next preceding the fiscal year in which said advance is made, on all interest-bearing marketable public debt obligations of the United States having a maturity date of fifteen or more years from the first day of said month, and by adjusting such average annual yield to the nearest one-eighth of 1 per centum.

(f) Business-type budgets shall be submitted to the Congress annually for all operations financed by the Basin Fund.

SEC. 5. Upon completion of each unit, participating project, or separable feature thereof the Secretary shall allocate the total costs (excluding any expenditures authorized by section 7 of this Act) of constructing said unit, project or feature to power, irrigation, municipal water supply, flood control, navigation, or any other purposes authorized under reclamation law. Allocations of construction, operation, and maintenance costs to authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1955, upon the status of the revenues from and the cost of constructing, operating, and maintaining the Colorado River storage project and the participating projects. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 6. The hydroelectric powerplants and transmission facilities authorized by this Act to be constructed, operated, and maintained by the Secretary shall be operated in conjunction with other Federal powerplants, present and potential,

so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates, but no exercise of the authority hereby granted shall affect or interfere with the operation of any provision of the Colorado River Compact, the Upper Colorado River Basin Compact, or the Boulder Canyon Project Act: *Provided*, That power produced pursuant to this Act shall be sold at the highest practicable price to enhance the development of the Upper Colorado River Basin and operation in conjunction with other powerplants shall not deprive the Basin Fund of revenues which it would receive in the absence of such joined operation.

SEC. 7. In connection with the development of the Colorado River storage project and of the participating projects, the Secretary is authorized and directed to investigate, plan, construct, operate, and maintain (1) public recreational facilities on lands withdrawn or acquired for the development of said project or of said participating projects, to conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands, and to provide for public use and enjoyment of the same and of the water areas created by these projects by such means as are consistent with the primary purposes of said projects; and (2) facilities to mitigate losses of and improve conditions for the propagation of fish and wildlife. The Secretary is authorized to acquire lands and to withdraw public lands from entry or other disposition under the public land laws necessary for the construction, operation, and maintenance of the facilities herein provided, and to dispose of them to Federal, State, and local governmental agencies by lease, transfer, exchange, or conveyance upon such terms and conditions as will best promote their development and operation in the public interest, and with due regard for any change in use that may occur at some future time. All costs incurred pursuant to this section shall be nonreimbursable and nonreturnable.

SEC. 8. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with any provision of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Compact, the Upper Colorado River Basin Compact, the Rio Grande Compact of 1938, or the Treaty With the United Mexican States (Treaty Series 994).

SEC. 9. Expenditures for the Curecanti, Echo Park, Flaming Gorge, Glen Canyon, Juniper, and Navajo initial units of the Colorado River storage project may be made without regard to the soil survey and land classification requirements of the Interior Department Appropriation Act, 1954.

SEC. 10. There are hereby authorized to be appropriated such sums as may be required to carry out the purposes of this Act.

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver, and provided that any such transfer shall be so limited as not to preclude the use of the property other than water rights for the necessary functions of the United States Government.

SEC. 12. In the operation and maintenance of all facilities, authorized by Federal law and under the jurisdiction and supervision of the Secretary of the Interior, in the basin of the Colorado River, the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the failure of the Secretary of the Interior to so comply, any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section, and consent is given to the joinder of the United States as a party in such suit or suits. No agency or official of the United States shall seek or accept a right to impound or use water for the generation of power or energy, created or established by the building, operation or use of any of the powerplants authorized by this Act.

SEC. 13. As used in this Act—

The terms "Colorado River Basin", "Colorado River Compact", "Colorado River System", "Lee Ferry", "States of the Upper Division", "upper basin",

and "domestic use" shall have the meaning ascribed to them in article II of the Upper Colorado River Basin Compact;

The term "States of the Upper Colorado River Basin" shall mean the States of Arizona, Colorado, New Mexico, Utah, and Wyoming;

The term "Upper Colorado River Basin" shall have the same meaning as the term "upper basin";

The term "Upper Colorado River Basin Compact" shall mean that certain compact executed on October 11, 1948, by commissioners representing the States of Arizona, Colorado, New Mexico, Utah, and Wyoming, and consented to by the Congress of the United States of America by Act of April 6, 1949 (63 Stat. 31);

The term "Rio Grande Compact" shall mean that certain compact executed on March 18, 1938, by commissioners representing the States of Colorado, New Mexico, and Texas and consented to by the Congress of the United States of America by Act of May 31, 1939 (53 Stat. 785); and

The term "treaty with the United Mexican States" shall mean that certain treaty between the United States of America and the United Mexican States signed at Washington, District of Columbia, February 3, 1944, relating to the utilization of the waters of the Colorado River and other rivers, as amended and supplemented by the protocol dated November 14, 1944, and the understandings recited in the Senate resolution of April 18, 1945, advising and consenting to ratification thereof.

Mr. ASPINALL. The Committee on Interior and Insular Affairs, during the 83d Congress, spent a total of 24 days considering this legislation. The Irrigation and Reclamation Subcommittee spent a total of 41 hours over a 10-day period in public hearings. The subcommittee spent an additional 16 hours over a 12-day period in executive session in amending and reporting a bill. The full committee spent 5 hours in 2 days on the legislation. Most of the members of this committee are familiar with it. The committee does not feel justified in going back into all the details of this development. Only new evidence, for the most part, should be submitted. It is the hope of the Chair to limit the hearings to 8 days, tentatively divided to give the Department 2 days to make a technical presentation, the proponents of the legislation 3 days, and those in opposition 3 days.

The five bills before the committee are all different with respect to plan. From 4 to 6 storage units are included for authorization and from 13 to 33 participating projects are included. The administration recommends 2 storage units and 11 participating projects for immediate authorization. For those participating projects where the planning has not advanced to the point where feasibility-type reports have been transmitted to the Congress, there is expected to be language in the bill providing for later congressional approval. Therefore, this committee will sometime in the future in another Congress consider these projects for authorization of construction. This being so, it is the Chair's position, approved by the chairman of the full committee, that this committee should not go into the engineering and economic details of these units but be advised only on the status of the planning with a few pertinent facts on the units themselves.

Now, with respect to the procedure to be followed by the committee, I would like to quote from the Legislative Reorganization Act of 1946, section 133, subsection (e), which reads as follows:

Each such standing committee shall, so far as practicable, require all witnesses appearing before it to file in advance written statements of their proposed testimony, and to limit their oral presentations to brief summaries of their argument.

With the approval of the chairman, this is the procedure which the committee desires to follow. I will ask that statements of the wit-

nesses, in 35 copies, be delivered to the staff prior to the beginning of the hearing on the date that the witness is scheduled to appear. It is expected that those witnesses who have detailed statements supporting their argument, which will require more than a few minutes to present, will limit their oral presentation to a brief summary of their argument. Each member of the committee will have a copy of the detailed statement.

We have scheduled today the Department witnesses and I believe Assistant Secretary Aandahl, Commissioner Dexheimer and Mr. Larson, Regional Director of the Bureau, are present. I understand Assistant Secretary Aandahl has a brief statement. I would hope that the members will not question Mr. Aandahl with respect to the engineering and economic details of the development but only with respect to broad, departmental policy. After Mr. Aandahl has made his brief statement, I would like for Commissioner Dexheimer and Regional Director Larson to come up together and such others of the staff as he wishes to have with him. I understand Commissioner Dexheimer has a brief statement and that Regional Director Larson will go into the details of the project. After Mr. Dexheimer makes his statement, I would appreciate it if the members will withhold questions so that he and Mr. Larson may be questioned together. I hope that Mr. Larson can summarize his statement. In order that we may keep straight on the development which is recommended for immediate authorization and construction by the administration, I am going to ask Mr. Larson in his statement to speak first only on the plan and on the units which the administration has recommended and at that time submit himself to questioning on that plan. After this procedure is completed, Mr. Larson could then describe the other units and projects in the plan, give us the status of the planning on these units and a few of the pertinent facts.

Mr. ENGLE. Mr. Chairman?

Mr. ASPINALL. Mr. Engle of California is recognized.

Mr. ENGLE. I would like to ask unanimous consent that the procedural arrangement stated by the Chair be approved and accepted and made the order of the committee.

Mr. SAYLOR. I object.

Mr. HOSMER. I object.

Mr. ENGLE. I so move, and desire to be heard briefly in support of the motion.

Mr. SAYLOR. Point of order.

Mr. ASPINALL. The gentleman from Pennsylvania makes a point of order. What is your point of order?

Mr. SAYLOR. I make the point of order there is no quorum present.

Mr. ASPINALL. The gentleman is sustained in his point of order. The Chair will ask that the staff members phone to the other members of the committee and ask them if they are going to present themselves.

(There was a short recess.)

Mr. ASPINALL. The committee will be in order. The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. My understanding is that the gentleman from California will withdraw his motion and I will withdraw my point of order.

Mr. ASPINALL. The Chair wants to know if the gentleman from Pennsylvania will withdraw his point of order for the time being.

Mr. SAYLOR. For the time being, Mr. Chairman.

Mr. ENGLE. I ask unanimous consent to withdraw my motion.

Mr. ASPINALL. Are there any objections to the withdrawal of the motion by the gentleman from California?

Hearing none, it is so ordered.

The Chair would ask the committee at this time for unanimous consent for those sponsoring the different bills to be permitted to file a statement for the record at this place in the hearings. Are there any objections?

Mr. SAYLOR. By that, do you mean the sponsors or the proponents of this legislation, namely——

Mr. ASPINALL. I mean the sponsors.

Mr. SAYLOR. That is Mr. Dawson, Mr. Fernandez, yourself and Mr. Rogers of Colorado?

Mr. ASPINALL. That is right.

Mr. SAYLOR. No objection.

Mr. ASPINALL. Hearing no objection, it is so ordered.

At this time, the Chair would ask unanimous consent that any Member of Congress who wishes to file a statement to be placed in the record be permitted to do so on this legislation. Is there any objection?

Hearing none, it is so ordered.

Is there any objection to having the memorandum prepared by the committee staff filed at this point in the record, explaining the legislation before the committee?

Mr. HOSMER. I object, Mr. Chairman.

Mr. ASPINALL. Hearing the objection, it is sustained.

We have a report from the Department under date of March 8, 1955, explaining the Department's position on the legislation and with an explanation of the differences in the various bills before the committee. Is there any objection to having the departmental report made a part of the record at this place in the hearings?

Hearing none, it is so ordered.

(The report referred to reads as follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington 25, D. C., March 8, 1955.

Hon. CLAIR ENGLE,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington 25, D. C.

MY DEAR MR. ENGLE: A report has been requested from this Department on H. R. 3833, a bill to authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects, and for other purposes. You have also requested that we comment on H. R. 270, H. R. 2836, and H. R. 3384 to the extent to which they differ from H. R. 3383.

In his address to the Congress on the state of the Union, President Eisenhower said (H. Doc. No. 1, 84th Cong., p. 8):

"* * * the Federal Government must shoulder its * * * partnership obligations by undertaking projects of such complexity and size that their success requires Federal development. In keeping with this principle I again urge the Congress to approve the development of the upper Colorado River Basin to conserve and assure better use of precious water essential to the future of the West."

Likewise in his budget message (H. Doc. No. 16, 84th Cong., p. M65) the President said:

"I also recommend enactment of legislation authorizing the Bureau of Reclamation to undertake construction of two comprehensive river-basin improvements which are beyond the capacity of local initiative, public or private, but which are needed for irrigation, power, flood control, and municipal and industrial

water supply. These are the upper Colorado River Basin development in the States of Colorado, Utah, Wyoming, Arizona, and New Mexico, and the Fryingpan-Arkansas development in Colorado. The Colorado River development will enable the upper basin states to conserve floodwaters and to assure the availability of water and power necessary for the economic growth of the region. * * * Sale of power generated at these developments will repay the power investment within 50 years and will make a contribution toward repayment of other investments."

In the budget itself it was pointed out (p. 830) that the administration proposes to initiate construction of the Colorado River storage project during the next fiscal year if it is authorized and that the budget includes an item for funds to be requested for this purpose.

The substance of our views on the proper contents of a bill to implement the President's recommendation and particularly on those projects and units which should be covered in the initial legislation is contained in the draft of bill which was developed by the Bureau of the Budget in collaboration with this Department and submitted to your committee on April 1, 1954, in connection with H. R. 4449, 83d Congress, a predecessor of the present H. R. 3383.

We recommend that H. R. 3383 be examned in the light of the proposal there made in the light of the two letters dated March 18, 1954, from the Director of the Bureau of the Budget to the Senate Committee on Interior and Insular Affairs and to this Department which are reprinted in Senate Report No. 1983, 83d Congress, and that, with suitable amendments, H. R. 3383 be enacted.

The Bureau of the Budget has advised that there would be no objection to the submission of the above report to your committee. That office, however, has not yet had an opportunity to consider the attached comparative analysis of H. R. 3383, H. R. 270, H. R. 2836, and H. R. 3384. The comments made therein must not, for this reason, be regarded as representing any commitment with respect to their conformity to the program of the President.

Sincerely yours,

FRED G. AANDAHL,
Assistant Secretary of the Interior.

COMPARATIVE ANALYSIS OF H. R. 3383, H. R. 270, H. R. 2836, AND H. R. 3384, 84TH CONGRESS

Storage project units named

H. R. 3383: Curecanti, Echo Park, Flaming Gorge, Glen Canyon.
H. R. 270: Adds Cross Mountain and Navaho to above.
H. R. 2836: Same as H. R. 270.
H. R. 3384: Adds Juniper and Navaho to those covered in H. R. 3383.
Comment.—The Department of the Interior recommends that only Glen Canyon and Echo Park be authorized as storage units at this time.

Participating projects named

H. R. 3383: Central Utah (initial phase), Emery County, Florida, Hammond, La Barge, Lyman, Paonia (new works), Pine River extension, Seedskadee, Silt, Smith Fork, San Juan-Chama, Navaho.
H. R. 270: Adds Gooseberry to above.
H. R. 2836: Same as H. R. 270.
H. R. 3384: Adds Gooseberry, Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone, Battlement Mesa, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwick Park, Grand Mesa, Dallas Creek, Savery Pot Hook, Dolores, Fruitgrowers extension, Elkhorn, Kendall to those named in H. R. 3383.
Comment.—Department of the Interior recommends that the projects covered be limited to the 11 listed in the administration bill submited to the committee on April 1, 1954, viz, central Utah (initial phase), Emery County, Florida, Hammond, La Barge, Lyman, Paonia (new works), Pine River extension, Seedskadee, Silt, and Smith Fork.

Extent of authorization

H. R. 3383: Echo Park, Glen Canyon, and Flaming Gorge fully authorized; Curecanti subject to certification, on basis of further engineering and economic investigations, that its benefits will exceed its costs. All participating projects except San Juan-Chama and Navaho fully authorized; San Juan-Chama and Navaho subject to submission of coordinated reports to States under Flood Control Act of 1944 and to approval of and authorization by the Congress.

H. R. 270: Same as H. R. 3383 for storage units. All participating projects subject to reexamination by Secretary of the Interior with respect to their economic justification and to certification by him that their benefits will exceed their costs and that they meet reimbursement requirements of bill. Estimates of direct agricultural benefits to be made after consultation with Secretary of Agriculture. Provisions with respect to San Juan-Chama and Navaho substantially same as in H. R. 3383.

H. R. 2836: Virtually identical with H. R. 270.

H. R. 3384: Same as H. R. 3383 for storage units. Virtually the same as H. R. 270 for participating projects named in that bill but with respect to the other participating projects not named therein requires submission of planning reports to States under Flood Control Act of 1944 and authorization by Congress.

Comment.—The administration bill submitted to the committee on April 1, 1954, provided that authority to construct the participating projects named in it should not become effective until the Secretary of the Interior had reexamined their economic justification (his appraisal of the direct agricultural benefits to be made in cooperation with the Secretary of Agriculture) and had certified to the Congress that their benefits exceeded their costs. We adhere to the principles of the bill and, as has been said before, to the list of projects named therein. As among the four bills now before the committee, we prefer the provisions of H. R. 270, H. R. 2836, and H. R. 3384 with respect to actions to be taken prior to construction of participating projects to those of H. R. 3383 on this point.

Repayment

H. R. 3383: Irrigation allocations to be returned to Treasury in equal annual installments over a period of not more than 50 years (exclusive of development period) from completion of each unit, participating project, or separable feature thereof. Municipal water allocation to be returned to Treasury with interest over a period of not more than 50 years from completion of each unit, participating project, or separable feature thereof. Commercial power allocation to be returned to Treasury with interest over expected economic life of unit, participating project, or separable feature or within 100 years, whichever is shorter.

H. R. 270: Irrigation, municipal water, and commercial power allocations—the latter 2 with interest—to be returned to the Treasury within not more than 50 years plus, in the case of irrigation, a development period.

H. R. 2836: Same as H. R. 270.

H. R. 3384: Same as H. R. 270.

Comment.—The provisions of H. R. 270, H. R. 2836, and H. R. 3384 are, in this respect, like those of the administration bill of April 1, 1954. We adhere to these provisions and recommend that they be substituted for those of H. R. 3383.

Operation of powerplants

H. R. 3383: After providing for operation of the powerplants covered by the bill in conjunction with other Federal power facilities, the bill provides that no exercise of that authority "shall affect or interfere with the operation of any provision of the Colorado River compact, the upper Colorado River Basin compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, or any contract lawfully entered into under said Acts without the consent of the other contracting parties."

H. R. 270: Same as H. R. 3383 but omits express reference to contracts.

H. R. 2836: Same as H. R. 270.

H. R. 3384: Same as H. R. 270.

Comment.—The language of H. R. 3383 with respect to contracts appears to be superfluous but is otherwise unobjectionable.

Appropriability of water used for power purposes

H. R. 3383: Provides that "neither the impounding nor the use of water for the generation of power and energy at the plants of the Colorado River storage project shall preclude or impair the appropriation for domestic or agricultural purposes, pursuant to applicable State law, of waters apportioned to the States of the upper Colorado River Basin."

H. R. 270: Omits the above.

H. R. 2836: Has provision similar to that of H. R. 270, but extends to all powerplants authorized by bill.

H. R. 3384: Same as H. R. 2836.

Comment.—The provisions of H. R. 3383 are in this respect identical with those of the administration bill and are recommended for inclusion in the legis-

lation. Unless a great deal of excess storage capacity beyond that provided by Glen Canyon and Echo Park is authorized and constructed, the waters impounded in these reservoirs will, within a comparatively few years, be devoted almost entirely to fulfilling the obligations of the upper division States with respect to deliveries at Lee Ferry for lower basin and Mexican Treaty purposes. The generation of power will be a byproduct of release for these purposes. Payout studies have been based upon the assumption that the upper basin depletion of the stream contemplated by this provision will occur in any event.

Soil survey and land classification exemption

H. R. 3383: Exemption applicable to four storage project units covered in bill.

H. R. 270: Exemption applicable to five storage project units covered in bill; not applicable to Curecanti.

H. R. 2836: Same as H. R. 270.

H. R. 3384: Exemption applicable to four storage project units covered in bill; not applicable to Curecanti, Juniper, and Navaho.

Comment.—It is believed that the exemption should be commensurate with whatever storage project units are ultimately covered by the bill.

Authorized appropriations

H. R. 3383: Limits authorized appropriations to $1,055 million.

H. R. 270: Omits limitation.

H. R. 2836: Omits limitation.

H. R. 3384: Omits limitation.

Comment.—The Department of the Interior would have no objection in this case to specifying the amount authorized to be appropriated. If such a limitation is spelled out in the bill, as it is in H. R. 3383, the text should make clear, as that of H. R. 3383 does not, that the sum specified is for construction costs only and is not inclusive of initial operation and maintenance costs.

Future planning

H. R. 3383: Section 12 of this bill provides that "in planning the additional development necessary to the full consumptive use in the upper basin of the waters of the Colorado River system allocated to the upper basin and in planning the use of and in using credits from net power revenues available for the purpose of assisting in the payout of costs of participating projects herein and hereafter authorized in the States of Colorado, New Mexico, Utah, and Wyoming, the Secretary shall have regard for the achievement within each of such States of the fullest practicable consumptive use of the waters of the upper Colorado River system consistent with the apportionment thereof among such States."

H. R. 270: Omits above.

H. R. 2836: Omits above.

H. R. 3384: Omits above.

Comment.—The Interior Department has no objection to the inclusion of the provision of H. R. 3383 quoted above. It would, in any event, seek to achieve the end specified. If this provision is included, however, it suggests that Arizona be added to the other States named in the bill since it is an upper basin State and is apportioned a small quantity of upper basin water by the upper Colorado River Basin compact.

Litigation and consultation

H. R. 3383: Provides that the Secretary of the Interior shall, in the storage and release of water from reservoirs under his jurisdiction anywhere in the Colorado River Basin, "comply with the applicable provisions of the Colorado River compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the treaty with the United Mexican States." Provides further that, in the event of his failure so to comply "any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce the provisions of this section" and gives the consent of the United States to its joinder as a party in any such suit.

H. R. 270: Directs compliance with the applicable provisions of the documents referred to above in the operation and maintenance of all Federal facilities in the Colorado River Basin under his jurisdiction. Provides further for consultation with an "integrating committee consisting of 1 representative from each of the Colorado River Basin States, 1 representative of the Colorado River Board of California, 1 representative of the Upper Colorado River Commission, and 1 representative of the United States section of the International Boundary Com-

mission, United States and Mexico" on the storage and release of waters from works under his jurisdiction.

H. R. 2836: Similar to H. R. 270.

H. R. 3384: Includes provisions similar both to those in H. R. 3383 and to those in H. R. 270.

Comment.—(*a*) Unless extraordinary circumstances so require, it would seem unwise to single out the Colorado River for special treatment with respect to litigation. Moreover, assuming that the Secretary will be directed (as all of the bills provide in various places) to comply with the Colorado River compact and related documents, there is no apparent reason for the waiver of the immunity of the United States from suit in the Supreme Court. There is ample in the other parts of the bills, we believe, on which to found an action against the Secretary alone in case he exceeds the authority given him under their terms. But if it is the desire of the committee to include such a provision as that contained in H. R. 3383 and H. R. 3384 on this subject and if it is restricted (as those bills now provide) to litigation with respect to the storage and release of water, we will not object. We suggest, however, that it be made clear that the waiver runs only in favor of a State adversely affected by the storage and release spoken of in order to forestall the provisions being looked upon as an open invitation to anyone to institute harassing, even though fruitless, litigation at any time it chooses to do so. We suggest also that the committee bear in mind that this provision, if enacted, will necessarily be read in conjunction with section 208 (c) of the Justice Department Appropriation Act, 1953 (66 Stat. 549, 560, 43 U. S. C., sec. 666) and that it is unlikely, therefore, that it will be usable except in quite extraordinary circumstances.

(*b*) We would have no objection, if the committee wishes to include such in the bill that it reports out, to a provision for an "integrating committee" along the lines of that set out in H. R. 270 and H. R. 3384. Its creation would not be in derogation of the ultimate responsibility of the Secretary of the Interior in the management of the works covered by it, but it could assist him in securing the advice of representatives of the States concerned and would furnish them with a forum in which to discuss and, it is to be hoped, iron out certain, and perhaps many, of their problems. The creation of such a committee might well assist its members in taking an overall view of the Colorado River and in treating its problems as of basinwide importance. It would also be a useful supplement to, and would perhaps supplant, the advisory provisions of section 16 of the Boulder Canyon Project Act. One of the objects of these provisions was to further "any comprehensive plan formulated hereafter for the control, improvement, and utilization of the resources of the Colorado River system" and to assure treatment of the works authorized by that Act "as a unit in such control, improvement, and utilization * * *." We have no suggestions to make on the composition of the "integrating" committee.

Quality of water studies

H. R. 3383: Direct the Secretary "to institute studies and to make a report to the Congress and to the States of the Colorado River Basin of the effect upon the quality of water of the Colorado River, of all transmountain diversion, of water of the Colorado River system and of all other storage and reclamation projects in the Colorado River Basin."

H. R. 270: Omits the above.

H. R. 2836: Omits the above.

H. R. 3384: Omits the above.

Comment.—No objection if the committee sees fit to include a provision along the lines of that included in H. R. 3383.

Denver diversions

H. R. 3383: Omits.

H. R. 270: Authorizes conveyance to the city of Denver of such lands and water rights used or acquired by the United States solely for the generation of power as may be required by Denver in connection with the development and use of its Blue River project, payment for the value of the rights acquired to be made by Denver to the United States.

H. R. 2836: Same as H. R. 270.

H. R. 3384: Omits.

Comment.—The terms of the provision in H. R. 270 are such as not to require objection from this Department. It should be understood, however, that maintenance of the integrity of the Colorado-Big Thompson project, including fulfill-

ment of its obligations to western slope water users in Colorado under Senate Document No. 80, 75th Congress, whatever those obligations may be, will be ultimately involved in the administration of this provision and that, for this reason, among others, no commitment can be made at this time concerning the exercise of the authority which its enactment would confer upon this Department.

Mr. ASPINALL. At this time, the Chair calls to the witness stand a former member of this commitee, Hon. Fred G. Aandahl, Assistant Secretary of the Interior, who will make a statement for the administration. Mr. Aandahl, we are glad to have you before the committee.

STATEMENT OF FRED G. AANDAHL, ASSISTANT SECRETARY OF THE INTERIOR

Mr. AANDAHL. Mr. Chairman, we appreciate the privilege of appearing before your committee.

I have a very brief statement I would like to read, indicating the support of the executive branch of the Government for the legislation that is now before the committee.

On January 18, 1954, representatives from the Department of the Interior were before a previous session of this committee to explain in detail the Department's recommendations concerning the proposal and the legislation for the Colorado River storage project and participating projects. Our purpose here today is to reiterate those recommendations which remain essentially unchanged.

I will not attempt to restate our recommendations and will leave the details to those who will follow me. However, I wish to bring to your attention some recent items which I believe are important in your consideration of the legislative bills before you.

The proposed development of the upper Colorado River Basin received the personal attention of President Eisenhower during his visit last fall in the West. The need for and the great benefits to be derived from this development so impressed the President that he included in his address to the Congress on the state of the Union the following:

> * * * the Federal Government must shoulder its * * * partnership obligation by undertaking projects of such complexity and size that their success requires Federal development. In keeping with this principle, I again urge the Congress to approve the development of the upper Colorado River Basin to conserve and assure better use of precious water essential to the future of the West.

Likewise in his budget message the President said:

> I also recommend enactment of legislation authorizing the Bureau of Reclamation to undertake construction of two comprehensive river-basin improvements which are beyond the capacity of local initiative, public or private, but which are needed for irrigation, power, flood control, and municipal and industrial water supply. These are the upper Colorado River Basin development in the States of Colorado, Utah, Wyoming, Arizona, and New Mexico, and the Fryingpan-Arkansas development in Colorado. The Colorado River development will enable the upper basin States to conserve floodwaters and to assure the availability of water and power necessary for the economic growth of the region. * * * Sale of power generated at these developments will repay the power investment within 50 years and will make a contribution toward repayment of other investments.

The Administration proposes to initiate construction of the Colorado River storage project during the next fiscal year if it is author-

ized and the budget includes an item for funds to be requested for this purpose.

Although feasibility reports are now available for the Gooseberry, San Juan-Chama, Navaho, Fruitgrowers Dam extension and Savery-Pot Hook participating projects, the Department must withhold its recommendations concerning these proposals until the reports have been reviewed by the affected States, interested Federal agencies, and the Bureau of the Budget. We will, however, be pleased to furnish the factual data this committee desires in its consideration of all projects in the bills before you.

With respect to the recommended Glen Canyon unit of the storage project, the Department proposes to provide the structures necessary for adequate protection of the Rainbow Natural Bridge from damage or destruction. Joint studies are being undertaken by the Bureau of Reclamation and the National Park Service to determine the most effective means of accomplishing the desired protection. Section 7 of each of the bills before you would authorize the Department to construct these facilities at the Glen Canyon Reservoir and also facilities at the sites of other storage units and participating projects for recreational uses and fish and wildlife propagation.

Commissioner of Reclamation W. A. Dexheimer and Commissioner of Indian Affairs Glenn L. Emmons are here to make a general statement and introduce the representatives from the field who will present the detailed testimony of the Department. Our legislative counsel Elmer Bennett is also here to present the Department's position with regard to certain sections of the Colorado River compact pertinent to the Department's recommendations on the Colorado River storage project and participating projects.

Mr. ASPINALL. Thank you, Mr. Secretary. Does that complete your statement?

Mr. AANDAHL. That completes the statement.

Mr. ASPINALL. Before questioning the Secretary, I would like to call attention to the fact that we have with the committee this morning Congressman Rogers of Colorado, Congressman Dixon of Utah, and Congressman Thomson of Wyoming.

We are glad to have you present with the committee and shall be pleased to have you join in the deliberations of the committee.

At this time, the Chair recognizes the gentleman from California, Mr. Engle.

Mr. ENGLE. No questions.

Mr. ASPINALL. The gentleman from Nebraska, Dr. Miller.

Dr. MILLER. No questions.

Mr. ASPINALL. The gentleman from New York, Mr. O'Brien.

Mr. O'BRIEN. No questions.

Mr. ASPINALL. The gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Secretary, the last sentence of your first paragraph of your statement, as follows:

> Our purpose here today is to reiterate those recommendations which remain essentially unchanged.

Will you tell the members of this committee what changes have been made by your Department in the recommendations submitted to the last Congress?

Mr. AANDAHL. I believe I would like the Commissioner of Reclamation or the regional director from the area to give the details of those changes.

Mr. ASPINALL. Will my colleague withhold his question until they get to the stand?

Mr. SAYLOR. Yes. I will then ask the Secretary whether or not you subscribe to the testimony given by Ralph Tudor when he appeared before this committee on Monday, January 18, 1954?

Mr. AANDAHL. I would like to have the provision of this statement on which I am to comment identified.

Mr. SAYLOR. I will call particularly your attention to the fact that Mr. Tudor stated that for the functioning of the upper Colorado River storage project and participating projects that was then presented to our committee, after studying all of the alternate sites and proposals, that the reason the Department had recommended the invasion of a national monument by the construction of Echo Park Dam and Split Mountain Dam is that the evaporation losses at Echo Park Dam site would be sufficiently less to take care of a city the size of Denver.

Mr. AANDAHL. It is my understanding that those evaporation figures have been subject to several revisions. I am not certain what the final figure is representing the difference in evaporation.

However, I do want to make this statement: The comparative figures that were used were comparisons to a higher elevation for the Glen Canyon storage project, and the Bureau of Reclamation and the Department of the Interior have always thought of the Glen Canyon project being one that would be constructed to the maximum elevation that would lend itself to advisable construction, that is, from the standpoint of the foundation conditions and also from the standpoint of the protection of the Rainbow Natural Bridge, and that with that reservoir constructed to the maximum elevation for the maximum storage, that the Echo Park Reservoir was also needed, and even though the evaporation figure is somewhat smaller than was originally claimed for it, it was only a secondary factor in justifying the Echo Park Reservoir.

Mr. SAYLOR. Mr. Secretary, Mr. Tudor stated that his analogy for the necessity for Echo Park Reservoir in this project was like taking the pistons out of an engine, and that without Echo Park Dam and Reservoir, the entire project was infeasible.

Now am I to gather from your statement that the Bureau has changed its position and that now Glen Canyon is to be the engine and the pistons and that one of the auxiliary features of the project will be Echo Park Dam?

Mr. AANDAHL. My testimony did not point in that direction. My testimony indicated that it has always been the purpose of the Bureau of Reclamation and the Department of the Interior to build the Glen Canyon Dam to the maximum elevation, and that when that has been done that Echo Park is still needed as an additional storage facility and for benefits that will come to the upper reaches of the river from that reservoir.

My only purpose in calling attention to the fact that the plan has always been to construct Glen Canyon to the maximum is that while an evaporation difference was used to indicate a relationship betwen replacing additional storage at Glen Canyon for the Echo Park, that

that was only of secondary importance, because we were already planning to build the Glen Canyon project to the maximum elevation. But both projects are essential to the full development.

Mr. SAYLOR. Mr. Secretary, you will recall in our hearings last year the Bureau submitted figures which indicated that from the time Mr. Tudor testified in January until the last day of our hearings, there was an error of 600 percent in evaporation losses at Echo Park Dam site. Now, in view of the fact that Mr. Tudor stated that evaporation losses were the primary reason as to why the Bureau elected and insisted that Echo Park Dam site be built, I am wondering whether or not you consider that to be an essential change or whether that, following the statement in your sentence, is "that the recommendation remains essentially unchanged."

Mr. AANDAHL. With respect to the need for the Echo Park Reservoir, our recommendations remain unchanged. We still recommend the construction of the Echo Park Dam and Reservoir.

Mr. SAYLOR. Now, I think that there have been alternate dam sites recommended. As I understand, the evaporation losses are now not what Mr. Tudor originally told us, what would the reason be for the Department's insisting that Echo Park Dam now be built?

Mr. AANDAHL. In specific answer to your question, the regional director has five answers tabulated. Perhaps it would be well to have them when he testifies, or if you wish, they can be presented at this time.

Mr. SAYLOR. No; that is perfectly all right with me if you desire to have the regional director, Mr. Lawson, testify on that point.

Mr. Secretary, the great State of Colorado employed one of the outstanding water engineers of this country, Mr. Raymond Hill, to make a survey for that State, and to determine the amount of water that was in the river. Mr. Hill, in his report to the State of Colorado indicated that there is not 7½ million acre-feet of water that can be put to beneficial use in the upper Colorado, for the simple reason that 7½ million acre-feet of water, according to Mr. Hill, does not exist in the river, and that his figures indicate that there is only 6 million acre-feet of water that can be put to beneficial consumptive use in the upper basin.

Now, assuming that Mr. Hill's figures are correct, what would be the Bureau's position and the Department's position with regard to the upper Colorado River storage project and participating projects, since all of the testimony at prior hearings has indicated that they have based their assumption upon the fact that there is 7½ million acre-feet of water that can be put to use in the upper basin?

Mr. AANDAHL. I would first make the statement that the upper Colorado River storage project and the participating projects that are proposed in this legislation will have a consumptive use of less water than the amount that you quote Mr. Hill as stating as available. And therefore, the project as being recommended can be justified.

Mr. SAYLOR. Now by that, Mr. Secretary, do you mean just the storage project and participating projects that are mentioned in this bill, or by your statement do you mean to include the further expansion and plans which each and every one of the bills call for in section 2?

Mr. AANDAHL. My statement could include all of the projects to which you are now making reference.

Mr. SAYLOR. In other words, all of the projects which are named in these various bills which are before the committee, together with the new and participating projects which the Bureau contemplates in the upper Colorado.

Mr. AANDAHL. That is correct, that are mentioned in these bills and that we are asking for authorization for.

Mr. SAYLOR. Now, Mr. Secretary, that is the reason I asked my question, because this bill asks for specific authorization for certain storage projects and they vary with regard to the participating projects, but all of them ask that when Congress approves this bill, they not only approve those units which are specifically named in the bills, but they also ask that Congress authorize the further study and complete development of the upper Colorado.

Mr. AANDAHL. My statement refers to all projects and participating projects that are named and identified in the bill.

Mr. SAYLOR. And it does not include the project which would be authorized in section 2 of the bills which are above and beyond those specifically mentioned.

Mr. AANDAHL. What is the authorization, as you are referring to it there, please?

Mr. SAYLOR. Section 2 of the bill states as follows:

In order to achieve——

Mr. ASPINALL. For the benefit of the record, give the number of the bill to which you refer.

Mr. SAYLOR. This is bill No. 270.

Mr. ASPINALL. Mr. Dawson's bill.

Mr. SAYLOR. Yes. I think I am correct in my statement that the part which I am about to read is identical in every bill. There are some additions beyond this in some of the other bills, but this part is identical in each of the bills:

In order to achieve such comprehensive development——

Mr. AANDAHL. What section is that, please?

Mr. SAYLOR. Section 2, page 5, beginning with line 3:

SEC. 2. In order to achieve such comprehensive development as will assure the consumptive use in the States of the Upper Colorado River Basin of waters of the Colorado River system the use of which is apportioned to the Upper Colorado River Basin by the Colorado River Compact and to each State thereof by the Upper Colorado River Basin Compact, it is the intent of the Congress in the future to authorize the construction, operation, and maintenance of further units of the Colorado River storage project, of additional phases of participating projects authorized in this Act, and of new participating projects as additional information becomes available and additional needs are indicated. It is hereby declared to be the purpose of the Congress to authorize as participating projects only projects (including units or phases thereof)—

(1) for the use, in one or more of the States designated in article III of the Upper Colorado River Basin Compact, of waters of the Upper Colorado River system the consumptive use of which is apportioned to those States by that article; and

(2) for which pertinent data sufficient to determine their probable engineering and economic justification and feasibility shall be available. It is likewise declared to be the policy of the Congress that the costs of any participating project authorized in the future shall be amortized from its own revenues to the fullest extent consistent with the provisions of this Act and Federal reclamation law.

Now the bill which Mr. Rogers of Colorado introduced includes, in addition to that, the following:

Furthermore, participating projects—

that is on page 6 of Mr. Rogers' bill, 4488; that bill includes in addition to what I have just read, the following:

Furthermore, participating projects authorized in the future shall be on a full equality with participating projects authorized herein with respect to all considerations including economic justification, appraisal of agricultural and other benefits, irrigation repayment contracts and obligations, interest charges, financial reimbursability requirements and payment, allocation of costs of construction to power, irrigation, municipal water supply, flood control and any other purpose or benefit authorized under reclamation law.

Mr. AANDAHL. My comment would be that these additional projects that are referred to as a group and that are not specifically identified would be subject to future study by the Bureau of Reclamation and to future consideration by Congress, and, of course, it would be very difficult to make a blanket statement now that might embrace all of the circumstances that might be associated with those projects. I think that we just very frankly recognize that additional projects of that nature will have the analysis and the consideration of the Department and the Congress before they are specifically authorized for construction. If they do not meet the requirement, they would not be authorized at that time. If they do fit within the amount of water that is available for their use, they might be authorized if they seem feasible at the time.

Mr. SAYLOR. Mr. Secretary, is there anything which is authorized in section 2 of the bills which I have read to you which the Department does not now have authority to do? In other words, these sections, as I read them, call for a study and submission to Congress of plans for other participating projects and storage projects in the upper Colorado River Basin.

Mr. AANDAHL. And what was your question with respect to it?

Mr. SAYLOR. My question is, Is there anything in that bill or that section of the bill which the Bureau does not now have the authority to do?

Mr. AANDAHL. It is my understanding that this section is a declaration of intent on the part of Congress. The Bureau of Reclamation does have the authority without any further declaration to make those investigations.

Mr. SAYLOR. So that if this entire section were deleted from the bill, the Bureau of Reclamation would have the authority, as it now does by law, to make any studies for any further project, be they storage projects or participating projects in the upper basin, and recommend them to Congress.

Mr. AANDAHL. I think that an expression of the intent of Congress would be helpful and is desirable. I would like to see the provision remain in the bill.

Mr. SAYLOR. Mr. Secretary, can you tell the members of this committee approximately how long the Bureau of Reclamation intends to take, if this bill should pass, to complete the units which have been set forth in the bill as storage projects and participating projects?

Mr. AANDAHL. I believe I would like the Commissioner of Reclamation or the regional director to answer that question.

Mr. ASPINALL. Will the gentleman yield for a question?

Mr. SAYLOR. Yes.

Mr. ASPINALL. That depends, of course, upon congressional appropriations as much as anything else. The gentleman knows that.

Mr. SAYLOR. Yes. I am only asking what the plans are at the present time the Bureau has for the development of this project.

Mr. Secretary, can you tell the members of this committee how much of the 7½ million acre-feet which have been allotted annually to the upper Colorado River Basin has been put to beneficial consumptive use by the States of the upper basin?

Mr. AANDAHL. That is up to the present time?

Mr. SAYLOR. Up until the present time.

Mr. AANDAHL. It is a little over 2 million acre-feet at the present time. It will be about 2½ million acre-feet when projects under construction now are completed.

Mr. SAYLOR. Mr. Secretary, can you tell us how much more can be put to beneficial consumptive use with no storage project whatsoever built upon the river?

Mr. AANDAHL. I believe we are getting into questions now that I would like to have the answers come from the regional director, who is more familiar with those details than I am.

Mr. SAYLOR. And any questions with regard to the storage projects, whether it be a high Glen Canyon or a low Glen Canyon, Echo Park, Split Mountain, or the other storage projects, you would like to have those questions also referred to the Commissioner and to the regional director?

Mr. AANDAHL. Yes. I think you would get much better answers that way because they are engineers and they are better qualified to answer such questions.

Mr. SAYLOR. Thank you, Mr. Secretary.

Mr. ASPINALL. The Chair recognizes the gentleman from Texas, Mr. Rogers.

Mr. ROGERS of Texas. Mr. Secretary, I just have one question. Could you explain to me briefly why the Department and the administration take one position concerning the upper Colorado and Fryingpan projects, yet take an entirely different position concerning the Hell's Canyon project?

Mr. AANDAHL. Yes. I think there are several reasons.

In the area of the Hells Canyon project the Bureau of Reclamation has sizable storage facilities from which water can be made available and is being made available for reclamation purposes. The Hells Canyon project itself is predominantly a power project, a commercial power project, and there are local interests that are anxious and willing to step in and make very similar developments for the commercial power purposes. There is a sizable difference between those circumstances in the case of Hells Canyon and in the case of the upper Colorado River storage project.

Mr. ROGERS of Texas. Now, Mr. Secretary, you say very similar development. You mean that the development anticipated originally by the Government in the Hells Canyon project is about the same insofar as expenditures are concerned and what it will produce as an end result as that which is proposed to be done by private interests?

Mr. AANDAHL. Yes, sir. There is a very close similarity there. The Hells Canyon Dam that was proposed by the Bureau of Reclamation is a somewhat larger dam, involves somewhat greater storage capacity, but the three dams that are being proposed by the Idaho Power Co. come up reasonably close, and when balanced in their effective

use over a series of years, probably the total output of power would not be very much different in the proposal of the Idaho Power Co. and the proposal of the Bureau of Reclamation.

Mr. ROGERS of Texas. Now, if any of these projects contained in this upper Colorado overall project should be separated, are any of those economically feasible from a private financing standpoint?

Mr. AANDAHL. I have not checked closely enough to be able to answer that question specifically.

Mr. ROGERS of Texas. Just from your general understanding of it, though, Mr. Secretary. Have you not made some investigation as to the cost of each one of these different integral parts of this project and whether or not it will, standing by itself, pay out?

Mr. AANDAHL. That information is available. The Commissioner and the Regional Director, again, I think, can give you specific information. I do not have the exact figures in mind.

Dr. MILLER. Will the gentleman yield there?

Mr. ROGERS of Texas. Yes.

Dr. MILLER. It is my understanding also that the lands to be irrigated under Hells Canyon are upstream from the dam, which is different from the lands here being downstream. I am not too sure how they would get the water up there, but I believe that is correct.

Mr. ROGERS of Texas. That was my next question. I do not know whether the Secretary is in position to answer it or not. What is the difference between the investment that can be charged to each acre irrigated under the Hells Canyon proposal and under this proposal?

Mr. AANDAHL. I do not have the exact figures with respect to the Hells Canyon project, but it is my understanding that there is very little, if any, conservation storage in the Hells Canyon reservoir. The Hells Canyon reservoir is a power reservoir with some flood control capacity in it, and any benefits that the Hells Canyon project might have to irrigation would be a monetary benefit, that is, power revenues from a Hells Canyon or any other power project under reclamation practices can be used as an aid to irrigation. But for the storage of water for reclamation purposes, you find very little, if any, of conservation storage in the Hells Canyon project.

Mr. ROGERS of Texas. Then that would indicate that your investment on a per acre basis insofar as irrigation is concerned would be tremendously high in Hells Canyon and probably low or average under this project, would it not, Mr. Secretary?

Mr. AANDAHL. Yes. I do not think that you relate the cost of the Hells Canyon project to a per acre valuation for irrigation. It just does not fit into the analysis in that way.

Mr. ROGERS of Texas. But this project does?

Mr. AANDAHL. Yes.

Mr. ROGERS of Texas. I mean it is evaluated that way?

Mr. AANDAHL. Yes.

Mr. ROGERS of Texas. What is the investment per acre insofar as irigation is concerned on this project?

Mr. ASPINALL. Will the gentleman from Texas hold that for the regional director? He has those figures.

Mr. ROGERS of Texas. Yes.

Mr. SAYLOR. Will the gentleman yield to me?

Mr. ROGERS of Texas. Yes.

Mr. SAYLOR. I feel that the gentleman from Texas has touched upon a very vital subject, because it is my understanding—and, Mr. Secretary, I would like you to correct me if I am wrong—that Glen Canyon Reservoir site and Echo Park Reservoir site will not place one drop of water on one acre of land, and that all they will do will be to create, as was referred to by your predecessor, Mr. Tudor, a bank account that can be drawn upon to help pay for the participating projects upstream.

Mr. DAWSON. Now, Mr. Chairman——

Mr. ASPINALL. Just a minute. The Congressman from Texas has the time.

Mr. DAWSON. Will the gentleman yield to me?

Mr. ROGERS of Texas. Yes.

Mr. SAYLOR. I have a question pending.

Mr. ASPINALL. The gentleman from Pennsylvania has the floor. The gentleman from Texas yielded to him, and the question has not been answered.

Mr. AANDAHL. As I understand your question, the answer is this: The Glen Canyon and the Echo Park Storage projects in their relationship to irrigation will hold a supply of water than can be released to meet downstream requirements and downstream deliveries required under the Colorado River compact at a time when it will be necessary to use tributary water for irrigation in the participating projects. So these storage projects are of direct value to the upper region irrigation by way of supplying the replacement water that is needed for downstream commitments.

Mr. SAYLOR. Mr. Secretary, they in and of themselves will not place 1 drop of water on 1 acre of land in the upper basin. Is that correct? That is Glen Canyon and Echo Park.

Mr. AANDAHL. There may be some possible future diversion from them, but that is not set up as a specific plan at the present time. Their value to irrigation is one of replacing downstream requirements that are currently met by the flow from the tributary streams that will be used for irrigation purposes when the participating projects are developed.

Mr. SAYLOR. Now the storage projects call for storage of, I believe, 43 million acre-feet; is that correct?

Mr. AANDAHL. Yes.

Mr. SAYLOR. That is about 5 years' flow of the river; is that correct?

Mr. AANDAHL. Now you are getting into the details of an engineering question, and again I would like either the Commisioner or the regional director to respond to those.

Mr. SAYLOR. I yield back to the gentleman from Texas.

Mr. ROGERS of Texas. I yield the floor. Mr. Dawson wanted me to yield to him first.

Mr. DAWSON. Mr. Chairman, I simply wanted to correct the record as far as the statement of Secretary Tudor was concerned. I think that the Secretary, if I remember his testimony, made it amply plain that these main-stem reservoirs were for the purpose of holding water which was to be delivered to the lower basin States to keep our commitments and to replace exchange water which was taken from up above in the higher reaches of these mountains. Of course, they have a direct relation to irrigation, and they are simply compensatory reservoirs. Both of them. I think the implication left by the gentleman

from Pennsylvania was entirely misleading, and I ask the committee members to read Secretary Tudor's statement to get the correct interpretation of what he did say.

Mr. ROGERS of Texas. I yield the floor.

Mr. ASPINALL. I will recognize the gentleman from South Dakota, Mr. Berry.

Mr. BERRY. No questions.

Mr. ASPINALL. The gentlewoman from Idaho, Mrs. Pfost.

Mrs. PFOST. Mr. Chairman, I would like to ask the Secretary if it is his opinion that it is necessary to include Echo Park in order for the upper Colorado to be economically feasible.

Mr. AANDAHL. I think that an answer to your question would have to be that other units are economically feasible without Echo Park, but that Echo Park is an essential and an important unit of the overall development.

Mrs. PFOST. In your opinion, are there other sites that would be as beneficial to the project as Echo Park?

Mr. AANDAHL. No; I think Echo Park is way out ahead——

Mrs. PFOST. There is no other substitute?

Mr. AANDAHL. It is way out ahead of alternates that might be proposed.

Mrs. PFOST. That is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Utah.

Mr. DAWSON. Just one further question, Mr. Secretary. The question was presented by the gentleman from Pennsylvania in regard to the Hill report in Colorado. I think that investigation, according to his statement, disclosed there was only approximately 6 million acre-feet for the use of the upper basin States. It was my understanding that this project calls for something in the neighborhood of 4 million acre-feet, that is, the projects that are included in these bills that you referred to; is that correct?

Mr. AANDAHL. That figure is substantially correct if you include not only what is in these bills but the developments that are already existing in the upper basin, so that the total use of water, taking those projects that are now authorized and under construction and those which are asked for in this bill, would still only total approximately 4 million acre-feet—just a little bit better than 4 million acre-feet and materially below the 6 million that was indicated as available.

Mr. DAWSON. And substantially under the 7½ million acre-feet which was awarded to us under the upper Colorado River compact?

Mr. AANDAHL. That is correct.

Mr. DAWSON. That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from Florida, Mr. Haley.

Mr. HALEY. The gentleman from Florida has no questions.

Mr. ASPINALL. The gentleman from Washington.

Mr. WESTLAND. I have no questions.

Mr. ASPINALL. The gentleman from California, Mr. Sisk.

Mr. SISK. No questions, Mr. Chairman.

Mr. ASPINALL. The gentleman from New York, Mr. Pillion.

Mr. PILLION. Mr. Secretary, if the storage projects do not directly supply water to the irrigation projects, then why should the people who consume the electricity and the taxpayers of the Nation as a whole

subsidize the participating projects if there is no direct relationship between the storage projects and the irrigation projects?

Mr. DAWSON. Before you answer that, would the gentleman——

Mr. ASPINALL. Just a moment. The Congressman from New York has the time. Do you yield to the gentleman from Utah?

Mr. PILLION. I would prefer to have the Secretary answer it.

Mr. ASPINALL. The gentleman refuses to yield.

Mr. AANDAHL. The Federal assistance to irrigation that you refer to is not tied into the investment in the two large storage projects; it is tied into the investment that is made in the participating projects, and these storage projects will be an aid in retiring that investment that is made for irrigation purposes. But the investment that the Federal Government makes in the storage projects themselves, aside from what direct benefit they have to irrigation, is to be fully repaid with interest and involves no subsidy.

Mr. PILLION. But the amount of money that is gained out of the hydroelectric projects will eventually be used to pay off the irrigation projects in some manner or another; will it not?

Mr. AANDAHL. Revenues in excess of what is needed to pay for the power investment in the projects will be used as an aid to irrigation. But when the revenue is in excess of what is needed to retire the Federal investment, it does not constitute a Federal aid to irrigation. That is an aid that comes from the price that the people of the whole area pay for the power that they purchase from these projects.

Mr. PILLION. Thank you.

Mr. ASPINALL. The Chair recognizes the gentleman from Oklahoma, Mr. Edmondson.

Mr. EDMONDSON. No questions.

Mr. ASPINALL. The gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Secretary, I fail to understand the previous question, and I would like to ask it again. Is it your position that these storage projects downstream will not be needed in order to permit the presently recommended irrigation projects to make beneficial use of water and still meet the requirements of 3 (d) of the Colorado compact?

Mr. AANDAHL. You mean the Glen Canyon project and Echo Park storage project?

Mr. HOSMER. The ones that you are recommending today?

Mr. AANDAHL. Yes. Those projects are needed to supply replacement water if the participating projects which are direct irrigation developments are to be constructed.

Mr. HOSMER. I mean, in relation now to—is it 11 participating projects that you recommend?

Mr. AANDAHL. That is correct.

Mr. HOSMER. Are they needed in connection with those, or are they needed in connection with some future participating projects?

Mr. AANDAHL. They are needed to some degree in connection with the 11 that are being recommended.

Mr. HOSMER. Do you know what degree?

Mr. AANDAHL. I think again you better have the regional director or the Commissioner bring out the engineering information with respect to that question.

Mr. HOSMER. I would just like to comment that these 11 participating projects that you have will permit the beneficial consumptive use

of some 401,000 acre-feet of water. The storage projects that you are building to permit that use will evaporate annually 613,000 acre-feet.

Now in reiterating these recommendations which are essentially unchanged from the ones that you made last year, and in your deliberations as to your action today, did you take into consideration the intervention into the suit by Arizona against California of the Attorney General of the United States on behalf of the Indians, claiming 1,847,250 acre-feet annually of water in the lower basin and about a million acre-feet of water in the upper basin, totaling 2,747,250 acre-feet a year and what that might do if those Indian claims are established?

Mr. AANDAHL. That question has been analyzed in the Department, and the witnesses to follow me from Reclamation and the Department are prepared to answer that question.

Mr. HOSMER. In other words, that has been considered in making your recommendation?

Mr. AANDAHL. That is correct.

Mr. HOSMER. I will ask, Mr. Secretary, if another matter has been considered in making your recommendation, namely, the testimony on the bill of last year by witnesses from California to the effect that the building of these projects would violate the terms of the Colorado River compact and also involve interpretations of that compact that are now before the Supreme Court in the *Arizona v. California* suit.

Mr. AANDAHL. That matter has been considered, and the same witnesses that I referred to are prepared to comment on it.

Mr. HOSMER. Then the same interpretations are being held to by the Bueau this year as they were last year as respects to the compact?

Mr. AANDAHL. That is substantially correct.

Mr. HOSMER. Mr. Secretary, as I understand the testimony that was given last year, the financial feasibility of this project is based on selling your power that is produced for about 6 mills per kilowatt-hour. Is that correct?

Mr. AANDAHL. That is correct.

Mr. HOSMER. Now, as I understand it further, this will involve a period of pay-out up to 100 years.

Mr. AANDAHL. I think that the investment in each of the projects will be repaid within 50 years after the completion of the construction of the project.

Mr. HOSMER. Which investment are you talking about—the power or the irrigation investment?

Mr. AANDAHL. The total investment in the projects in the bills before the committee.

Mr. HOSMER. That is a material departure from the financing scheme that was proposed last year.

Mr. AANDAHL. No, I think not. As I recall, our Department spent a great deal of time in working out the legislation and working it over with the Bureau of the Budget to set it up in such a way that total repayment would be made in the 50-year period.

Mr. HOSMER. Of all reimbursable costs, of the power investment, of the irrigation investment, and interest on the power investment; is that right?

Mr. AANDAHL. After the construction of each project. It is recognized that many of these participating projects will not be built

for quite a number of years, and the repayment of those participating projects that are built at a later date will occur in the 50 years following their construction.

Mr. HOSMER. I understand, then. But howsoever the construction is accomplished, the financing is still based on 6-mill power, whether it be 50 years from now or 50 years from some future time when construction is started.

Mr. AANDAHL. That is correct.

Mr. HOSMER. In other words, that power rate will have to be competitive with any other source of power over some period—we do not know what—in excess of 50 years?

Mr. AANDAHL. That is correct.

Mr. HOSMER. In reiterating your recommendations from last year, have you taken into consideration, as the evidence indicated you did not last year, the swift development of nuclear electric power production in this country and elsewhere?

Mr. AANDAHL. We have tried to check that just as closely as we can, and we have some information on it.

Mr. HOSMER. Will that be covered by later witnesses?

Mr. AANDAHL. The Commissioner of Reclamation will give you a statement on that.

Mr. HOSMER. Mr. Secretary, last year it was indicated that geological studies had not been completed with respect to all of the sites on which the recommended power and irrigation projects were to be placed.

Mr. AANDAHL. Yes.

Mr. HOSMER. Have those studies yet been completed?

Mr. AANDAHL. I believe I would like to have you direct that question to the Regional Director or the Commissioner, who have the detailed information.

Mr. HOSMER. You were responsible for the ultimate decision in making this recommendation that you have made this morning, are you not?

Mr. AANDAHL. That is correct.

Mr. HOSMER. And I did not ask for the details of it, but I asked you if you were aware when you made this decision to testify today whether or not studies had or had not been been completed from a geological standpoint.

Mr. ASPINALL. Will my colleague from California yield?

Mr. HOSMER. Yes.

Mr. ASPINALL. I think my colleague is conversant with the procedure, that the final surveys, the final studies, are not made until after authorization, as a rule, of all of these projects. I do not know how far my colleague wishes to go.

Mr. HOSMER. In answer to the distinguished chairman, I will say this: It was indicated at the beginning of the hearing today there would be some effort to place a time limitation on the amount of hearings that will be held, and I am trying to find out what we are going to get so that my course of action can be determined in relation to this limitation of time apparently in the back of the chairman's mind.

Mr. ASPINALL. The chairman is not suggesting that the gentleman stop his questioning. He is just suggesting that is the procedure that

the Bureau has followed throughout the years as far as final determination and engineering on building sites.

Mr. HOSMER. I understand that, but I still would like the Secretary to respond to my previous question.

Mr. AANDAHL. The reason I hesitated was because there is some uncertainty in my mind as to just what you are driving at, that is, exactly what you meant by your question. The studies that have been made with respect to the participating projects are studies that have gone as far into detail as we go until the projects are authorized, and those studies we have at the present time indicate the engineering feasibility of these projects to which you are referring.

Mr. HOSMER. Will you then present or your later witnesses present some of the studies to the committee for its evaluation?

Mr. AANDAHL. Yes, they will present the information.

Mr. HOSMER. Thank you, Mr. Secretary.

Now another question with respect to salinity studies. We had testimony last year that the studies up to that time had been somewhat meager and the intention was expressed by the Department to accelerate its salinity studies with particular reference to the possible effect of these upper basin developments on the quality of the lower basin water. Have those studies been made and accelerated? Are there factual data at the present time sufficient to base real opinions on?

Mr. AANDAHL. Yes, those studies have been continued, and the later witnesses will give you the more detailed information. I make the general statement that to the best of my understanding of the information that we have, salinity is not a difficult problem.

Mr. HOSMER. Now in relation to the decision you made to reiterate your recommendation in substantial detail, I believe it was on December 20 last that the governor of one of the upper basin States in a detailed statement indicated that it was not within the provisions of the Colorado compact for the upper basin to make storage of water for any purpose other than its immediate beneficial consumptive use for irrigation and domestic purposes. Has Governor Johnson of Colorado's statement in that regard been considered by you in reiterating this recommendation?

Mr. AANDAHL. It has been considered by the Department, and one of the later witnesses will be able to give you the understanding that we have of that particular question.

Mr. HOSMER. Mr. Secretary, it was pointed out that this proposed construction would involve some future benefits to the lower basin with respect to holding back silt and things like that. It was alleged by one of the witnesses in behalf of the Department last year that it was a substantial benefit. I believe on questioning he eventually admitted that it was a nominal benefit.

Now there are immediate detriments to the lower basin from this construction, and I cite as one only a loss to the Government of at least $187 million in power revenues from Hoover Dam and to the power consumers in the lower basin an added cost of approximately $2 million a year for their power. Have these detriments to the lower basin been considered in coming to a judgment as to the economic feasibility of this project?

Mr. ASPINALL. Mr. Secretary, before you make your answer, please face the Chair and speak so that all members of the committee can hear you.

Mr. AANDAHL. Yes.

I do not have the specific answer to the question that was asked. The Commissioner of Reclamation says that he does have the answer to it.

Mr. HOSMER. Then you do not know whether or not it was considered when you made up your mind to come up here today?

Mr. AANDAHL. If there is an answer to it, it was considered.

Mr. HOSMER. Now, Mr. Secretary, in making these considerations and decision, I think it has been stated today that there are some 44 million acre-feet of water to be stored in these power projects, and the estimates go as high as 48 million acre-feet. Can you tell me what category that water is viewed as being in relation to the Colorado River compact, that is, 3 (a) water, 3 (b) water, 3 (c) water, or 3 (d) water.

Mr. AANDAHL. I would prefer to have the witness from the Solicitor's Office answer that question.

Mr. HOSMER. Now, Mr. Secretary, you state in your testimony that—

> an amount has been set aside in next year's fiscal budget to commence construction if this bill is authorized.

Can you tell us what amount that is and for what purposes it is intended to be used?

Mr. AANDAHL. The specific amount that is in the President's budget is an item that is subject to authorizations made by Congress during this session, and if authorizations are made for contemplated projects, there will be a supplemental appropriation coming from the Bureau of the Budget which will carry a specific item. Of course, that has not been worked out and cannot be worked out until we know what authorizations are made by Congress.

Mr. HOSMER. In other words, you are incorrect in stating then that the budget includes an item for funds to be requested for this purpose?

Mr. AANDAHL. There was a specific item in the President's budget, I believe, of $10 million, without any distribution by projects, which is available and is a commitment on the part of the President and the Bureau of the Budget that such money will be requested in supplemental appropriations if projects are authorized by Congress.

Mr. HOSMER. So Congress has no idea of what that $10 million would be used for?

Mr. AANDAHL. No, and it has not been requested for appropriations. It is merely an Executive commitment that a supplemental appropriation will be requested if Congress authorizes the projects.

Mr. HOSMER. That is all. Thank you.

Mr. ASPINALL. The Chair recognizes the gentlewoman from Oregon.

Mrs. GREEN. No questions, Mr. Chairman, just my apologies. I had a conflict of the Education and Labor Committee and could not get here.

Mr. ASPINALL. The gentleman from Arizona, Mr. Rhodes.

Mr. RHODES. Mr. Secretary, will future witnesses testify as to the exact manner in which power from Glen Canyon and Echo Park and the other projects will be marketed?

Mr. AANDAHL. They will testify insofar as that can be determined at this early date.

Mr. RHODES. At the hearings in the last Congress there was a marketing analysis, a marketing study, presented which indicated the setting up of certain fringe areas in certain States, consisting of those areas in those States which were not geographically within the upper basin. Do you know whether or not a similar study brought up to date will be presented by future witnesses?

Mr. AANDAHL. We have no additional studies.

Mr. RHODES. Might I ask then that the study which was made last time be re-presented to the committee by future witnesses so that we may reexamine the whole situation?

Mr. AANDAHL. Yes, that will be done.

Mr. RHODES. Thank you.

Mr. ASPINALL. The Chair recognizes the gentleman from Michigan, Mr. Diggs.

Mr. DIGGS. I have no questions.

Mr. ASPINALL. The gentleman from Idaho, Mr. Budge.

Mr. BUDGE. No questions, Mr. Chairman.

Mr. ASPINALL. The gentleman from Texas, Mr. Rutherford.

Mr. RUTHERFORD. I have one question. You state power is to be sold for 6 mills. What is the lowest rate that power is being sold for now in the lower basin projects?

Mr. AANDAHL. Do you mean in the Colorado Basin?

Mr. RUTHERFORD. Yes.

Dr. MILLER. Will the gentleman from Texas yield?

Mr. RUTHERFORD. Yes.

Dr. MILLER. I suppose you want to distinguish between dump power and firm power?

Mr. RUTHERFORD. I was following the gentleman from California there on the 6-mill power and the same type of power.

Mr. AANDAHL. Power is, of course, being sold from the Hoover and the Parker and the Davis projects in the lower basin, and that power is being sold at a much lower figure than the 6 mills that is suggested for the upper basin.

Mr. RUTHERFORD. I have heard it is down to half a mill or in that neighborhood; is that correct?

Mr. AANDAHL. No; that would not be correct as an average rate. The average rate is much higher than that.

Mr. RUTHERFORD. But a low rate might be in the neighborhood of half a mill?

Mr. AANDAHL. I am not familiar with a rate as low as the gentleman is referring to. It might be for a few days or a very short period during the flood season there might be some dump power that is sold at a very low rate which is comparable to the figure that you have suggested, but that is not the average or the general price of power that we would refer to in the same light as the 6 mills that is referred to in the upper region.

Mr. RUTHERFORD. I see. That is all.

Mr. ASPINALL. The Chair recognizes his colleague from Colorado, Mr. Chenoweth.

Mr. CHENOWETH. Mr. Secretary, I want to go back just a moment to the question propounded to you by the gentleman from California, Mr. Hosmer, relative to the plans of the Bureau. In your letter to the chairman of the commitee and also in your statement to the committee today you refer to the President's budget message in which he

recommends that you undertake construction of two projects. One is the Colorado River storage project, which we have before us today, and the other is the Fryingpan-Arkansas project in Colorado.

Mr. AANDAHL. Yes.

Mr. CHENOWETH. I would like to have you make it clear to the committee just what the attitude of the Bureau is concerning these two projects. The President mentioned both in his message, and I assume you are giving them equal consideration.

Mr. AANDAHL. The Department of the Interior and the President and the Bureau of the Budget have all made statements in support of these two projects.

Mr. CHENOWETH. As I understand it, the Bureau is ready and anxious to undertake the construction of the Colorado River storage project, also the Fryingpan-Arkansas project at this time if authorized by the Congress.

Mr. AANDAHL. The Bureau of Reclamation?

Mr. CHENOWETH. The Bureau of Reclamation.

Mr. AANDAHL. That is correct.

Mr. CHENOWETH. And this is the policy of the administration?

Mr. AANDAHL. That is correct.

Mr. CHENOWETH. I would like to also emphasize for the benefit of the committee, Mr. Secretary, that the President of the United States made a personal trip and spent a day looking over the sites of these two projects last September, and that after making that personal inspection, he submitted this recommendation in his budget message; is that correct?

Mr. AANDAHL. That is correct.

Mr. CHENOWETH. That is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from California, Mr. Utt.

Mr. UTT. No questions.

Mr. ASPINALL. The gentleman from Colorado, Mr. Rogers. Do you have any questions of the Secretary?

Mr. ROGERS of Colorado. If I may. Directing your attention to the report you have given to this committee, and particularly as it deals with all of the bills in the comparison on page 7, I think it will reflect that H. R. 270 by Dawson of Utah, and H. R. 2836 by Fernandez, of New Mexico, and my bill, H. R. 4488, and S. 500 have what is known as section 11 in them, and section 11 is omitted from the two Aspinall bills, H. R. 3383 and H. R. 3384.

Now in your report to this committee on page 7 you have reference to it as it deals with section 11, and you state: "The terms of the provision in H. R. 270 are such as not to require objection from this Department." Now I take it that the Department has no objection to the so-called section 11 that appears in all bills except those of Congressman Aspinall and that is the position of the Department?

Mr. AANDAHL. That is correct.

Mr. ROGERS of Colorado. And that is due to a situation that exists wherein the proper administration of the river would require some authority in the Secretary to adjust a condition that exists in the State of Colorado?

Mr. AANDAHL. Yes.

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Mr. ROGERS of Colorado. That is all.

Mr. HOSMER. Will the gentleman yield at that point?

Mr. ROGERS of Colorado. I would be delighted to.

Mr. HOSMER. Mr. Secretary, is it your understanding that the subject matter in section 11 are rights which heretofore have been acquired by the United States solely for the generation of power or rights which are to be acquired under the authority of this bill?

Mr. AANDAHL. Those are rights that already have been acquired.

Mr. HOSMER. Thank you.

Mr. ROGERS of Colorado. That is all. Thank you.

Mr. ASPINALL. The gentleman from Utah, Mr. Dixon, if he has any questions.

Mr. DIXON. I have none. Thank you.

Mr. ASPINALL. The gentleman from Wyoming, Mr. Thomson.

Mr. THOMSON. If I may, Mr. Chairman.

Mr. Secretary, it has always been recognized in connection with the Colorado River the problem was one of control of this river if we are going to serve the needs of both the lower and upper areas at all times, has it not, because of the variation in the flow of the stream?

Mr. AANDAHL. That is correct.

Mr. THOMSON. From year to year?

Mr. AANDAHL. Yes.

Mr. THOMSON. So that, if I recall correctly, before the negotiation of the compact there was a time when the stream flow was only about 10 million acre-feet or some place in that neighborhood.

Mr. AANDAHL. May I ask again what the figure was that you used there as the low figure?

Mr. THOMSON. Something over 10 million. I think it was in 1919.

Mr. AANDAHL. My staff people indicate it was slightly under 10 million, but that is the approximate figure.

Mr. THOMSON. Yes. It was always recognized then that in order to supply the various needs that were contemplated it was necessary to store this water in reservoirs from the good years over to the lean years, and that was in contemplation; is that correct?

Mr. AANDAHL. That is correct.

Mr. THOMSON. And even if the storage reservoirs were to be constructed on the stream headwaters, that is, the Green and Colorado and other rivers involved, the irrigation uses in the upper basin would be from stream uses or from current uses in the lean years, and the water for downstream uses would be coming out of the reservoir; is that correct?

Mr. AANDAHL. Yes, that is correct.

Mr. THOMSON. So it is merely a matter of where we are locating the storage reservoirs in the good years to take care of the lean years when we talk about whether or not this water is going to be put to beneficial use for irrigation purposes. Would you say that is correct?

Mr. AANDAHL. Yes, that is correct. It involves the replacement.

Mr. THOMSON. It is a replacement proposition. Thank you.

Mr. ASPINALL. Mr. Secretary, I have one further question. Is it the Secretary's understanding that at this time the Bureau of the Budget favors without qualification the proposal by the Department of the Interior and the Bureau of Reclamation?

Mr. AANDAHL. For the upper Colorado storage?

Mr. ASPINALL. For this legislation.

Mr. AANDAHL. Yes. As reported in our previous report, that was cleared through the Bureau of the Budget.

Mr. HOSMER. Will the gentleman yield?

Mr. ASPINALL. Certainly.

Mr. HOSMER. If the Department were satisfied that the proposal does in fact violate the terms of the Colorado River compact and the Boulder Canyon Project Act, would you still approve and recommend it?

Mr. AANDAHL. I believe I prefer not to make an answer on the basis of that assumption.

Mr. HOSMER. I am just asking you, would you do the right thing or would you have the Federal Government violate the terms of a solemn contract between the States? I think you can certainly answer that question.

Mr. AANDAHL. We would do the right thing.

Mr. HOSMER. In other words, you would not recommend it? [Laughter.]

Dr. MILLER. Mr. Chairman, will the gentleman yield?

Mr. ASPINALL. Does the gentleman from California yield?

Mr. HOSMER. Yes.

Mr. ASPINALL. He yields to the gentleman from Nebraska.

Dr. MILLER. The gentleman from California is a very capable lawyer, and I hope he does not put words in the witness' mouth.

Mr. ASPINALL. Thank you very much, Mr. Secretary, for appearing before the committee this morning.

Mr. SAYLOR. Mr. Chairman?

Mr. ASPINALL. Just a moment, Mr. Secretary.

Mr. SAYLOR. I have no further questions at this time, but I ask unanimous consent to reserve the right to submit to the Secretary, or to the representatives of the Department to follow him, questions which I will ask with regard to the differences between the various versions of these bills that are before us.

Mr. ASPINALL. Is there any objection?

Hearing none, the gentleman's request is granted. Thank you, Mr. Secretary.

Mr. AANDAHL. Thank you, Mr. Chairman.

Mr. ASPINALL. At this time the Chair requests that Commissioner of Reclamation, Mr. Dexheimer, and his staff present themselves for presentation of their statement. It is understood that the statement will come from the Bureau and that the questions of the various witnesses will be delayed until the statement of the Bureau has been presented to us, keeping in mind also that the rules provide that the witnesses are to file their statements and then make oral presentations of matters which they have.

As I understand it, Mr. Dexheimer, I have in my hand your statement which you wish to have filed in the hearings at this place. Is that correct?

STATEMENT OF W. A. DEXHEIMER, COMMISSIONER, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR

Mr. DEXHEIMER. I would like to read my statement, Mr. Chairman, if that is appropriate.

Mr. ASPINALL. We will permit it to be filed and you read just the parts you think necessary.

Mr. HOSMER. Mr. Chairman?

Mr. ASPINALL. Just a moment. The gentleman from Pennsylvania has asked me to specify the witnesses who will make their statements before questioning, and I shall be glad to have that designation at this time.

Mr. DEXHEIMER. Mr. Chairman, I have proposed to make a brief statement which you have before you, and at the conclusion of that very brief statement, I would like to call on Mr. Elmer Bennett, the legislative counsel for the Department, to answer, in effect, some of the questions that have already been raised here, and also Mr. Larson very briefly, before we go ahead with other questions. Then we would be glad to answer any questions.

Mr. ASPINALL. In the order that you have designated them, Mr. Bennett first for a statement, then Mr. Larson for his statement, and then opening to questioning?

Mr. DEXHEIMER. Yes, sir.

Mr. ASPINALL. Is there any objection?

Mr. HOSMER. Reserving the right to object, I shall not do so, Mr. Chairman. As I understand it, in some cases the witnesses will present written statements and then speak orally on the same or other matters. In the light of that, I would like to suggest the possibility of having them give us their statements ahead of time so that we can know what is in them and then be able to ask questions about what is in writing as well as what they say, because once they have gone away, then we will not have the opportunity to explore the written statements that happen to be on the record.

Mr. ASPINALL. I think the gentleman's point is well taken, and from now on we will try to follow that procedure. Of course, it is rather difficult to get them before we come up here, as you know, Mr. Hosmer, every day; but we will follow it as closely as possible, the procedure you suggest.

Mr. HOSMER. Thank you.

Mr. ASPINALL. I hear no objections to the request that the presentation of the three witnesses designated proceed in that order. Hearing none, it is so ordered.

Mr. DEXHEIMER. Mr. Chairman, I would like to say first that my statement is prepared. It is before you. The only deviation from the prepared statement will be brief answers to some of the questions which these other gentlemen can give. Mr. Larson's statement will also be before you, and he will briefly discuss that and summarize it rather than to read the whole thing.

Mr. ASPINALL. Very well.

Mr. DEXHEIMER. The legislation before you for authorization of irrigation, power, and storage works on the upper Colorado River is the product of extensive investigation and planning by Federal, State, and local agencies. These works are part of a comprehensive basin plan described in the Department's 1950 report, Colorado River Storage Project and Participating Projects, to harness Colorado River waters for the continued growth of the upper Colorado River basin States.

I shall briefly review the background of this legislation. An understanding of the problem facing the States of the upper basin in the use of their allotted waters, and the steps that have been taken to plan for such use, are important in your consideration. Many of you are familiar with this background, but I believe a repetition of the essential facts is desirable and should be part of this record.

The Colorado River compact of 1922 apportioned to the upper basin a beneficial consumptive use of 7.5 million acre-feet per annum. It also imposed an obligation on the upper basin not to deplete the flow at Lee Ferry, the point of division between the upper and lower basins, below 75 million acre-feet in any period of 10 consecutive years. There are further provisions in the compact relating to the use of Colorado River water, but the two mentioned are the controlling and important limitations in the upper basin. With the uneven flow of the Colorado River—erratic periods of drought and flood—substantial water developments within these limitations in the upper basin are impossible without river regulation. Bureau of Reclamation studies show that, unless adequate storage capacity is provided to harvest floodwaters of abnormal years, only about 60 percent of the water apportioned to the upper basin could be used.

After some 20 years of investigation, the Bureau of Reclamation issued the Colorado River basin report in 1946 covering potential development of the Colorado River including over 100 irrigation and power projects in the upper basin. This report was an inventory and served as a guide for planning and compact negotiations.

In 1948 the upper Colorado River compact was signed. It apportioned among the States of the upper basin the use of the water allotted them as a group by the 1922 compact. The compact is a comprehensive document covering the many phases of interstate and intrastate river development. It makes possible specific plans for further use of Colorado River water in the upper basin. With it as a foundation, the Bureau of Reclamation issued in 1950 its report on the Colorado River storage project and participating projects. This report, submitted by the Secretary of the Interior to the President on December 4, 1952, presented a basin plan for the upper Colorado River.

The basin plan is designed to permit further development of the apportioned waters of the upper Colorado River by the States of Wyoming, Colorado, New Mexico, Utah, and Arizona. It includes a number of storage dams at the most efficient and economical sites on the river and its tributaries in the upper basin. In addition, multiple-purpose, water-use projects are planned to allow each State of the upper basin to use its share of the water for irrigation, industrial and municipal development, power, recreation, fish and wildlife, and other beneficial uses.

The Department of the Interior recommends for initial authorization the Glen Canyon and Echo Park storage units and 11 irrigation

and mutliple-purpose projects, known as participating projects. These units and projects are presented in the Secretary's report, printed in House Document No. 364, 83d Congress, 2d session. The States of both upper and lower basins and interested Federal agencies have approved the recommendations for an initial development. There are, however, problems requiring further study prior to ultimate development of the upper basin. Although an integral part of the basin plan, the storage units and participating projects recommended for authorization are justified in themselves and can be considered on their own merits apart from their contribution to future development.

The development of the upper Colorado River basin has been approved by the President, and the initial program would be in accord with the President's program.

The Glen Canyon and Echo Park units were selected for initial development because of their efficiency and economy. The 11 initial participating projects are supported by reports outlining their economic justification and engineering feasibility. The basin plan, however, provides for the submission of feasibility reports on additional storage units and participating projects as their needs arise and information pertaining to their economic and engineering feasibility has been ascertained.

Others are here for a discussion of details of the features contained in the bills before you. However, we wish first to present brief statements to clarify our position with respect to specific problems associated with the proposed construction of upper basin projects. These specific problems include: geology at Glen Canyon Dam site; our position on Echo Park Reservoir; matters of Indian water rights; our rights to construct and build reservoirs in the upper basin consistent with the Colorado River compact; our physical ability to fill the recommended reservoirs; and our estimates of the quality of water at Lee Ferry following additional development of these projects.

A reservoir created by a 700-foot dam at Glen Canyon, if unrestricted, would encroach on the Rainbow Bridge National Monument by backing water up Bridge Creek under the natural arch. The Bureau of Reclamation and the National Park Service are undertaking joint investigations to determine the most effective means of preventing this encroachment. The dam should be built to the maximum height consistent with economy, the safety of the structure, and adequate protection of the Rainbow Natural Bridge. Our studies indicate that a concrete dam rising 700 feet above bedrock and 580 feet above the river and creating a reservoir of 26 million acre-feet would meet all of these criteria.

Echo Park, proposed to be built on the Green River in Colorado 3 miles from the Utah State line, would be approximately 690 feet above bedrock and the reservoir, at full capacity, would be 520 feet deep at the dam. The canyons of the Green and Yampa rivers average 1,500 to 2,000 feet deep.

The Department's plan for the Echo Park unit includes a program by the National Park Service for developing recreational facilities at an estimated cost of $21 million. These facilities would include roads and trails, campgrounds, picnic areas, lodges, beaches, and boat landings. Interpretive museums and headquarters for personnel would also be constructed. Such facilities would make many points of

interest accessible to the general public and provide the means for educational and recreational activities. The facilities of the plan will enormously increase opportunities for use of the monument and open the canyon area to the general public where now it is almost inaccessible and has been seen by only an adventurous or privileged few.

Opposition to Echo Park Dam has been based on the grounds that it would destroy the scenic and "white water" boating values of the Dinosaur National Monument and set a precedent for the invasion of other national park areas. Proponents of this dam, on the other hand, claim that the recreational values of the monument would be greatly enhanced as a result of the dam's construction and that no precedent is involved since the President's proclamation enlarging the monument provided for just such development.

The original 80-acre Dinosaur Monument, created in 1915, contains all the known fossils in the area. This area is 20 miles away and downstream from any reservoir development. It would not be disturbed. There are no improved roads in the area except to the fossil beds.

The proposed use of the canyon sections of the Dinosaur National Monument for water and power developments was contemplated long before the original 80-acre area was enlarged to its present size of over 200,000 acres in 1938. A number of power-site withdrawals prior to that year are evidence of this fact. Recognition of the importance of these potential power developments was given in the President's proclamation enlarging the 80-acre monument. The supervision of the area by the National Park Service under this proclamation was not to affect the operation of the Federal Water Power Act of June 10, 1920, as amended, and administration of the monument was subject to the reclamation withdrawal of October 17, 1904.

The plan before you for coordinating the development of the water and power resources of Green and Yampa River Canyons along with their scenic and recreation values is therefore consistent with the language and spirit of the proclamation. The Department has no doubts as to the appropriateness of creating an artificial lake and adjoining facilities within the bounds of this particular national monument. It would not create a precedent for invasion of other parks. The precedent, if any, was created in 1938 when the boundaries were extended to the canyon areas with a clear understanding that water conservation and power development had prior right to the use of those areas.

Returning now to the initial development recommended by the Secretary of the Interior, we find that its construction and operation would result in material and important accomplishments.

The participating irrigation projects would provide a supplemental water supply to farms now subject to drought and crippling water shortages, thus permitting farmers to stabilize their production. A full water supply would be created for the development of new farms and homes. The production of crops of the upper basin States would be increased. A necessary balance in the livestock industry would be achieved through the production of field crops to supplement the use of the extensive rangelands in the area. This agricultural development would not only increase the farmers' income and raise their standard of living, but also would meet the expanding demands of an increasing population. The recommended projects would also supply

water needed to meet rapidly expanding municipal and industrial requirements. New farms, growing rural communities, and associated growth in urban and industrial areas would contribute to a sound and stable economy vital to our national development.

Highly developed sections in the upper basin States are also looking to the upper Colorado River for an enlarged water supply. Areas in the upper Colorado Basin will be called on to provide many of our most vital resources. From them will come much of the Nation's supply of such products as copper, uranium, phosphate, shale oil, and coal, as well as other resources found abundantly in the upper basin States.

A significant contribution to the upper Colorado River Basin would be the power, totaling more than 1 million kilowatts of hydroelectric generating capacity, which would result from the recommended development.

Electric power is needed in the upper basin States to further commercial and industrial expansion and for use in the homes and on the farms. The total peak electric powerload now amounts to approximately 1½ million kilowatts in the upper basin States and is continually increasing. The project will assist in meeting the new electric load growth in the area estimated to total about 150,000 kilowatts a year.

This is a bare outline of the facts on which more detailed information will be given by Regional Director E. O. Larson. I am aware of the magnitude of the undertaking before you and its significance to the future of the people of the upper Colorado River Basin. For this reason I consider the initial development of the plan for upper Colorado River Basin development the greatest single task that I have faced as Commissioner of Reclamation.

Now, Mr. Chairman, with your permission, as to questions that have already been asked, most of you know the matter of Indian rights is in litigation in the lower basin. Our position is that regardless of what the court may give as its answer, it can in no significant way affect the upper basin development recommended.

I would like to have Mr. Elmer Bennett, legislative counsel for the Department, give the Department's position on that particular point now, if I may.

Mr. ASPINALL. Thank you, Mr. Commissioner.

I would like to suggest to members of the committee that I would like to meet this afternoon for 2 hours. Unless there is serious objection from the members of the committee, we will meet from 2 to 4 o'clock, meet on time and adjourn on time so that the members may arrange their affairs in their office accordingly. Is there any objection?

If not, the meeting is recessed until 2 o'clock this afternoon.

(Whereupon, at 12 noon, the subcommittee recessed to reconvene at 2 p. m., of this same day.)

AFTERNOON SESSION

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will be in session for further consideration of the bills having to do with the upper Colorado River storage project.

Mr. WESTLAND. Do we have any specific bill before us?

Mr. ASPINALL. We have five bills before us.

At this time the committee will hear the presentation by Mr. Larson. You may proceed.

STATEMENT OF E. O. LARSON, REGIONAL DIRECTOR, REGION IV, BUREAU OF RECLAMATION, SALT LAKE CITY, UTAH

Mr. LARSON. Mr. Chairman, I would like to read the introductory statement to which is attached the tables, and brief statements on all of the projects included in the House bills.

Mr. HOSMER. A point of inquiry, Mr. Chairman.

We are not to question Commissioner Dexheimer; is that right?

Mr. ASPINALL. We will question Mr. Dexheimer, according to my understanding, immediately following Mr. Larson's presentation and a short oral presentation by Mr. Bennett, who I do not see in the room at the present time.

Mr. HOSMER. What is the purpose of taking the witnesses out of order in that manner?

Mr. ASPINALL. The only purpose of taking the witnesses out of order is so that the questions directed to the witnesses, Mr. Hosmer, may be directed to the one who has the information rather than the referrals that took place this morning.

Mr. HOSMER. Will Mr. Larson be on hand? I notice that his statement consists of upward of 100 pages which was presented to us about 2½ hours ago.

Mr. ASPINALL. Mr. Larson will be available here all afternoon and tomorrow morning if the committee so desires.

Mr. HOSMER. Thank you.

Mr. ASPINALL. You may proceed, and the statement in full will be made a part of the record. You may refer to it as you see fit.

Mr. LARSON. In addition to the 2 storage units and 11 participating projects recommended for initial authorization by the Secretary of the Interior, the bills before you contain other storage units and other participating projects.

One bill also provides for a different schedule of repayment of the storage units and participating projects.

I will first discuss the items recommended by the Secretary and then present material now available on the additional units and projects in the bills.

The investigation of two of the additional participating projects has not been under my administrative jurisdiction. I suggest, therefore, that questions concerning the Indian features of the Navaho project be referred to the Bureau of Indian Affairs, and, likewise, a representative of region 5 of the Bureau of Reclamation will answer questions concerning the San Juan-Chama project.

The Secretary's proposals would authorize construction of 2 storage reservoirs, Echo Park and Glen Canyon, with a total capacity of 32½ million acre-feet. Besides regulating the flow of the river, these units would generate power needed by the upper basin States and provide sediment control for the lower basin.

Construction of the 11 recommended participating projects would constitute a material advance in the development of the upper basin water resources. They would bring 132,360 acres of new land into agricultural production and provide supplemental water to 233,930 acres of land now irrigated with an inadequate water supply. They would also supply industrial and municipal water and hydroelectric energy.

STORAGE UNITS

The Echo Park and Glen Canyon units of the storage project are part of the plan for regulation of the upper Colorado River through which the provisions of the Colorado River compact can be met and additional use of apportioned waters can be made in the upper basin.

The basin plan would eventually comprise a system of seven large regulatory reservoirs located at strategic points of control on the main stem and major tributaries of the upper Colorado River. At each of the seven storage sites a powerplant would be constructed for the generation of hydroelectric energy. Two additional powerplants with small reregulating reservoirs that would utilize upstream regulation would complete the integrated storage and power system of the plan.

The Secretary, however, recommends initial construction of only two of these power and storage units, and has selected the Echo Park and Glen Canyon units because of their economy and efficiency.

Although the regulatory reservoirs proposed in the basin plan are generally below the points of diversion for the participating projects, they would serve essentially the same purposes as reservoirs above points of diversion. This would be achieved through a replacement practice quite common on western streams where water is diverted upstream in exchange for storage water releases from downstream reservoirs. In this manner the downstream obligations would be met.

It would be impossible and there is no necessity to provide this replacement through reservoirs at the sites of the participating projects.

Selection of a few large reservoirs would also facilitate the integrated operation of the system, which would be necessary in order to provide river regulation, water for consumptive use and generate the optimum amount of hydroelectric power from the system's water as it is released to meet downstream obligations.

Optimum production of power at the Glen Canyon and Echo Park units would be assured by the construction of interconnecting transmission lines. These interconnecting facilities would permit maximum flexibility in power operation and facilitate the delivery of Glen Canyon power to load centers in the upper basin States. The initial lines would be the backbone of the transmission grid to which subsequently constructed powerplants would be added. Supply lines from the transmission grid would be constructed to serve local market areas.

Ten major private power companies support this project and propose to absorb the project power output from a main transmission system and deliver it to existing and prospective customers. This would relieve the Federal Government of a portion of its contemplated construction cost.

Glen Canyon Dam would be on the Colorado River in northern Arizona approximately 13 miles downstream from the Utah-Arizona border and 16 miles upstream from Lee Ferry. The dam would be a concrete structure rising 700 feet from bedrock and 580 feet above the

river. The reservoir would offer final regulation for deliveries of water at Lee Ferry in compliance with the Colorado River compact.

Out of a total capacity of 26 million acre-feet, 20 million acre-feet would initially be active capacity. The reservoir when filled would have a normal water surface area of 153,000 acres and would extend about 186 miles up the Colorado River, nearly to the mouth of the Green River, and 71 miles up the San Juan River. It would be the principal point of sediment control in the upper basin.

Even after 200 years, at the present rate of sediment flow and with upstream storage developed, almost half the initial storage space would be available for river regulation.

A powerplant would be located near the toe of Glen Canyon Dam. It would consist of 7 generating units with a total installed capacity of about 800,000 kilowatts or approximately one-half the total capacity contemplated for the entire Colorado River storage project.

The total construction cost of the Glen Canyon unit, with an appropriate share of transmission costs, is estimated at $421 million. Also provided in the proposed bill of authorization would be the construction of facilities for adequate protection of the Rainbow Natural Bridge.

Echo Park Dam would be located in Colorado on the Green River about 3 miles east of the Utah-Colorado State line and 3 miles below the junction of the Green and the Yampa Rivers in the tri-corner area of Colorado, Wyoming and Utah. The dam would be a concrete structure rising 690 feet from bedrock and 525 feet above the river. The reservoir would have a storage capacity of 6,460,000 acre-feet, including 5,460,000 acre-feet of active capacity. When filled to capacity the reservoir would have a surface area of 43,400 acres and would extend 63 miles up the Green River and 44 miles up the Yampa River.

The powerplant at the dam would consist of 4 generating units with a total capacity of about 200,000 kilowatts.

The construction cost of the Echo Park unit is estimated at $176 million including an appropriate part of the basic transmission system but not including the Department's plan for recreational development of the Dinosaur National Monument estimated to cost $21 million.

PARTICIPATING PROJECTS

A participating project is defined as any water-consuming project which would utilize water of the upper Colorado River system for irrigation and require repayment assistance on irrigation costs from power revenues of the storage project.

The following 11 such participating projects are recommended for initial authorization in the Secretary's supplemental report: LaBarge, Wyo., Seedskadee, Wyo., Lyman, Wyo., Silt, Colo., Smith Fork, Colo., Paonia, Colo. (including Minnesota unit), Florida, Colo., Pine River extension, Colorado-New Mexico, Emery County, Utah, central Utah (initial phase) Utah, Hammond N. Mex.

Brief statements on each of the initial participating projects are attached for filing with your committee, and further details can be found in the supplements to the Colorado River storage project report (H. Doc. 364, 83d Cong., 2d sess.).

A 12th project, the Eden project in Wyoming, was authorized in 1949 and is now under construction. That authorization provided that the project be assisted in repayment by power revenues from the Colorado River storage project. The Eden project is therefore included in the plan as a participating project.

The Secretary's supplemental report also included the Shiprock division of the Navaho project. Subsequent studies show that major features of the Navaho project, including the Navaho Reservoir, would be used jointly by the two divisions of the project. The Navaho Reservoir would also be used by the potential San Juan-Chama project. Thus, the Navaho project would be uneconomical of construction by divisions, and authorization of only the Shiprock division of the project would therefore be unsound.

For the information of the committee, however, a brief summary statement on the overall Navaho project prepared by the Bureau of Indian Affairs is attached. Further details on this project can be found in the feasibility report Navaho Project, New Mexico, January 1955, compiled by the Bureau of Indian Affairs.

WATER SUPPLY

The Colorado River compact in article III (a) apportioned from the Colorado River system in perpetuity to the upper basin and the lower basin, respectively, exclusive beneficial consumptive use of 7½ million acre-feet per annum. There is a provision in article III (d) of the same compact that the States of the upper division (Colorado, New Mexico, Utah, and Wyoming) will not cause the flow of the river at Lee Ferry, the point of division between the upper and lower basins, to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years. These are the controlling and most important limitations with respect to water uses in the upper basin although there are other provisions in the compact relating to uses and deliveries of water.

Substantial water development in the upper basin is impossible without regulation of the uneven flow of the Colorado River. Our studies show that without such control only about 58 percent of the water apportioned to the upper basin could be used.

During the past 59 years the historic annual flow of the Colorado River in the upper basin has varied from a high of 22 million acre-feet in 1907 to less than 5 million acre-feet in 1934. That span of years also presented extended periods of abnormal and subnormal flows, the most impressive being the extremely high flows of the period 1914–29 with historic annual flows averaging over 16 million acre-feet and the prolonged 25-year drought following thereafter with historic annual flows averaging only 11.5 million acre-feet. The long-time average flow, however, including periods of high runoff and drought, is sufficient to supply the allocated consumptive uses in the upper basin in addition to the downstream obligations.

The primary function of the storage units in the plan is to store water during years of high runoff for release during years of low runoff. Therefore, these cyclic conditions must be recognized in planning future uses of water in the upper basin.

A history of 59 years of river operation may or may not have revealed the full characteristics of the Colorado River. Yet, an initial

development of the magnitude now proposed has the assurance of the availability of sufficient water supply. Later stages of development would derive additional assurances as time goes on, or, if changes are required, time will permit appropriate adjustments in the later stages of development.

Under sound engineering and economic practices it would be impractical to completely regulate past historic flows of the river and its tributaries. Also, in years of extreme drought conditions the users of upper basin water would experience shortages in their supply which cannot be prevented. However, analyzing the upper basin's long-time program for developing its apportioned use of 7½ million acre-feet per annum we found that such occasional shortages would be within the limits of normal irrigation, industrial, and municipal operations.

The initial storage project units would provide for a greater amount of replacement storage than would be needed to permit the increase in consumptive use which would result from the initial development. However, these large storage facilities would develop the optimum power potential of these sites necessary to meet the demands of the region. These large power and storage units would also fit into any subsequent phase of the upper basin development which may be authorized.

A start on the required storage facilities in advance of their actual need is imperative because of the time element involved in the construction and initial filling of the storage reservoirs. Apportioned water not presently consumed in the upper basin would greatly facilitate the initial filling of the reservoirs.

Through electrical interconnection between Glen Canyon, Echo Park, and existing powerplants in the lower basin a first filling of the storage reservoirs could be attained with no interruption in delivery of firm electric energy to existing and potential customers on the river's system.

The time required to initially fill the Glen Canyon and Echo Park Reservoirs will largely depend upon the amount of runoff in the river. Under very favorable runoff conditions the filling period could be less than 5 years whereas a much longer period would be necessary under extreme drought conditions.

In either event, however, dead storage levels at Glen Canyon and at Echo Park could be attained during the period of construction of the dams, thereby providing the heads necessary for initial power generations.

Since the initial participating projects do not require the full capacity of Glen Canyon and Echo Park Reservoirs for regulatory purposes, there would be no immediate need to completely fill these reservoirs. Thus the initial filling process can be readily adapted to the amount of runoff and downstream demands for water and firm electric energy. This initial filling process would not violate the terms of the Colorado River compact.

The total consumptive use of water in the upper basin by all constructed projects, those authorized and projects under construction, will be approximately 2½ million acre-feet, or one-third of the annual allotment of 7½ million acre-feet to the upper basin. The 11 participating projects recommended in the Secretary's supplemental report

would increase present stream depletion by an additional 400,000 acre-feet annually.

Average evaporation from the recommended Echo Park and Glen Canyon storage units would amount to about 613,000 acre-feet annually. The units and projects recommended for authorization would thus involve an increased use of approximately 1 million acre-feet per annum. With accelerated development in the future, the remainder (4 million acre-feet per annum) of the upper basin's share of the Colorado River water may be put to beneficial use within the next 75 years.

Our studies show that the recommended units and projects would have no material effect on the quality of water downstream. With respect to later phases of development, the plan provides for additional gaging and sampling stations to supply data for continued analysis and scrutiny as each phase approaches authorization.

Our analysis of the quality of water at Lee Ferry reveals for the critical period of low flow (1931–47) concentrations of dissolved salts averaging 0.78 ton per acre-foot (575 parts per million) corresponding to uses totaling 2½ million acre-feet per annum in the upper basin.

An average concentration of 0.85 ton per acre-foot (625 parts per million) or an increase of about 9 percent is anticipated at Lee Ferry following completion of the recommended Glen Canyon and Echo Park storage units and the 11 initial participating projects, with a corresponding use then totaling about 3½ million acre-feet.

With full use of the 7½ million acre-feet per annum allotment in the upper basin, the average concentration of dissolved salts at Lee Ferry is estimated at about 1.20 tons per acre-foot or 880 parts per million.

Under any of the above conditions concentrations and type of salts are well within the standard range for irrigation water designated by the United States Salinity Laboratory at Riverside, Calif., as "good to permissible," and within the range of practical treatment for municipal and industrial purposes.

COST, ALLOCATIONS, AND REPAYMENT

The total construction cost of the initial units and participating projects is estimated at $930 million as summarized in table 1. This cost includes $7,287,000 for the authorized Eden project now nearing completion, $2,035,000 expended on the Paonia project under a previous authorization, and $21 million proposed for recreational development of the Dinosaur National Monument. This cost is based on January 1953 price levels and if adjusted to October 1954 price levels would be reduced by about 1 percent.

Also included is the cost of a transmission system necessary to deliver electrical energy to power market centers in the upper basin States and to tie in with the lower basin system.

If the Federal Government constructs only the interconnecting trunkline, with the remainder of the system to be constructed by non-Federal interests, the estimated Federal construction cost would be reduced and the purchase price for project power to those non-Federal interests decreased.

Costs of the two initial units of the storage project have been allocated to power, irrigation, and recreation. The costs of the participating projects have been allocated primarily to irrigation.

Costs allocated to recreation represent only the added cost resulting from the inclusion of recreational facilities. The allocation of costs will be subject to further study in connection with preparation of definite plans. The costs as presently allocated on a preliminary basis are presented in table 1.

The reimbursable construction costs of each unit and participating project would be repaid within 50 years of the time that unit or project is completed, exclusive of authorized development periods.

Commercial power and municipal and industrial water supply investments would be repaid with interest at the going rate for long-term marketable securities. Interest-bearing and non-interest-bearing investments would be paid concurrently to the extent practicable.

Repayment of the irrigation investment would be accomplished during a 50-year period with the irrigators paying up to their ability and the balance paid by the appliction of excess power revenues from the storage project during the same 50-year period.

Exceptions to this are the Paonia and Eden participating projects for which special legislative provision has already been made, and those cases involving Indian lands to which the provisions of appropriate acts (the Leavitt Act) would be made applicable by the terms of the bill.

The cost of the recreational planning and construction program of the National Park Service in the Dinosaur National Monument would be nonreimbursable.

At a 6-mill per kilowatt-hour average firm power rate, power revenues would be sufficient during 50 years of operation to repay the costs allocated to power at the Echo Park and Glen Canyon units and central Utah project, with 2½ percent interest on the unpaid balance, and also to make substantial payments on irrigation costs. Thereafter, power revenues would be sufficient to complete repayment of the non-interest-bearing construction costs allocated to irrigation and assigned for repayment from power revenues. The actual selling price of power would be established at rates consistent with sound business principles and would take into account the irrigation costs to be repaid from power revenues.

A payout schedule was included in the supplemental report of the Secretary illustrating how repayment could be accomplished within a 50-year period assuming power revenues were applied first to the repayment of power costs.

The Department now proposes that in those instances where repayment of interest-bearing costs, such as power and non-interest-bearing costs, such as irrigation, are due concurrently, they will be repaid concurrently to the extent practicable.

One of the bills (H. R. 3383) provides for a repayment schedule quite different from that recommended by the Secretary of the Interior in that it would permit a period up to 100 years for the repayment of costs allocated to power and would require the repayment of costs allocated to irrigation in equal annual installments within a period not exceeding 50 years. This repayment procedure, if applied to the stor-

age units and participating projects contained in the recommendation of the Secretary, could be accomplished by a 6-mill rate per kilowatt-hour for firm power. However, any substantial addition to the Secretary's recommended units and projects, such as suggested by H. R. 3383, would require an increase in sale price for firm electric energy in order not to exceed the 100-year power repayment period.

BENEFIT-COST ANALYSIS

A benefit-cost analysis has been made of each initial storage unit and each initial participating project to determine whether or not they are justified to the Nation as Federal developments. This analysis compares Federal project costs with tangible project benefits. It is used by the Bureau of Reclamation in addition to and apart from the repayment analysis.

The benefit-cost analysis covers the widespread local, regional and national benefits which are not included in the repayment analysis. Such benefits susceptible to monetary evaluation are known as tangible benefits and are used in the benefit-cost comparison. Other benefits for which no monetary value can be estimated are known as intangible and do not appear in this analysis.

There are three main types of tangible irrigation benefits used in the benefit-cost ratio: direct, indirect, and public.

Direct benefits are the increase in net farm income; indirect benefits. the increase in profits of businesses handling, processing and marketing farm products, and the increase in the supply of goods and services. Public irrigation benefits comprise the increase or improvement in settlement investment opportunities and in community facilities and services.

In general, benefits from power and municipal and industrial water are limited to the costs of providing such power and water from the most economical alternative sources.

Flood control, recreational, and fish and wildlife benefits are computed by the Corps of Engineers, the National Park Service, and the Fish and Wildlife Service, respectively.

The cost side of the benefit-cost comparison includes all Federal or project costs. These are construction costs, interest cost, and operation, maintenance, and replacement costs.

The recommended units of the storage project and the participating projects collectively and individually would have tangible benefits greater than costs.

LEGAL FRAMEWORK

In a plan of this magnitude the authorities and laws under which the various features would be constructed, administered and operated would normally present serious problems and certainly would raise grave questions of jurisdiction.

The plan before you is happily free of such complications. The storage project with its regulatory reservoirs is of interstate significance, and each of its units would be so treated. These would be constructed, operated, and maintained by the Bureau of Reclamation, and, as far as water is concerned, would be operated in conformance with the Mexican Water Treaty, the Colorado River and upper Colorado

River Basin compacts. The last document includes provisions to cover all the necessary aspects of such operation.

The participating projects are consumptive-use projects intrastate in character. In the proposed plan these projects would be constructed, operated, and maintained under reclamation law. Water rights would therefore be obtained and administered under the water code of the State in which the project would be built. The participating projects would in general be operated and maintained by water users' organizations after construction.

The plan includes the formation of appropriate districts, preferably of the water conservancy type and subject to Secretary approval, as contracting entities to represent project water users in project operation, repayment, and other matters.

ADDITIONAL UNITS AND PARTICIPATING PROJECTS IN THE BILLS

In addition to the two units of the storage project and eleven participating projects I have discussed, the bills before you include either one or more of the following: the Cross Mountain, Juniper, Curecanti, Flaming Gorge, and Navaho units of the storage project and the Gooseberry, San Juan-Chama, Navaho, Sublette, Savery-Pot Hook, Dolores, Fruitgrowers Dam Extension, Bostwick Park, Dallas Creek, East River, Fruitland Mesa, Grand Mesa, Ohio Creek, Tomichi Creek, Battlement Mesa, Bluestone, Eagle Divide, Parshall, Rabbit Ear, Troublesome, West Divide, and Woody Creek participating projects.

The bills all provide that the Curecanti Dam shall be constructed to a height which will impound not less than 940,000 acre-feet of water or will create a reservoir of such greater capacity as can be obtained by a high waterline located at 7,520 feet above mean sea level. The additional units of the storage project excepting the Juniper unit and a further modified plan of the Curecanti unit were covered in the 1950 report on the Colorado River storage project and in the 1953 supplemental report of the Secretary.

The Juniper unit has been suggested as an alternate to the Cross Mountain unit. A summary statement of reconnaissance data on the Juniper unit is attached.

Analyses of the Curecanti unit for any size reservoir, when a dam and powerplant at the Curecanti site are considered alone, indicate that power from the site would be more expensive than power from alternative sources. Preliminary studies are now in progress of a modified plan of development for this unit, including additional downstream power drops dependent on storage regulation at the Curecanti Reservoir; a summary statement of reconnaissance data on this modified plan is attached. This statement shows that by adding power dams downstream and all considered as one unit, the cost of production of power would be less than the cost at alternative sources.

As I have previously stated, the Navaho Reservoir is treated as a feature of the potential Navaho participating project mentioned below rather than as a unit of the storage project.

Project reports have been prepared on the Gooseberry, San Juan-Chama, Fruitgrowers Dam Extension, Savery-Pot Hook and Navaho projects. These reports are yet to be circulated to other agencies,

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States and local interests for review in accordance with the 1944 Flood Control Act. Only reconnaissance data are available on the remainder of the additional participating projects listed in the bills.

The present plan of development as covered in the report on the San Juan-Chama participating project is a modification of the plan presented for this project at the congressional hearings in 1954.

Brief summary statements on all of the additional participating projects are attached. A summary (table 2 (a)) is attached showing pertinent data for the additional units and participating projects in the bill.

Following this statement is a small map of the upper Colorado River Basin showing the location of the various units and participating projects. Also attached is table 1 showing the units and the participating projects recommended by the Secretary. All other participating projects and units are shown on table 2 (a) attached.

Following those tables are very short 1-page statements and 1-page summaries of data with maps of the first 11 participating projects, and they are about the same as submitted last year.

Similar statements, some based on detailed reports and others based on reconnaissance data, for all of the other projects mentioned in the bills also follow.

(The material referred to follows:)

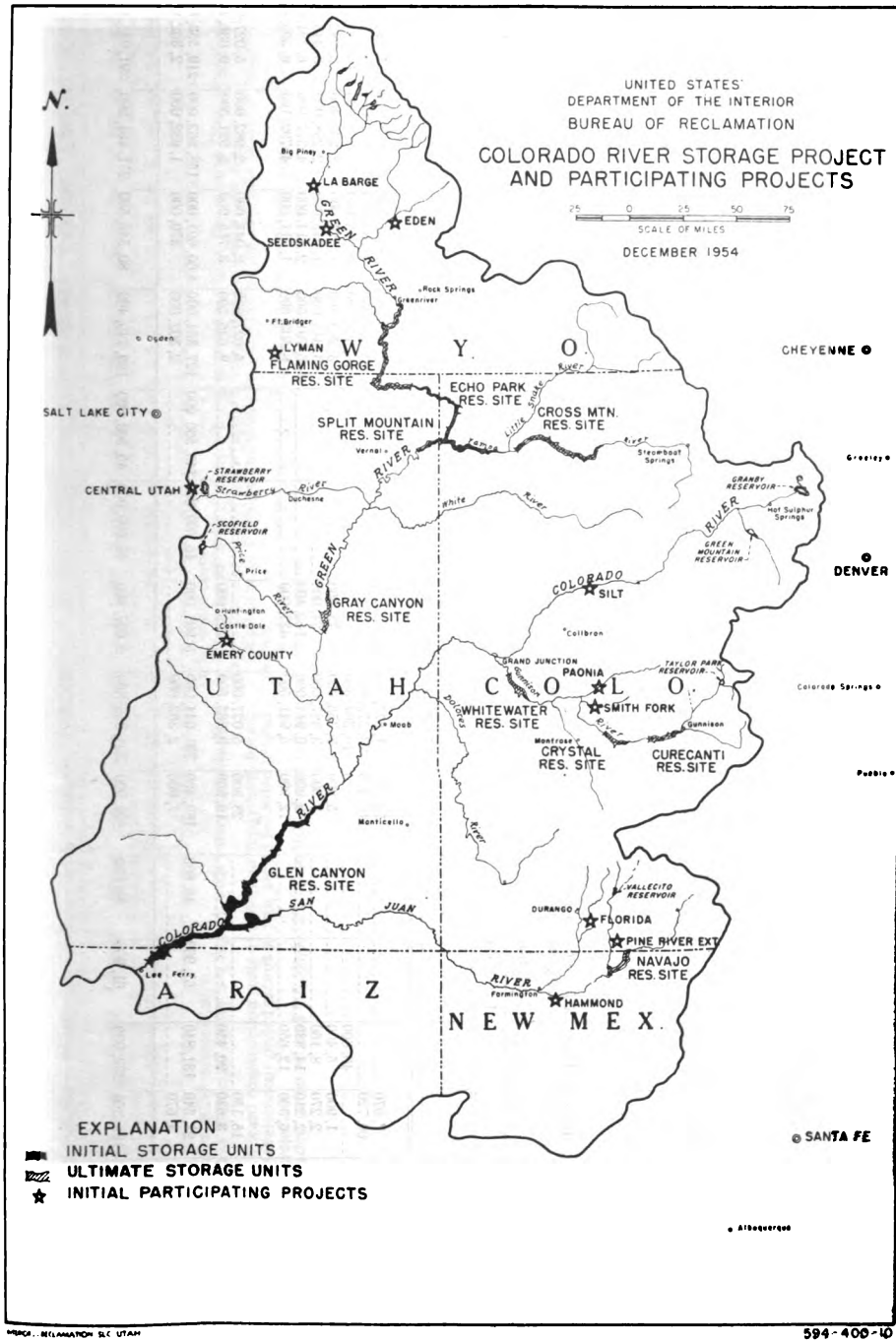


TABLE 1.—*Summary of initial units of Colorado River storage project and 12 participating projects*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [2]		
								Reimbursable allocations					
	New	Supplemental				Total [1]	Nonreimbursable	Power	Municipal water	Irrigation	By water users [3]	By initial power units (Echo Park-Glen Canyon-central Utah)	Total
Colorado River storage project initial units:													
Echo Park unit, Colorado, Utah	*Acres*	*Acres*	*Kilowatts* 200,000	*Acre-feet*	*Acre-feet* 87,000	$176,426,000		$128,383,000		$48,043,000		$176,426,000	$176,426,000
Glen Canyon unit, Arizona, Utah			800,000		526,000	421,270,000		370,974,000		50,296,000		421,270,000	421,270,000
Subtotal initial units			1,000,000		613,000	597,696,000		499,357,000		98,339,000		597,696,000	597,696,000
Recreation development of Dinosaur National Monument, Colorado, Utah						21,000,000	$21,000,000						
11 participating projects:													
LaBarge, Wyoming	7,970				14,200	1,673,300				1,673,300	$495,000	1,178,300	1,673,300
Seedskadee, Wyoming	60,720				110,400	23,272,000				23,272,000	4,785,000	18,487,000	23,272,000
Lyman, Wyoming		40,600			0	10,564,000				10,564,000	2,255,000	8,309,000	10,564,000
Silt, Colorado	1,900	5,400			5,800	3,356,000	73,600			3,282,400	1,020,000	2,262,400	3,282,400
Smith Fork, Colorado	2,270	8,160			7,500	3,367,000	24,000			3,343,000	1,045,000	2,298,000	3,343,000
Paonia, Colorado	2,210	14,830			9,000	6,944,000	152,400			6,791,600	2,414,000	4.377,600	6,791,600
Florida, Colorado	6,300	12,650			12,900	6,941,500	437,900			6,503,600	1,711,500	4,792,100	6,503,600
Pine River project extension, Colorado, New Mexico	15,150				28,300	5,027,000				5,027,000	2,045,000	2,982,000	5,027,000
Emery County, Utah	3,630	20,450			15,500	9,865,500	229,000			9,636,500	3,715,000	5,921,500	9,636,500
Central Utah (initial phase), Utah	28,540	131,840	61,000	48,800	189,400	231,044,000	5,991,000	46,699,000	$45,500,000	127,354,000	[4] 60,691,000	[5] 158,862,000	[6] 219,553,000
Hammond, New Mexico	3,670				7,900	2,302,000				2,302,000	370,000	1,932,000	2,302,000
Subtotal, 11 initial projects	132,360	233,930	61,000	48,800	400,900	304,356,300	6,907,900	46,699,000	45,500,000	199,749,400	80,546,500	211,401,900	291,948,400

Additional participating project authorized and under construction: Eden, Wyoming	10,660	9,540			32,400	7,287,000				7,287,000	1,500,000	5,787,000	7,287,000
Total, 12 participating projects	143,020	243,470	61,000	48,800	433,300	311,643,300	[7] 6,907,900	46,699,000	45,500,000	207,036,400	82,046,500	217,188,900	299,235,400
Grand total	143,020	243,470	1,061,000	48,800	1,046,300	930,339,300	[7] 27,907,900	546,056,000	45,500,000	305,375,400	82,046,500	814,884,900	896,931,400

[1] Exclusive of nonreimbursable CRDF expenditures.
[2] Costs allocated to power and municipal water are repaid with interest, including interest during construction.
[3] Repayment by water users toward construction costs over 50-year repayment period beyond a reasonable irrigation development period except 60-year period for Eden project and 68-year period for Paonia project.
[4] Includes $15,191,000 in irrigation revenues and $45,500,000 from municipal and industrial water users.
[5] Includes $27,838,000 of excess power revenues from the central Utah project powerplants accruing during the irrigation repayment periods of this project.
[6] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.
[7] Includes cost ($7,287,000) of authorized Eden project now nearing completion and $2,035,000 expended on Paonia project under previous authorization.

TABLE 2 (a).—*Summary of additional units of Colorado River storage project and additional participating projects*

Project	Type of report or data	State	Lands to be irrigated		Generating capacity	Municipal water (annually)	Stream depletion (annually)
			New	Supplemental			
			Acres	*Acres*	*Kilowatts*	*Acre-feet*	*Acre-feet*
Colorado River storage project, additional units:							
Cross Mountain	Feasibility	Colorado			60,000		70,000
Curecanti (940,000 acre-feet)	Reconnaissance	do			40,000		18,000
Flaming Gorge	Feasibility	Utah-Wyoming			72,000		56,000
Curecanti (modified plan)	Reconnaissance	Colorado			152,000		17,000
Juniper (in lieu Cross Mountain)	do	do			25,000		38,000
Participating projects, additional projects:							
Gooseberry	Feasibility	Utah		16,400			12,500
Navajo	do	New Mexico	137,250				341,400
San Juan-Chama	do	do		225,000		55,800	235,000
Savery-Pot Hook	do	Colorado-Wyoming	18,380	13,230			33,400
Dolores	Reconnaissance	Colorado	35,450	30,550			69,370
Sublette	do	Wyoming	72,000	12,000	2,200		108,000
Gunnison River projects:							
Fruitgrowers Dam extension	Feasibility	Colorado	1,850	2,000			5,540
Bostwick Park	Reconnaissance	do	1,040	5,830			4,800
Dallas Creek	do	do	15,750	6,190			29,900
East River	do	do	1,780	970			2,100
Fruitland Mesa	do	do	11,700	7,700			25,100
Grand Mesa	do	do	11,070	14,230			26,300
Ohio Creek	do	do	6,200	10,710			9,300
Tomichi Creek	do	do	12,180	15,400			17,700
Cliffs-Divide projects:							
Battlement Mesa	do	do	6,780	50			10,700
Bluestone	do	do	8,660	2,215			19,900
Eagle Divide	do	do	8,990	1,885			12,000
Parshall	do	do	24,410	3,100			28,600
Rabbit Ear	do	do	13,955	5,235			16,400
Troublesome	do	do	8,990	4,650			13,000
West Divide	do	do	40,500	25,110			88,100
Woody Creek	do	do	645	2,320			1,400

TABLE 2 (a).—*Summary of additional units of Colorado River storage project and additional participating projects*—Continued

Project	Type of report or data	State	Construction costs					Repayment of reimbursable costs [1]	
			Total	Non-reimbursable	Reimbursable allocations				
					Power	Municipal water	Irrigation	By water users [2]	By power [3]
Colorado River storage project, additional units:									
Cross Mountain	Feasibility	Colorado	$50, 225, 000		$36, 329, 000		$13, 896, 000		$50, 225, 000
Curecanti (940,000 acre-feet)	Reconnaissance	do	49, 305, 000		41, 205, 000		8, 100, 000		49, 305, 000
Flaming Gorge	Feasibility	Utah-Wyoming	82, 942, 000		52, 042, 000		30, 900, 000		82, 942, 000
Curecanti (modified plan)	Reconnaissance	Colorado	88, 500, 000		88, 500, 000				88, 500, 000
Juniper (in lieu Cross Mountain)	do	do	16, 348, 000		16, 348, 000				16, 348, 000
Participating projects, additional projects:									
Gooseberry	Feasibility	Utah	5, 760, 500	$33, 000			5, 727, 500	$2, 375, 000	3, 352, 500
Navajo	do	New Mexico	[4] 211, 237, 300	1, 298, 000			209, 939, 300	30, 730, 000	179, 209, 300
San Juan-Chama	do	do	[4] 135, 169, 000	470, 000		$26, 775, 000	107, 924, 000	54, 665, 000	80, 034, 000
Savery-Pot Hook	do	Colorado-Wyoming	10, 814, 000				10, 814, 000	1, 390, 000	9, 424, 000
Dolores	Reconnaissance	Colorado	24, 633, 000				24, 633, 000	1, 533, 000	23, 100, 000
Sublette	do	Wyoming	37, 099, 000		953, 000		36, 146, 000	1, 350, 000	35, 749, 000
Gunnison River projects:									
Fruitgrowers Dam extension	Feasibility	Colorado	1, 690, 000				1, 690, 000	470, 000	1, 220, 000
Bostwick Park	Reconnaissance	do	2, 634, 000				2, 634, 000	695, 000	1, 939, 000
Dallas Creek	do	do	10, 330, 000				10, 330, 000	950, 000	9, 380, 000
East River	do	do	212, 000				212, 000	95, 000	117, 000
Fruitland Mesa	do	do	11, 551, 000				11, 551, 000	1, 060, 000	10, 491, 000
Grand Mesa	do	do	20, 164, 000				20, 164, 000	30, 000	20, 134, 000
Ohio Creek	do	do	3, 402, 000				3, 402, 000	35, 000	3, 367, 000
Tomichi Creek	do	do	11, 523, 000				11, 523, 000	0	11, 523, 000
Cliffs-Divide projects:									
Battlement Mesa	do	do	5, 853, 700				5, 853, 700	645, 000	5, 208, 700
Bluestone	do	do	3, 329, 900				3, 329, 900	370, 000	2, 959, 900
Eagle Divide	do	do	3, 411, 700				3, 411, 700	305, 000	3, 106, 700
Parshall	do	do	11, 881, 900				11, 881, 900	1, 420, 000	10, 461, 900
Rabbit Ear	do	do	4, 733, 500				4, 733, 500	760, 000	3, 973, 500
Troublesome	do	do	5, 243, 000				5, 243, 000	725, 000	4, 518, 000
West Divide	do	do	79, 675, 600				79, 675, 600	5, 960, 000	73, 715, 600
Woody Creek	do	do	177, 700				177, 700	177, 700	0

[1] Costs allocated to power and municipal water are repaid with interest, including interest during construction.

[2] Repayment by irrigation water users toward construction costs over a 50-year repayment period following a reasonable development period.

[3] A power rate of more than 6 mills would be required for these storage units to repay their construction cost allocated to power in 50 years at 2.5 percent interest, and an extension of the payout period or an increase in the average power rate would be required to accomplish repayment of the irrigation costs.

[4] $800,000 of the $36,400,000 estimated cost for Navajo Dam and Reservoir allocated to the San Juan-Chama project for added capacity necessary to serve the San Juan-Chama project.

Statement on La Barge Project, Wyoming

The potential La Barge project would make a direct flow diversion from Green River, a principal tributary of the Colorado River, to provide for the irrigation of 7,970 acres of desert lands in Sublette and Lincoln Counties in southwestern Wyoming. Only about 300 acres of these lands receive any irrigation water at the present time. Their meager supply would likely be used on other lands outside the project area if the project was constructed. Water for domestic and stock-watering use on farms in the project area would be taken from project canals and from shallow wells that would be developed by the water users.

Project lands would generally be utilized for the support of livestock enterprises. Climatically adaptable crops, such as hay, small grain, pasture, and some garden crops would be produced. The principal livestock would be dairy cows and sheep. Analyses made indicate that an average farm of about 210 irrigated acres in the project area would provide the farm family with a reasonable standard of living, provide employment for the available family labor, and permit payment of operation, maintenance, and replacement costs and some payment toward construction costs of project facilities.

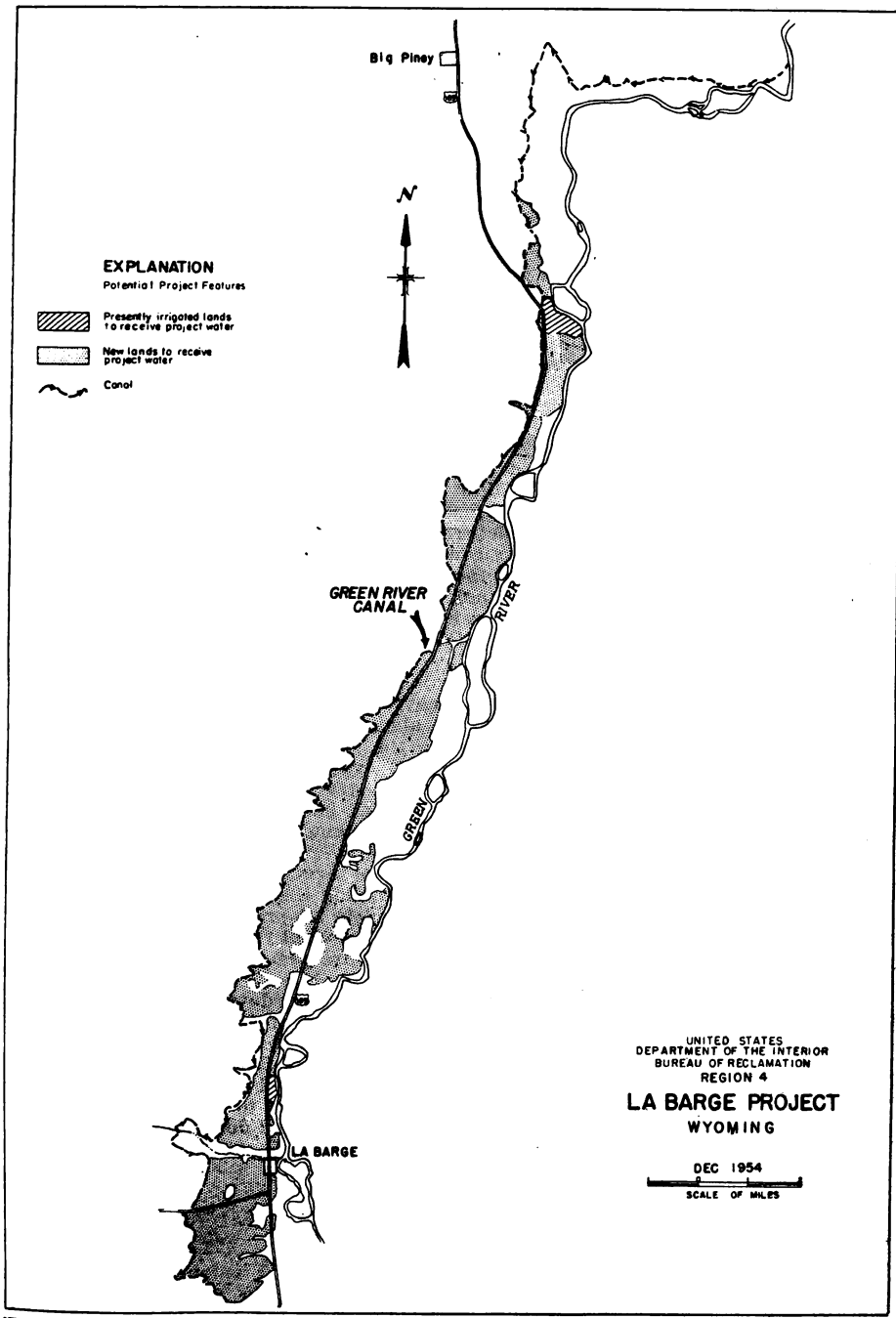
Detailed land clasification surveys show the project lands to be suitable for sustained production of crops under irrigation farming. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply of 24,300 acre-feet annually would be available for the project from direct flows with permissible shortages in occasional drought years. A water right for the project can be obtained under Wyoming State law.

Construction features of the project would include a main diversion and distribution canal with an initial capacity of 175 second-feet and extending approximately 40 miles along the west side of Green River, a few short laterals, and a few short drains as required. Construction of the main canal and the laterals would require about 2 years. Drains would not be completed until a few years after application of water to the land so that the extent of works required could be determined. A period of 2 to 3 years would be required to construct the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the La Barge project, Wyoming, dated January 1951, a supplement to the Colorado River storage project report dated December 1950. Results of current January 1953 estimates for this project plan are summarized in the following project summary tabulation.

Summary data, La Barge project, Wyoming

Irrigated acreage:	*Acres*
New lands	7,970
Principal agricultural production:	
Hay, pasture, small grain, dairy cows, and sheep.	
Water supply:	*Acre-feet*
Average annual increase in direct flow diversions	24,300
Average annual increase in storage yield	None
Stream depletion (average annual)	14,200
Project works:	
Construction features would include main diversion and distribution canal with initial capacity of 175 second-feet and extending approximately 40 miles along west side of Green River, a few short laterals and a few short drains.	
Construction cost and repayment:	
Estimated cost	$1,673,300
Reimbursable cost allocated to irrigation	1,673,300
Nonreimbursable allocation	None
Repayment by—	
Irrigation water users	495,000
Power revenues from Colorado River storage project	1,178,300
Total	1,673,300
Annual operation, maintenance, and replacement costs	14,700
Benefit-cost ratio	2.12 to 1



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Statement on Seedskadee Project, Wyoming

The potential Seedskadee project would divert water from Green River, a principal tributary of the Colorado River, to provide for the irrigation of 60,720 acres of arable dry lands lying along both sides of the river in Lincoln and Sweetwater Counties in southwestern Wyoming. Of the total area 51,960 acres would be included in family-sized farm units and 9,030 acres would be used for community pasture. Water for domestic and stock watering use in the project area would be obtained from project canals and from shallow wells that would be developed by the water users. Fish and wildlife values in the area would probably suffer minor damage as a result of project development. Recreation values would not be materially affected.

With project development, the irrigated lands would be utilized primarily for the support of livestock enterprises, particularly dairy cows and sheep. Climatically adaptable crops, such as grasses for hay and pasture, small grain, alfalfa, and some garden crops would be produced. Analyses made indicate that an average farm of about 200 irrigated acres in the Seedskadee area would be required to provide the farm family with a reasonable standard of living, provide employment for the available family labor, and permit payment of operation, maintenance, and replacement costs of project facilities and some payment toward construction costs of project facilities.

Detailed land classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming. Water supply studies based on records of streamflows as they have occurred in the past indicate that an adequate irrigation supply of 225,800 acre-feet annually would be available from direct flows for the project with permissible shortages in occasional drought years. A water right for the project can be obtained under Wyoming State law.

Principal construction features of the project would include a diversion dam on Green River, a system of main canals and laterals to convey water from the diversion dam and distribute it to project lands, two hydraulic driven pumps at drops in the distribution canals to lift water to some of the lands, and a few miles of artificial drains.

The Seedskadee diversion dam would consist of a low ogee overflow section 400 feet long, canal headworks, a sluiceway, and a dike 1,000 feet long. The Seedskadee diversion canal would extend along the west side of Green River and would convey water from the river to the project lands. It would be 19 miles in length and would have an initial capacity of 1,350 second-feet. The diversion canal would terminate at a bifurcation structure at the headings of the two main canal distribution systems, one serving lands west of the river and the other serving lands east of the river. Main canals in the distribution system would total about 160 miles in length. A lateral system would be constructed to deliver water from the main canals to individual farm tracts.

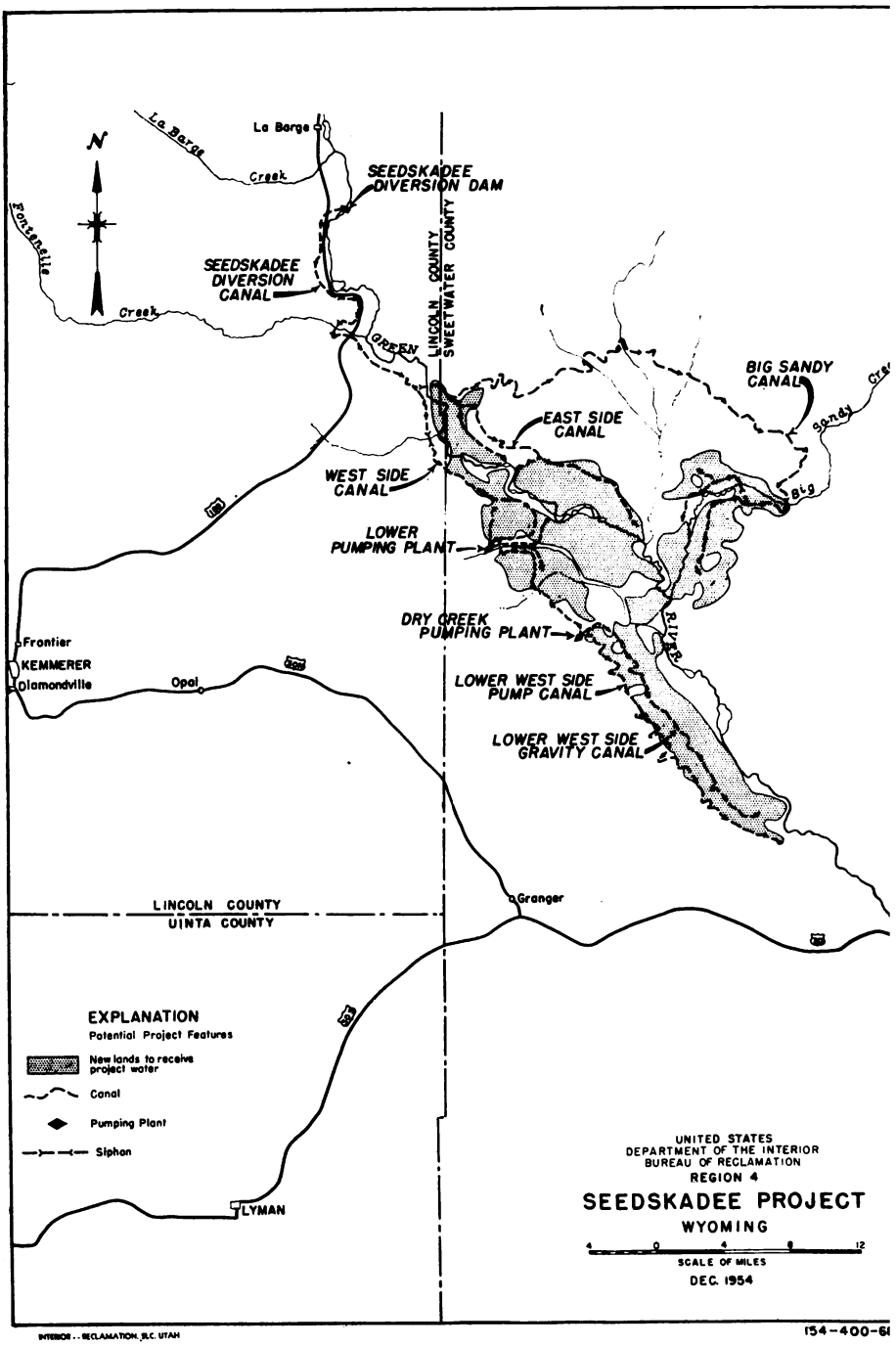
A construction period of about 8 years, including the completion of definite plan investigations, would be required to complete all project facilities except the drains. Drains would not be completed until several years after application of water to the lands so that the actual extent of drainage works required could be determined.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Seedskadee project, Wyoming, dated November 1950, a supplement to the Colorado River storage project dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the following project summary tabulation. Studies of the upper Green River Basin made subsequent to 1950 indicate that significant modifications in the project plan may be found desirable during the definite planning stage of the investigation.

Summary data, Seedskadee project, Wyoming [1]

Irrigated Acreage:		*Acres*
New lands		[2] 60,720
Supplemental		None
Total		60,720
Principal agricultural production:		
Hay pasture, and small grain—dairy cows and sheep.		
Water supply:		*Acre-feet*
Increase in average annual direct flow diversions		225,800
Increase in average annual storage yield		None
Stream depletion (average annual)		110,400
Project works:		
Construction features would include a diversion dam on the Green River, a system of main canals and laterals, two hydraulic-driven pumps and a few miles of drains. The diversion canal, 19 miles in length, would have an initial capacity of 1,350 second-feet. Main canals and laterals in the distribution system would total about 160 miles in length.		
Cost and repayment:		
Estimated cost		$23,272,000
Reimbursable cost allocated to irrigation		23,272,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$4,785,000	
Power revenues from Colorado River storage project	18,487,000	
Total		23,272,000
Annual operation, maintenance and replacement costs		136,600
Benefit-cost ratio		1.46 to 1

[1] Studies in the upper Green River Basin subsequent to 1950 indicate that enlargement of the project area and addition of some storage may be found desirable during the definite plan investigations of the potential project.
[2] Largely public domain.



Statement on Lyman Project, Wyoming

The potential Lyman project is contemplated as a means of improving the late-season irrigation water supply and thus of bettering agricultural production on 40,600 acres of land near the town of Lyman in Bridger Valley, a part of the upper Colorado River Basin in southwestern Wyoming. The lands are now irrigated with only a partial supply.

Because of the semiarid climate in the area, irrigation is necessary for successful crop production. Only grasses for hay and pasture, alfalfa, and some small grains can be produced to any extent as the growth of most other crops is precluded by a short growing season and untimely summer frosts that characterize the high 6,500 to 7,000-foot elevations of the project lands. Additional late-season irrigation water is needed to increase yields of the forage and grain crops to bolster the all-important local livestock industry. Principal livestock would be dairy cows and beef cattle.

The Lyman project would provide late-season irrigation water through construction of a dam and reservoir with 43,000 acre-feet total capacity at the Bridger site on Willow Creek to store the spring flood flows of Blacks Fork and its tributary, West Fork of Smiths Fork. Surplus flows of these streams, now largely used for excessive irrigation in the spring runoff season, would be conveyed to the reservoir by 2 feeder canals, 1 diverting from each of the streams. The water would be retained in the reservoir until needed and then released to the Willow Creek channel. Enlargement of a few miles of this channel and construction of three canals to divert from this enlarged channel would provide the necessary facilities along with the existing irrigation systems in the area to effect the distribution of the water to project lands. The existing canal systems would be improved and extended as necessary. Drains would be provided where necessary to improve the removal of unavoidable waste and excess surface waters on the irrigated lands and to protect the lands from accumulations of harmful salts.

Preliminary land-classification surveys indicate that project lands would be suitable for sustained irrigation farming although detailed surveys will be necessary to firmly establish their suitability. Some presently irrigated lands that may be found to be nonarable could be abandoned and their water supply transferred to readily accessible arable lands now idle.

Water-supply studies, based on records and estimates of streamflows as they have occurred in the past, indicate the project would increase the irrigation supply from storage by an average of 32,500 acre-feet annually and reduce the present average irrigation shortage of 37 percent to an average of 12 percent. A water right for the project can be obtained for the project as planned under Wyoming State law provided the necessary agreements and adjustments in water rights can be negotiated with holders of prior natural-flow rights in the project area.

A period of 5 or 6 years would be required to complete definite plan investigations and construction of the project facilities excepting the drains. The drains would not be completed until a few years after operation of the project and the actual extent of drainage required could be determined.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the "Lyman project, Wyoming" dated October 1950, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the following project summary tabulation.

Summary data, Lyman project, Wyoming

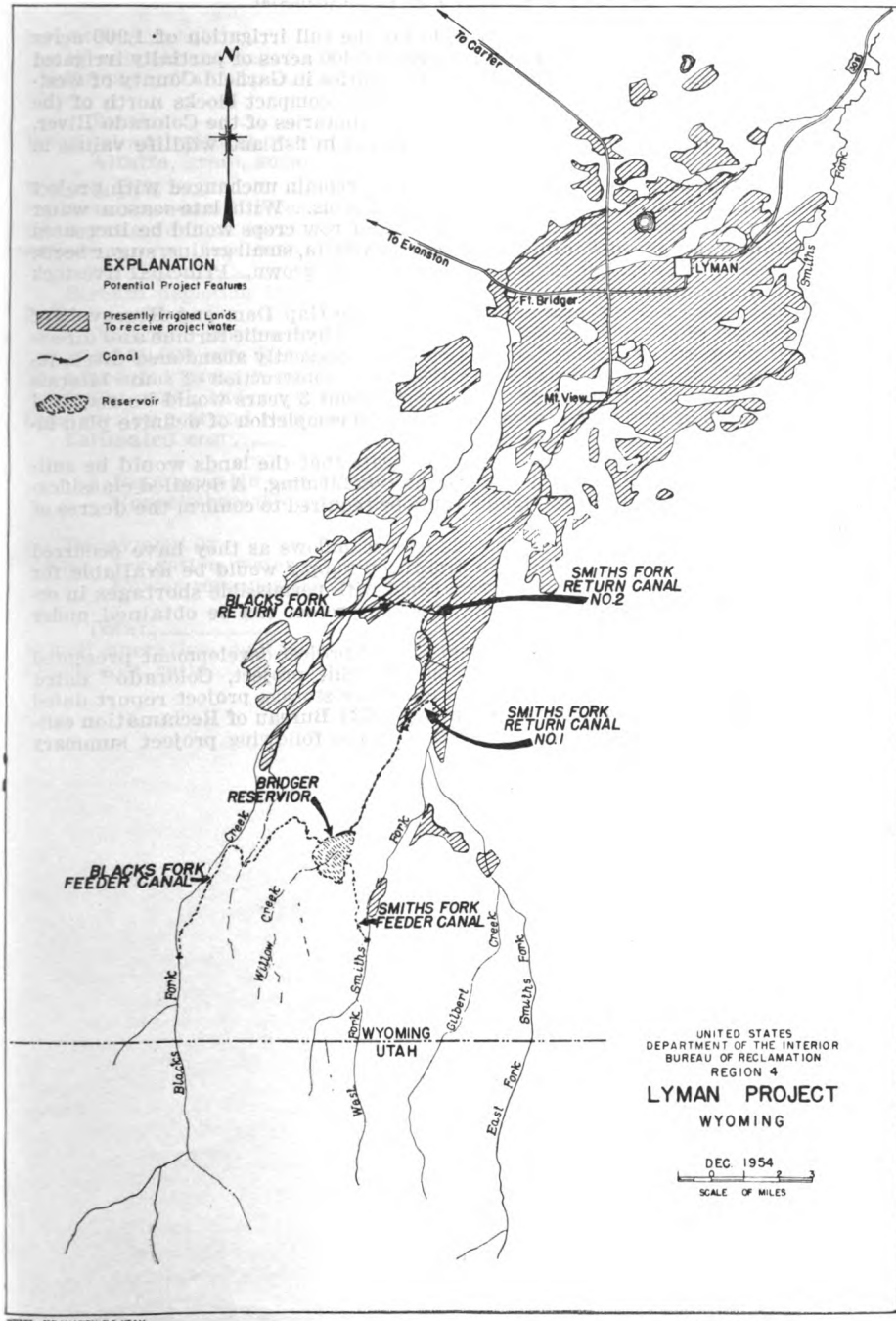
		Acres
Irrigated acreage:		
New lands		None
Supplemental		40,600
Total		40,600

Principal agricultural production: Hay, pasture, and small grain—dairy cows and beef cattle.

	Acre-feet
Water supply:	
Average annual increase in direct flow diversion	0
Average annual increase in storage yield	32,500
Stream depletion	None

Project works: Construction features would include the Bridger Dam and Reservoir with total of 43,000 acre-feet capacity, enlargement of the Willow Creek channel, construction of three canals and some drainage facilities.

Construction cost and repayment:		
Estimated cost		$10,564,000
Reimbursable cost allocated to irrigation		10,564,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$2,255,000	
Power revenues from Colorado River storage project	8,309,000	
Total		10,564,000
Annual operation, maintenance and replacement costs		45,900
Benefit-cost ratio		1.01 to 1.



INTERIOR—RECLAMATION SLC UTAH

145-400-31

Statement on Silt Project, Colorado

The potential Silt project would provide for the full irrigation of 1,900 acres of new land and provide supplemental water to 5,400 acres of partially irrigated land, all in the vicinity of Rifle and Silt, communities in Garfield County of west-central Colorado. The lands are situated in three compact blocks north of the Colorado River between Rifle and Elk Creeks, tributaries of the Colorado River. The project would also provide some enhancement in fish and wildlife values in the area.

The basic type of agriculture in the area would remain unchanged with project development because of climatic and soil conditions. With late-season water provided by the project, however, the plantings of row crops would be increased somewhat as would the yield of livestock feeds. Alfalfa, small grains, sugar beets, and potatoes would continue to be the principal crops grown. Principal livestock would be dairy cows, beef cattle and sheep.

Principal construction features include the Rifle Gap Dam and Reservoir of 10,000 acre-feet total capacity on Rifle Creek, a small hydraulic turbine and direct-connected pump at the dam, reconstruction of one presently abandoned ditch, rehabilitation of the existing Grass Valley Canal and construction of some laterals and drains. Except for minor drainage work, about 3 years would be required for construction of project features, including the completion of definite plan investigations.

Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification of the presently unirrigated lands would be required to confirm the degree of their suitability.

Water supply studies based on records of streamflows as they have occurred in the past indicate that an adequate irrigation supply would be available for the project from direct flows and storage yield with permissible shortages in occasional drought years. A water right for the project can be obtained under Colorado State law.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the "Silt project, Colorado" dated January 1951—a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the following project summary tabulation.

Summary data, Silt project, Colorado

Irrigated Acreage:	*Acres*
New lands	1,900
Supplemental	5,400
Total	7,300
Principal agricultural production:	
Alfalfa, grain, sugar beets, potatoes—dairy cows, beef cattle, and sheep.	
Water supply:	*Acre-feet*
Average annual increase in direct flow diversion	4,200
Average annual increase in storage yield	5,900
Total	10,100
Stream depletion (average annual)	5,800
Project works:	
Principal construction features include the Rifle Gap Dam and Reservoir with 10,000 acre-feet total capacity, a small hydraulic turbine and direct-connected pump, reconstruction of abandoned ditch, rehabilitation of an existing canal, and construction of some laterals and drains.	
Construction cost and repayment:	
Estimated cost	$3,356,000
Reimbursable cost allocated to irrigation	3,282,400
Nonreimbursable cost allocated to fish and wildlife	73,600
Repayment by:	
Irrigation water users	1,020,000
Power revenues from Colorado River storage project	2,262,400
Total	3,282,400
Annual operation, maintenance, and replacement costs	8,400
Benefit-cost ratio	1.71 to 1

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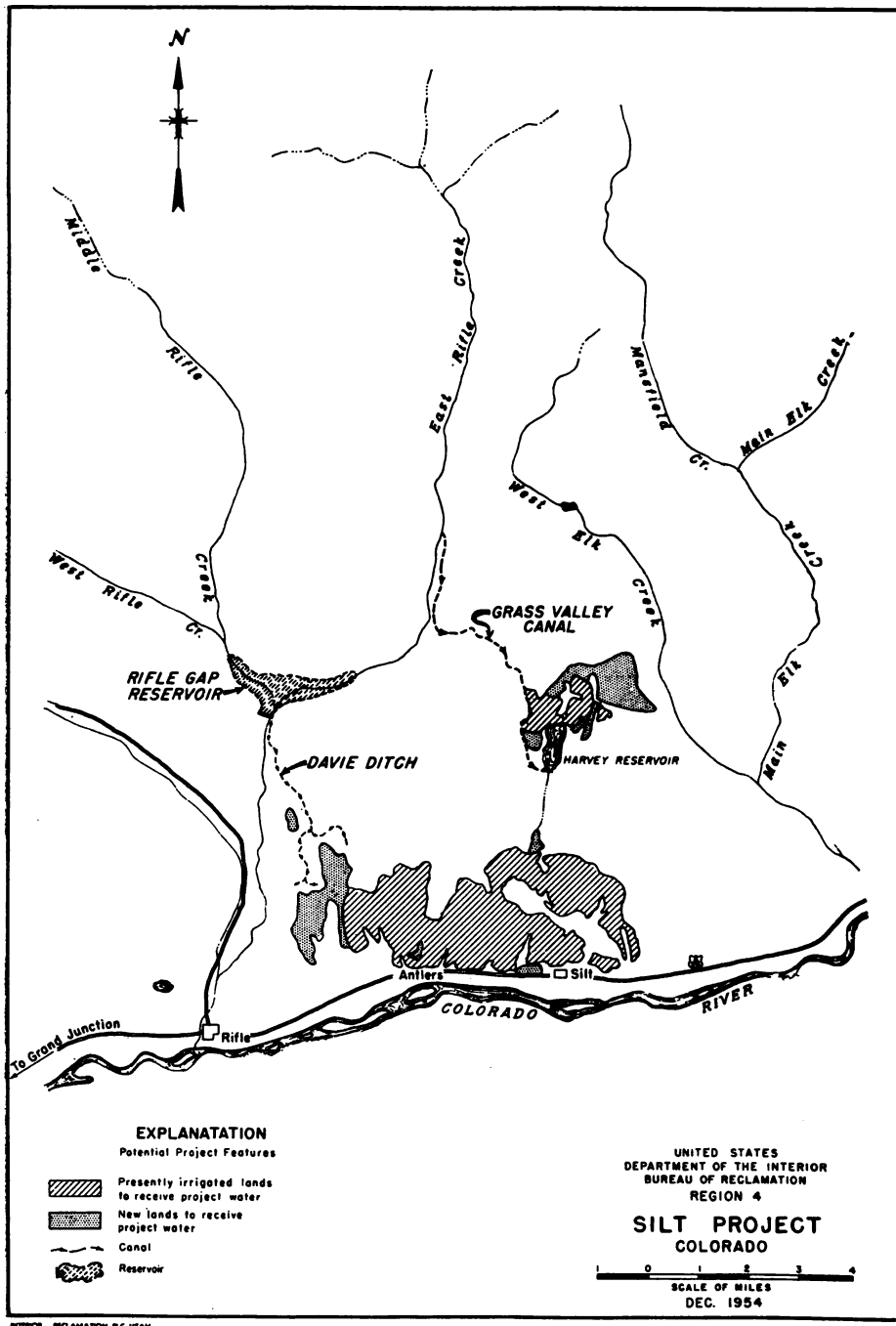


INTERIOR - - RECLAMATION SLC UTAH

514-400-13

Statement on Smith Fork Project, Colorado

The potential Smith Fork project in west-central Colorado would regulate surplus flows of Iron Creek and the Smith Fork of the Gunnison River, a tributary of the upper Colorado River, to increase the irrigation supply for 8,160 acres of land now partially irrigated, and provide a new supply for 2,270 acres now unirrigated.

Although an improved irrigation supply would permit new lands to be cultivated and result in better crop yields on presently irrigated lands, the cropping program is largely controlled by climatic, soil, and topographic conditions. Most of the acreage would continue to be utilized for the production of livestock feeds with hay, small grains, and pasture predominating. Increased feed production in the area would result mostly in increased dairy cows with some increase also in beef cattle, hogs, and poultry.

Detailed land-classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming.

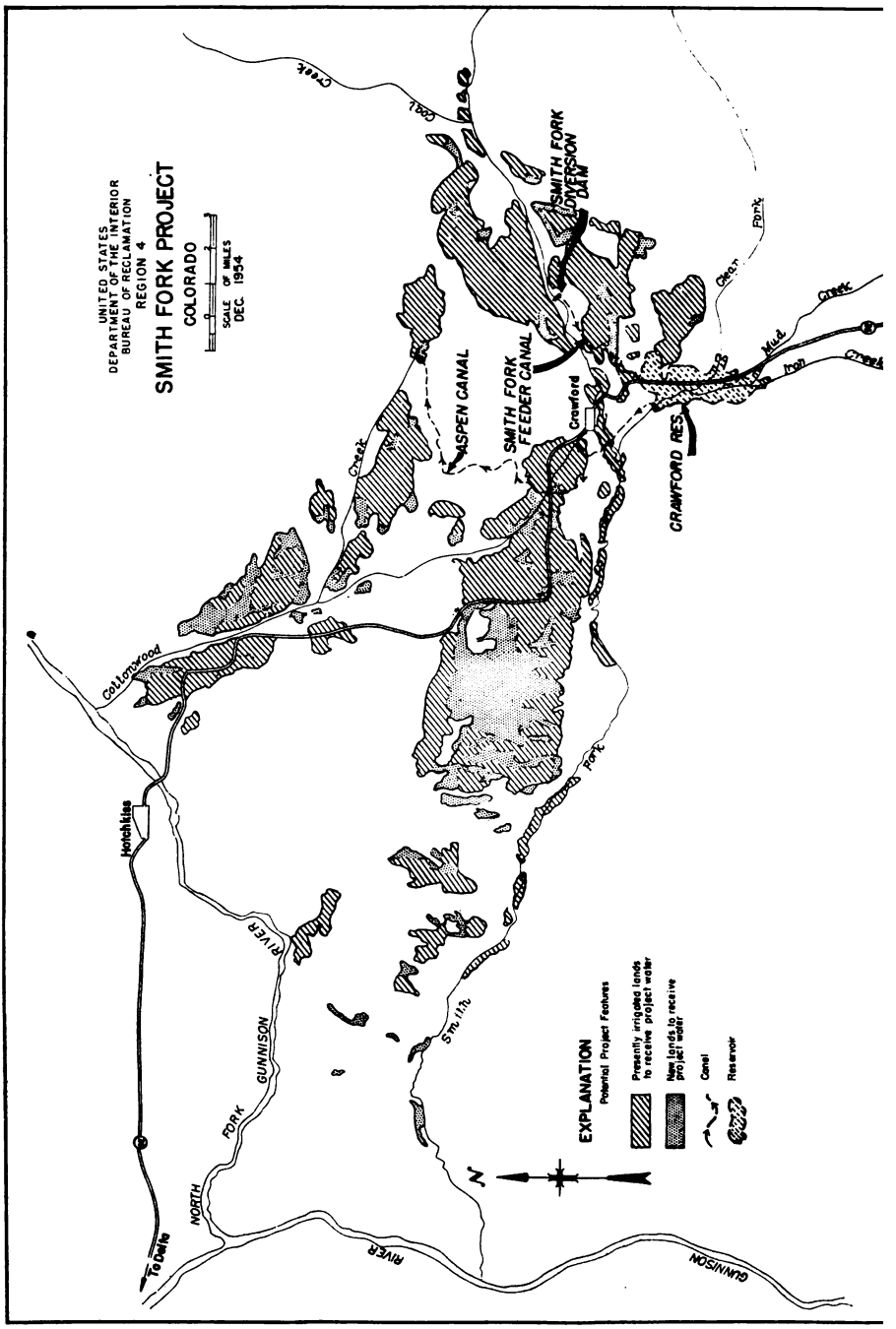
Water-supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project from direct flows and storage water, with permissible shortages in occasional drought years. A water right for the project can be obtained under Colorado State law.

Construction features of the project include a storage dam and reservoir with 14,000 acre-feet total capacity at the Crawford site on Iron Creek, the Smith Fork diversion dam, the 2.7 mile-long Smith Fork feeder canal of 100 second-feet to divert from Smith Fork to Crawford Reservoir, the 6.6-mile Aspen Canal of 145 second-feet initial capacity to convey water from Crawford Reservoir to part of the project lands and feed existing ditches and four small lateral canals. Existing irrigation facilities in the area would be utilized as fully as practicable. A period of 3 to 4 years would be required to complete definite plan investigations and construct the project works.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Smith Fork project, Colorado—a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the following project summary tabulation.

Summary data, Smith Fork project, Colorado

Irrigation acreage:	*Acres*
New lands	2,270
Supplemental	8,160
Total	10,430
Principal agricultural production:	
Alfalfa, pasture, and grain; dairy cows and beef.	
Water supply:	*Acre-feet*
Average annual increase from direct-flow diversions and storage	13,650
Stream depletion (average annual)	7,500
Project works:	
The construction features include the Crawford Dam and Reservoir, with 14,000 acre-feet of total capacity, Smith Fork diversion dam, the 2.7-mile-long Smith Fork feeder canal of 100 second-feet, 6.6-mile-long Aspen Canal of 145 second-feet and 4 small lateral canals.	
Construction cost and repayment:	
Estimated cost	$3,367,000
Reimbursable cost allocated to irrigation	3,343,000
Nonreimbursable cost allocated to recreation	24,000
Repayment by:	
Irrigation water users	1,045,000
Power revenues from Colorado River storage project	2,298,000
Total	3,343,000
Annual operation, maintenance, and replacement costs	8,400
Benefit-cost ratio	1.27 to 1



Statement On Paonia Project, Colorado

The potential Paonia project would divert water from the North Fork of the Gunnison River in the upper Colorado River Basin to improve the irrigation water supply, and thus the agricultural production, of 17,040 acres of land in west-central Colorado. Of these lands 14,830 acres are presently irrigated and 2,210 acres are arable but not now irrigated. Fish and wildlife values in the area would be enhanced and flood damages would be decreased.

The general type of farming now practiced in the area would be continued with project development but the additional irrigation supplies would make possible a more intensive crop production. Production of livestock foods and fruit, such as apples, peaches, and cherries, would continue to be the major crops grown. Principal livestock would be dairy cows and beef cattle.

Under the project plan, the Spring Creek Dam and Reservoir would be constructed at a site on Muddy Creek 1 mile above its junction with the North Fork River. The reservoir would have a capacity of 18,000 acre-feet, of which 11,000 acre-feet would be active and 7,000 acre-feet would be reserved for sediment retention and dead storage. The existing Fire Mountain Canal diverting from the North Fork River 5 miles below the Spring Creek Dam would be enlarged and extended. The enlarged canal would be capable of diverting an increased amount of natural streamflow during the early irrigation season and in the late season its supply would be supplemented by water released from the reservoir. In this manner the irrigation water supply for lands under the Fire Mountain Canal would be improved and through its extension the canal would also serve lands on Rogers Mesa that heretofore have been irrigated from Leroux Creek, a tributary of the North Fork River. The Leroux Creek water thus released from Rogers Mesa would be diverted into the higher Overland Canal, which would be improved and enlarged for this purpose, and used to augment the present irrigation supply for lands on Redlands Mesa. Beginning at a point on the Fire Mountain Canal 9 miles below its head, the Minnesota siphon would be constructed to convey part of the water southward 12,000 feet across the North Fork River to the existing Minnesota Canal.

Water-supply studies based on records of streamflows as they have occurred in the past indicate that with project development the irrigation supply for project lands would be increased by 18,500 acre-feet annually from direct flows and storage yield. The increase in stream depletion attributable to the development is estimated at an average of 9,000 acre-feet annually.

Land-classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. Some further detailed classification would be required to confirm the suitability of all the lands, particularly in the Leroux Creek and Minnesota areas.

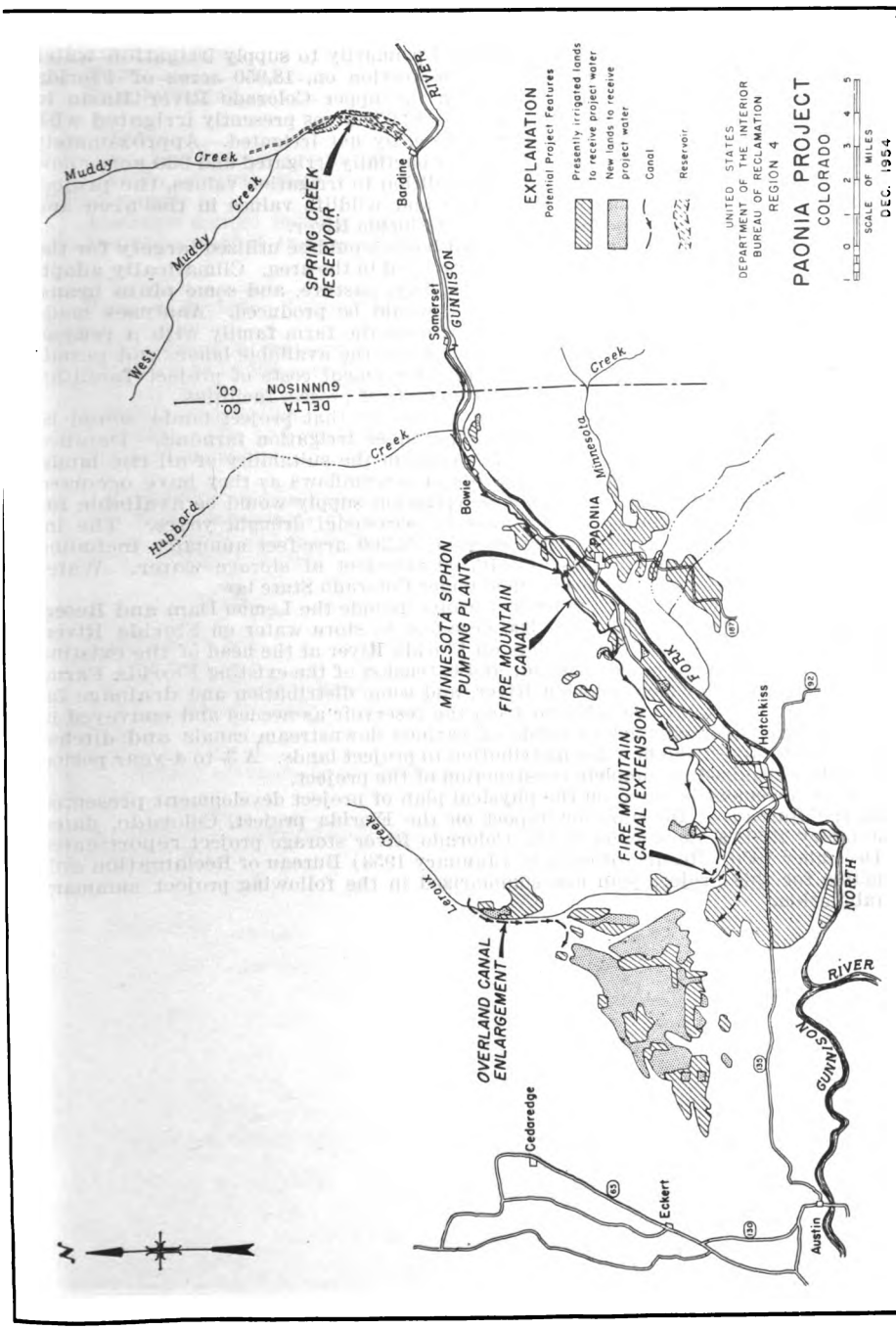
The project, exclusive of the Minnesota unit, was authorized, under a modification of the above-described plan, by act of Congress on June 25, 1947. Enlargement and extension of the Fire Mountain Canal has been essentially completed under this authorization. Reauthorization of the project, under the revised plan described above, was recommended in the Bureau of Reclamation report on the Paonia project, Colorado, dated February 1951, a supplement to the Colorado River storage project report dated December 1950.

Results of current (January 1953) Bureau of Reclamation estimates for the physical plan of the project is covered in the Paonia project report of February 1951 are summarized in the following project summary tabulation.

Summary data, Paonia project, Colorado

Irrigated acreage:		*Acres*
New lands		2,210
Supplemental		14,830
Total		17,040
Principal agricultural production:		
Alfalfa, grain, apples, peaches; dairy cows and beef cattle.		
Water supply:		*Acre-feet*
Average annual increase in direct-flow diversions		7,500
Average annual increase in storage yield		11,000
Total		18,500
Stream depletion (average annual)		9,000
Project works:		
The construction features include the Spring Creek Dam and Reservoir with 18,000 acre-feet total capacity, enlargement and extension of the Fire Mountain and Overland Canals and the Minnesota siphon. The enlargement and extension of the Fire Mountain Canal is essentially completed under prior project authorization.		
Construction cost and repayment:		
Estimated cost		$6,944,000
Reimbursable cost allocated to irrigation		6,791,600
Nonreimbursable cost allocated to—		
Flood control	$74,100	
Fish and wildlife	70,800	
Recreation	7,500	
Total		152,400
Repayment by:		
Irrigation water users [1]		2,414,000
Power revenues from Colorado River storage project		4,377,600
Total		6,791,600
Annual operation, maintenance, and replacement costs		11,100
Benefit-cost ratio		1.6 to 1

[1] Based on 68-year repayment period as provided under project authorizing act of 1947.



551-400-65

INTERIOR—BUREAU OF RECLAMATION

Statement on Florida Project, Colorado

The potential Florida project is planned primarily to supply irrigation water to, and thus increase the agricultural production on, 18,950 acres of Florida Mesa and Florida River Valley lands in the upper Colorado River Basin in southwestern Colorado. The lands include 12,650 acres presently irrigated with only a partial supply and 6,300 acres presently not irrigated. Approximately 1,000 acres of the land, including 100 acres partially irrigated and 900 acres now unirrigated, are owned by Indians. In addition to irrigation values, the project would provide some enhancement in fish and wildlife values in the area and affect some decrease in flood damages along Florida River.

With project development, the irrigated lands would be utilized largely for the support of livestock enterprises as now practiced in the area. Climatically adaptable crops, such as small grains, alfalfa, hay, pasture, and some pinto beans, potatoes, apples, vegetables, and berries, would be produced. Analyses made indicate that a family-size farm would provide the farm family with a reasonable standard of living, provide employment for the available labor, and permit payment of operation, maintenance, and replacement costs of project facilities and some payment toward the construction costs of project facilities.

Preliminary land-classification surveys indicate that project lands would be suitable for sustained production of crops under irrigation farming. Detailed land classification would be required to confirm the suitability of all the lands.

Water-supply studies based on records of streamflows as they have occurred in the past indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. The increase in irrigation supply would average 23,200 acre-feet annually including 6,900 acre-feet of direct flows and 16,300 acre-feet of storage water. Water rights for the project could be obtained under Colorado State law.

Construction features of the project would include the Lemon Dam and Reservoir with a total capacity of 23,300 acre-feet to store water on Florida River, construction of a new diversion dam on Florida River at the head of the existing Florida Farmers ditch, enlargement and extension of the existing Florida Farmers ditch diverting from Florida River, and some distribution and drainage facilities. Water would be released from the reservoir as needed and conveyed in the natural river channel to heads of various downstream canals and ditches that would divert the flow for distribution to project lands. A 3- to 4-year period would be required to complete construction of the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Florida project, Colorado, dated January 1951, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the following project summary tabulation.

Summary data, Florida project, Colorado

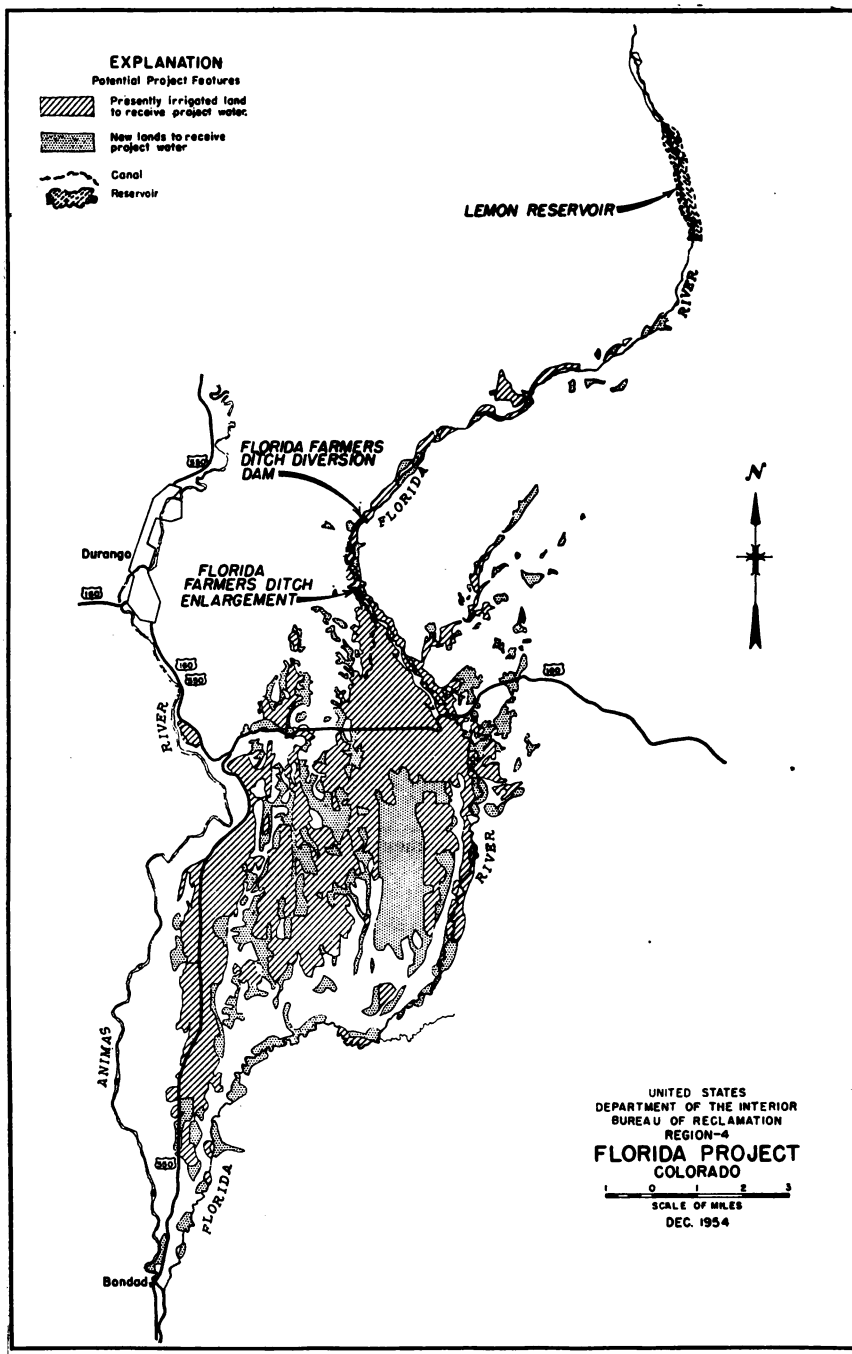
	Indian	*Non-Indian*	*Total*
Irrigated acreage:			
New	900	5,400	6,300
Supplemental	100	12,550	12,650
Total	1,000	17,950	18,950

Principal agricultural production:
Alfalfa, grains—dairy cows and beef.

Water supply:	*Acre-feet*
Average annual increase in direct flow diversions	6,900
Average annual increase in storage yield	16,300
Total	23,200
Stream depletion (annual average)	12,900

Project works:
Construction features include Lemon Dam and Reservoir with a total capacity of 23,300 acre-feet, a diversion dam on Florida River, enlargement and extension of existing Florida Farmers ditch, and some distribution laterals and drains.

Construction costs and repayment:		
Estimated cost		$6,941,500
Reimbursable allocation to irrigation		6,503,600
Nonreimbursable allocation to:		
Fish and wildlife	$208,700	
Flood control	229,200	
Total		437,900
Repayment by:		
Irrigation:		
Non-Indian lands		1,585,500
Indian lands		126,000
Total		1,711,500
Power revenues from Colorado River storage project		4,792,100
Total		6,503,600
Annual operation, maintenance, and replacement cost		12,600
Benefit-cost ratio		1.4 to 1



INTERIOR - - RECLAMATION, SLC. UTAH

519-400-10

Statement on Pine River Project Extension, Colorado and New Mexico

The potential Pine River project extension would provide distribution canals to deliver water made available by the existing Pine River project to irrigate 15,150 acres of land now unirrigated in southwestern Colorado and northwestern New Mexico. Of this acreage 1,940 acres are within the boundaries of the existing Pine River Indian irrigation project.

The Pine River project, consisting of Vallecito Dam and Reservoir of 126,280 acre-feet active capacity on Pine River, was authorized for construction in 1937 to provide storage water for 69,000 acres and was substantially completed and placed in operation by the Bureau of Reclamation in 1941. About half of the lands to be served were under canals and partially irrigated at the time of construction and now receive supplemental water from Vallecito Reservoir. The remaining lands had no distribution facilities at the time of construction. Facilities for these lands were not included as part of the original project as it was thought that the works required were relatively minor and could be undertaken by the water users with private capital. The required works proved so costly, however, that they have not been private constructed. As a result, canal systems for the lands that can be economically developed at the present time are planned for Federal construction as the Pine River project extension.

With development of the extension the irrigated lands would be utilized largely for the support of livestock enterprises as now practiced in the general locality. Major crops that would be produced on the extension lands are hay and small grains with some potatoes, pinto beans, and early maturing vegetables, and berries also grown. Principal livestock would be dairy cows and beef cattle.

The project extension would consist of the enlargement and extension of 8 major canals and ditches diverting from Pine River, the construction of 1 new diversion dam on Pine River, and the construction of a number of small distribution laterals. Over half the extension lands would be served by enlargement and extension of the existing King consolidated canal and construction of a new diversion dam at the head of this canal. The other canals and ditches to be enlarged and extended include the Pine River canal and the Myers-Asher, Bennet and Myers, Bear Creek, and Pine River, Sullivan, Shroder extension, and Thompson Epperson ditches. A period of 3 to 4 years would be required to complete definite plan investigations and construction of the extension works.

Preliminary land classification surveys indicate the extension lands to be suitable for sustained crop production under irrigation farming. A detailed classification is necessary to confirm the suitability of all the lands.

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate water supply would be available for the development from direct flows and storage water from the existing Vallecito Reservoir. A water right for the project can be obtained under Colorado and New Mexico State laws.

This statement is based on the physical plan of development presented in the report on Pine River project extension, Colorado and New Mexico, dated January 1951—a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this development plan are summarized in the following project summary tabulation.

Summary data, Pine River project extension, Colorado and New Mexico

	Colorado	New Mexico	Tot
Irrigated acreage:			
New lands:			
Indian	1,940	---	1,94
Non-Indian	12,580	630	13,21
Total	14,520	630	15,15

Principal agricultural production:

Alfalfa, grains—dairy cows and beef.

Water supply:	Acre-fe
Average annual increase in direct flow diversions	31,55
Average annual increase in storage yield	13,90
Total	[1]45,45

Storage at existing Vallecito Reservoir of 126,280 acre-feet active capacit of which some 20 to 25 percent of such capacity would be available to th Pine River project extension lands.

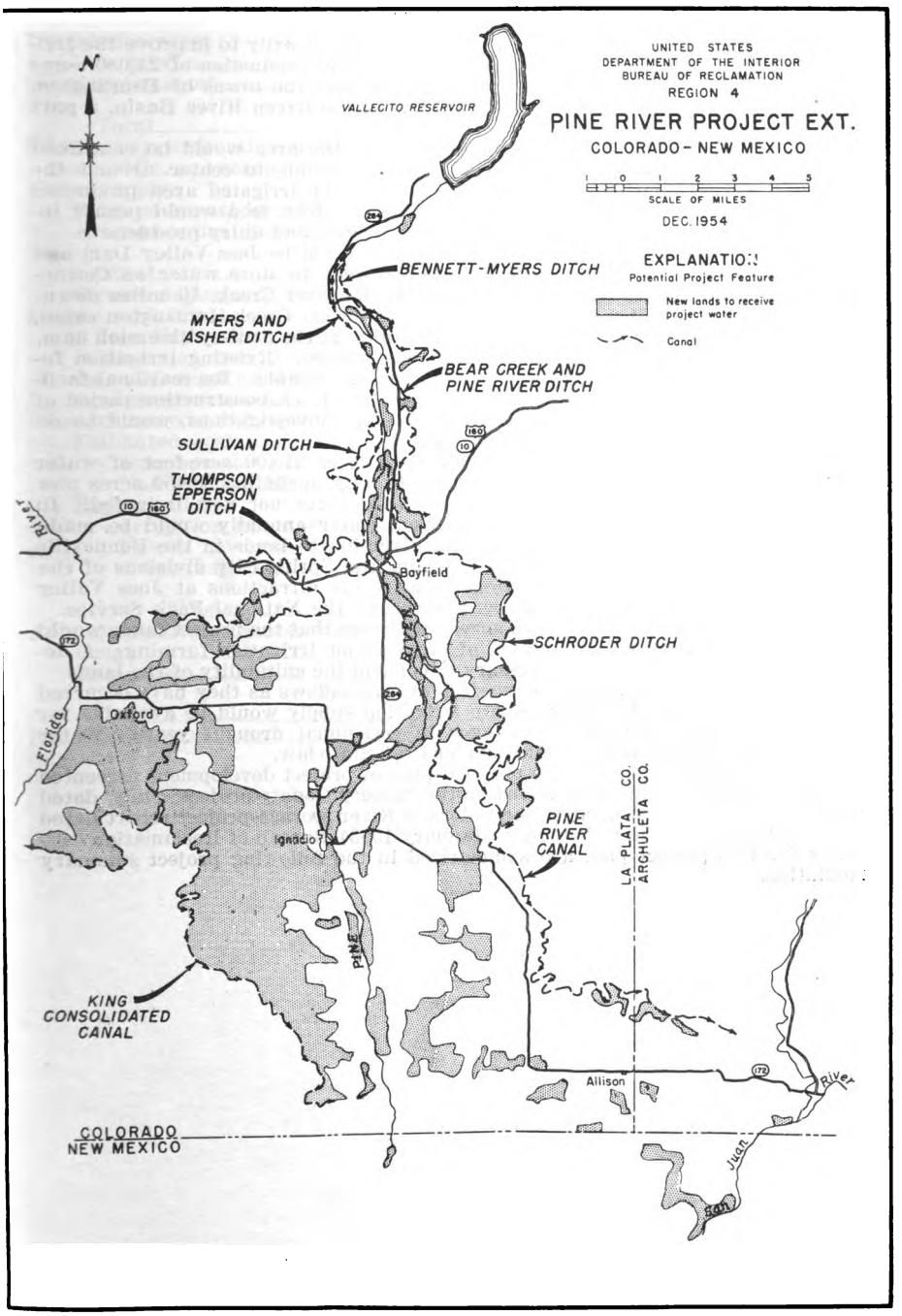
	Colorado	New Mexico	Tot
Average annual stream depletion (acre-feet)	27,200	1,100	28,30

Project works:

New construction features include enlargement and extension of eigl canals and ditches, a diversion dam, and a number of distribution lateral

Construction cost and repayment:		
Estimated cost		$5,027,00
Reimbursable allocation to irrigation		5,027,00
Nonreimbursable cost allocation		Non
Repayment by:		
Irrigation:		
Indian lands	$262,000	
Non-Indian lands	1,783,000	
Subtotal	2,045,000	
Power revenues from Colorado River storage project	2,982,000	
Total		5,027,00
Annual operation, maintenance, and replacement costs		18,95
Benefit-cost ratio		2.2 to

[1] Return flow of 4,250 acre-feet would also be diverted, making a total diversion of wat by extension lands of 49,700 acre-feet.



INTERIOR RECLAMATION S.L.C. UTAH 191-400-53

Statement on Emery County Project, Utah

The potential Emery County project is planned primarily to improve the irrigation water supply and thus better the agricultural production of 24,080 acres of land in Emery County in east central Utah near the towns of Huntington, Castle Dale, and Orangeville. The project is in the Green River Basin, a part of the upper Colorado River Basin.

The general type of farming now practiced in the area would be continued with project development. Agriculture would continue to center around the livestock industry with more than 90 percent of the irrigated area producing hay and grains. The increased production in livestock feed would permit increased production on the farm of beef, sheep, pork, and dairy products.

Principal construction features of the project would be Joes Valley Dam and Reservoir, with a total capacity of 57,000 acre-feet, to store water on Cottonwood Creek, the Swasey diversion dam on Cottonwood Creek, 10 miles downstream from Joes Valley, and the 17-mile Cottonwood Creek-Huntington canal, with an initial capacity of 250 second-feet, heading at the Swasey diversion dam. Some canal laterals and drains would be constructed. Existing irrigation facilities in the area would be utilized as fully as practicable. Recreational facilities would be provided at the Joes Valley Reservoir. A construction period of 3 to 5 years, including completion of definite plan investigations, would be required to complete construction of the project.

The project would make available an average of 31,400 acre-feet of water annually for 24,080 acres of land in Emery County, including 20,450 acres now irrigated with only a partial supply and 3,630 acres not now irrigated. In addition, about 1,000 acre-feet of late-season water annually would be made available by exchange for transmountain diversion to lands in the Bonneville Basin now partially irrigated by the Ephraim and Spring City divisions of the existing Sanpete project. Recreational and scenic attractions at Joes Valley Reservoir site would be developed as planned by the National Park Service.

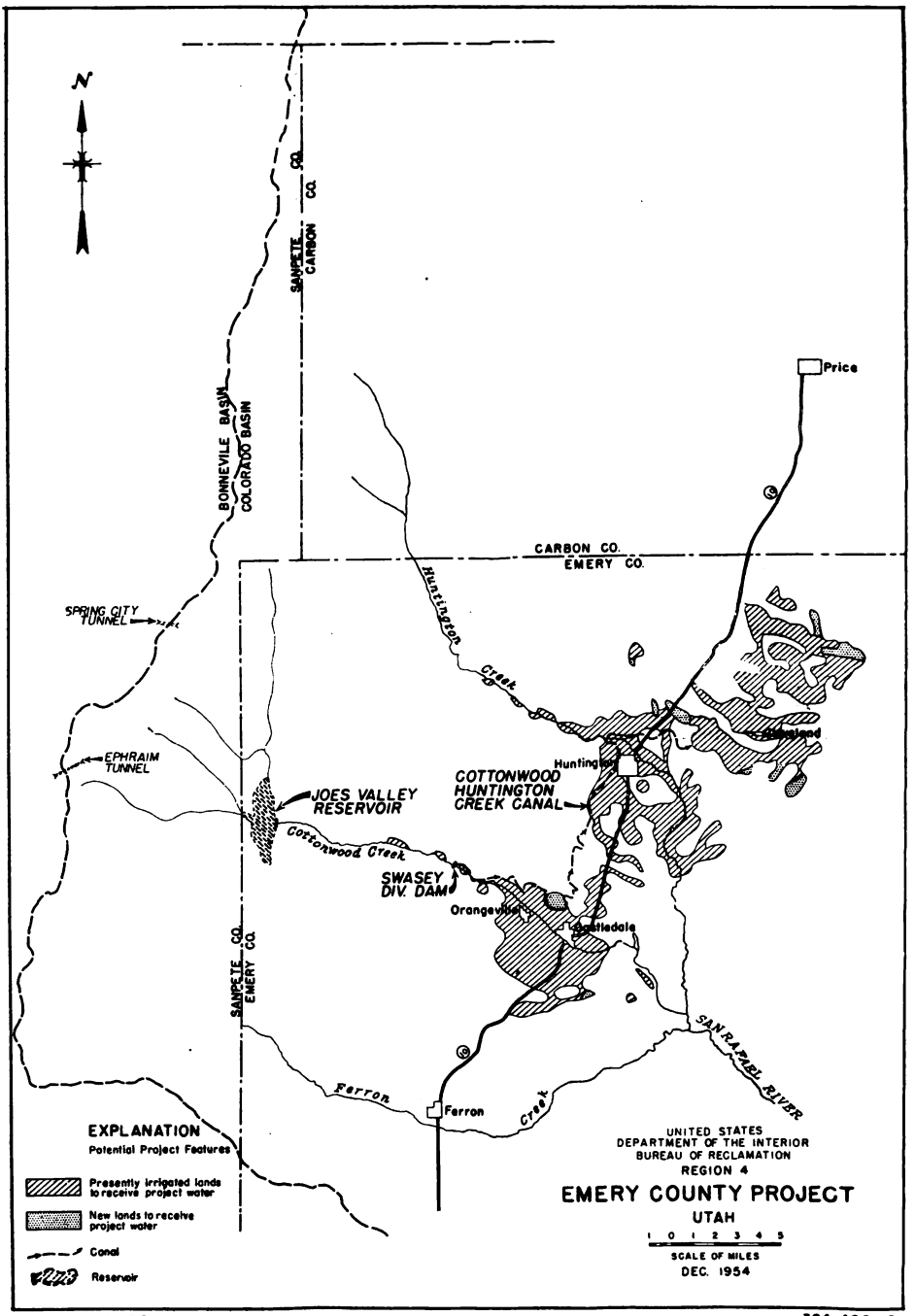
A preliminary land classification survey indicates that the project lands would be suitable for sustained production of crops under irrigation farming. A detailed classification would be necessary to confirm the suitability of the lands.

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project can be obtained under Utah State law.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the "Emery County project, Utah" dated February 1951, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) Bureau of Reclamation estimates for this project plan are summarized in the following project summary tabulation.

Summary data, Emery County project, Utah

Irrigated acreage:		*Acres*
New land		3,630
Supplemental		20,450
Total		24,080
Principal agricultural production: Alfalfa, grain, peaches, vegetables—dairy cows, beef cattle, and sheep.		
Water supply:		*Acre-feet*
Average annual increase in direct flow diversions		3,900
Average annual increase in storage yield		28,500
Total		32,400
Stream depletion (average annual)		15,500
Project works:		
Joes Valley Dam and Reservoir, with a total capacity of 57,000 acre-feet, a diversion dam, the 17-mile Cottonwood Creek-Huntington Canal with 250 second-feet initial capacity, and some canal laterals and drains are the principal construction features.		
Construction cost and repayment:		
Estimated cost		$9,865,500
Reimbursable cost allocated to irrigation		9,636,500
Nonreimbursable cost allocated to recreation		229,000
Repayment by:		
Irrigation water users	$3,715,000	
Power revenues from Colorado River storage project	5,921,500	
Total		9,636,500
Annual operation, maintenace and replacement costs:		
Irrigation	21,870	
Recreation	15,110	
Total		36,980
Benefit-cost ratio		1.38 to 1



Statement on Central Utah Project, Utah

The potential Central Utah project would provide for the multiple-purpose use in Utah of water tributary to the Colorado River. Under the general plan of development, streams draining the southern slope of the Uinta Mountains in the Uinta Basin in northeastern Utah would be intercepted and conveyed westerly by gravity flow through the Wasatch Mountains to the Bonneville Basin. The water would be collected by an aqueduct leading to a storage reservoir high in the Wasatch Mountains. From the reservoir the water would drop through a series of hydroelectric powerplants before being used for irrigation, municipal, and industrial purposes. Replacement of water and water for additional development in the Uinta Basin would be provided by a major diversion from the Green River and by smaller developments on local streams.

The project would serve an area along the eastern border of the Bonneville Basin. This area, the most highly developed region in Utah, includes the communities of Salt Lake City, Provo, Heber, Spanish Fork, Payson, Nephi, Richfield, Delta, and Fillmore. The flow of small local streams, practically the only source of water, falls far short of irrigation requirements.

In contrast to the Bonneville Basin, the Uinta Basin has abundant water resources as compared with the land resources. Streams flowing south from the Uinta Mountains—the Duchesne River and its major tributaries, together with Ashley Creek and Brush Creek—produce more than ample water for irrigation.

The project is of such magnitude it has been planned in two parts—the initial phase, a unified portion that could be developed and operate independently, and the ultimate phase. The two phases combined made up the comprehensive plan. Detailed investigations have been made only on the initial phase.

INITIAL PHASE OF PROJECT

In the initial phase of the project only Rock Creek and Uinta Mountain streams west of Rock Creek would be diverted into the Bonneville Basin where development would be limited to areas between Salt Lake City and Nephi. Initial phase development in the Uinta Basin would include the Jensen, Vernal, Upalco, and Duchesne River areas.

The initial phase of the project would provide for the irrigation of 28,540 acres of new land and 131,800 acres now irrigated but in need of more water. Full seasonal regulation would be provided for 42,600 acres of land in the Duchesne River area, more than half of which is owned by Indians or has been acquired from them. 48,800 acre-feet of water would be provided annually for municipal, industrial, and other miscellaneous uses. Powerplants with an installed capacity of 61,000 kilowatts would generate approximately 373 million kilowatt-hours of electric energy annually. Approximately 2.2 million kilowatt-hours of energy would be required by the project for irrigation and drainage pumping. Central Utah project powerplants would be interconnected with plants of the Colorado River storage project.

Preliminary land classification surveys of the project lands indicate that they would be suitable for sustained crop production under irrigation farming.

The potential Strawberry aqueduct would intercept flows of Rock Creek, Hades Creek, Wolf Creek, West Fork of the Duchesne River, Currant Creek, Layout Creek, and Water Hollow. Reservoirs to regulate inflow to the aqueduct would be provided on Rock Creek (Upper Stillwater), West Fork of the Duchesne River (Vat), and Currant Creek (Currant Creek).

The existing Strawberry Reservoir, terminus of the Strawberry aqueduct, would be enlarged through construction of the Soldier Creek Dam.

The existing outlet tunnel from the Strawberry Reservoir would be enlarged. Below the tunnel outlet would be constructed the Old West powerplant, Sixth Water aqueduct, Hammock powerplant, Tanner powerplant, Monks Hollow Dam, the Wasatch aqueduct as far as York Ridge near Santaquin, and the Castilla powerplant. The Mona-Nephi Canal would be constructed from York Ridge to Salt Creek near Nephi. The Mona Reservoir would be enlarged, the Elberta service pipeline and the existing Elberta Canal would be enlarged to distribute water from Mona Reservoir.

Use of Provo River water through exchange would require Bates Dam on Provo River, Hobble Creek Dam on Little Hobble Creek, the West Valley Canal, and the Front Dam. Provo Bay would be diked and drained and the upper 7 miles of the Jordan River channel would be enlarged.

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An exchange of water between the Bates Reservoir and numerous small storage reservoirs on the upper Provo River would be made to provide supplemental water to areas in the vicinity of Francis and Heber City. The Wallsburg area would be served by a similar exchange in Hobble Creek Reservoir. A dam would be constructed creating Round Knoll Lake for recreational and fish and wildlife purposes.

New project works to provide water for replacement and expanded irrigation and municipal use in the Uinta Basin would include Hanna Reservoir on the North Fork of Duchesne River, Starvation Reservoir on Strawberry River with a feeder canal from the Duchesne River, the Upalco Reservoir offstream from Lake Fork River, the Stanaker Reservoir with a feeder canal from Ashley Creek, and the Tyzack Reservoir on Brush Creek.

Construction of some new distribution laterals and drains would be required where existing facilities are not adequate to serve the area and where new lands are developed.

Necessary distribution and treatment facilities for municipal and industrial water within the communities would be constructed and financed by local interests.

Transmission lines for delivery of project power would be constructed to Salt Lake City on the north and to Manti on the south.

Facilities would be constructed for development of fish and wildlife, recreation, and forest resources in general as recommended.

Features would be constructed in an orderly sequence and as water became available irrigation development would be undertaken at different times in 13 areas or blocks, extending over a 13-year period; municipal and industrial water would be supplied in 3 different areas with construction extending over a 7-year period and construction of the 4 hydroelectric plants would require 8 years before reaching full production.

The operation of various existing facilities would require modification for correlation with the construction and operation of works planned for the Central Utah project. Among the principal features in the Bonneville Basin affected would be the Strawberry Reservoir outlet tunnel, canals, and powerplants of the Strawberry Valley project; Deer Creek Reservoir, Provo Reservoir Canal, and Salt Lake aqueduct of the Provo River project; Utah Lake; and Mona Reservoir. Principal facilities in the Uinta Basin similarly affected would include Strawberry Reservoir of the Strawberry Valley project, Moon Lake and Midview Reservoirs and canals of the Moon Lake project, works of the Uinta Indian irrigation project, and various other structures on the Duchesne River, Ashley Creek, and Brush Creek systems. There would be a minor effect on some public and private power facilities in both basins.

This statement on the Central Utah project, except as otherwise noted in the following paragraphs, is based on the physical plan of development presented in the Bureau of Reclamation report on Central Utah project, Utah, dated February 1951—a supplement to the Colorado River storage project report dated December 1950. Significant modifications may be found in the project plan during the definite planning stage of the investigation.

Since preparation of the 1951 report, the communities in eastern Duchesne County have constructed a municipal water pipeline and this feature would therefore be excluded from the project. As a result of eliminating the pipeline, about 2,300 acre-feet of Upalco Reservoir water is considered as a supplemental supply to 2,300 additional acres of land in the Upalco area. A refinement of the water supply studies for lands in the Duchesne River area—Indian- and white-owned—shows that 4,070 acres of white lands formerly considered as receiving replacement water would receive supplemental water instead. Allowances for these revisions in plan are incorporated in the results of current estimates as shown on page 6.

Results of current (January 1953) estimates are shown on the following two summary data sheets.

Summary data, Central Utah project initial phase, Utah

	Acres
Irrigated acreage:	
New land	28,540
Supplemental	131,840
Total	160,380

Principal agricultural production:

Alfalfa, grain, fruit, vegetables, sugar beets, tomatoes—dairy cows, beef cattle, and sheep.

Water supply:

Average annual increase in supply:

Purpose	Uinta Basin	Bonneville Basin	Total
Irrigation:	*Acre-feet*	*Acre-feet*	*Acre-feet*
Direct flow	----------	None	----------
Return flow and salvage	----------	31, 500	----------
Storage yield	----------	97, 500	----------
Subtotal	[1] 46, 200	129, 000	175, 000
Municipal and industrial:			
Direct flow	----------	None	----------
Storage	----------	44, 300	----------
Subtotal	[1] 4, 500	44, 300	48, 800
Project summary:			
Direct flow	----------	None	----------
Return flow and salvage	----------	31, 500	----------
Storage yield	----------	141, 800	----------
Total	[1] 50, 700	173, 300	224, 000
Stream depletion (Colorado River)	47, 600	141, 800	189, 400

[1] Water supplied by direct flow and storage.

Project works:

The principal project features would include construction of the 36.8-mile-long Strawberry aqueduct along the south slope of the Uinta Mountains intercepting Uinta Basin streams as far east as Rock Creek, enlargement of the Strawberry Reservoir through construction of the Soldier Creek Dam, an enlargement of the Strawberry Reservoir tunnel, 4 powerplants with a combined generating capacity of 61,000 kilowatts, numerous reservoirs including 5 with capacities over 30,000 acre-feet:

	Acre-feet total capacity
Starvation Reservoir	160,000
Upper Stillwater Reservoir	31,500
Strawberry Reservoir	1,370,000
Stanaker Reservoir	37,000
Bates Reservoir	65,000

Aqueducts (including the 28.4-mile-long Wasatch) and canals and distribution systems as necessary to deliver and utilize the increased water supply. Drainage would be provided when necessary.

Construction cost and repayment, initial phase:			
Estimated cost			$231,044,000
Reimbursable cost allocated to—			
Irrigation		$127,354,000	
Power		46,699,000	
Municipal and industrial water		45,500,000	
Ultimate development		5,500,000	
Total			225,053,000
Nonreimbursable cost allocated to—			
Flood control		$3,113,000	
Recreation		2,830,000	
Forest resource development		48,000	
Total			5,991,000
Repayment of reimbursable costs by—			
Irrigation costs:			
From water users	$15,191,000		
From Central Utah project power revenue	[1] 27,838,000		
From Colorado River storage project power revenues	[2] 84,325,000		
Total		$127,354,000	
Power costs from project power revenues		46,699,000	
Municipal and industrial water costs by users		45,500,000	
Total repayment			219,553,000

Annual operation, maintenance, and replacement costs:	
Irrigation	253,930
Power	445,900
Municipal and industrial water	69,160
Total	768,990
Benefit-cost ratio	1.23 to 1

[1] Available from net power revenues from Central Utah project powerplants over a 17-year period following payment of CUP power costs but prior to the end of the 50-year repayment period on the last irrigation block.

[2] A 1-mill tax under the Utah Water Conservancy Act could appreciably reduce this amount.

THE COMPREHENSIVE PLAN

When fully developed the Central Utah project would provide a full irrigation water supply for 200,000 acres of new land, a supplemental supply for 239,900 acres now inadequately irrigated, and 48,800 acre-feet of water to meet foreseeable demands for municipal, industrial, and other miscellaneous purposes. Project powerplants would have an installed capacity of 249,000 kilowatts and generate almost 1.2 billion kilowatt-hours of electric energy annually. Additional power potentialities exist and will be evaluated as the investigations progress.

The flow of all important streams on the south slope of the Uinta Mountains would be intercepted by the potential 110-mile aqueduct and conveyed to the Strawberry Reservoir. The flow of Carter Creek on the Uintas' northern slope would be brought to the southern slope. The western 36.8 miles of the aqueduct, extending from Rock Creek to the Strawberry Reservoir, would consist of 2 parallel bores.

Water would be released from the Strawberry Reservoir to the Bonneville Basin through two tunnels. In its 12-mile descent to the Bonneville Basin floor, a drop of about 2,600 feet, the water, including the water of the existing Strawberry Valley project, would pass through a series of hydroelectric powerplants, and then would be divided, part continuing to the south and part being diverted to the north.

During the irrigation season the water continuing south would be distributed for irrigation and other purposes in areas as far south as Fillmore. During the nonirrigation season water used through the powerplants and continuing south would be stored in the Dyer Reservoir for irrigation of the lands in the vicinity of Fillmore. Water of the Sevier River could be stored in existing reservoirs by exchange and used for irrigation of lands along the upper reaches of the river, principally near Richfield and on the lower reaches near Delta.

Water diverted during the irrigation season to the north would be used for irrigation and other purposes in the area from Santaquin to Springville now partially served by the Strawberry Valley project. During the nonirrigation season releases would flow down Spanish Fork River to Utah Lake, replacing Provo River water stored in the potential Bates Reservoir on the Provo River and the potential Hobble Creek Reservoir, a tributary. Project water stored in Bates and Wallsburg Reservoirs would be used for irrigation, municipal, and industrial purposes in the Heber-Francis-Wallsburg areas and in the Provo-Salt Lake City region as well as the western part of the Jordan River Valley.

Where practicable the project reservoirs would impound water for recreational and fish and wildlife purposes, thus providing partial compensation for damages to these purposes.

A dike would be constructed across the mouth of Provo Bay, an arm of Utah Lake, and the bay drained, reducing evaporation losses and reclaiming 9,340 acres of land. The diking of Goshen Bay of Utah Lake, authorized as a part of the Provo River project but not yet undertaken, would permit the south 26,000 acres of Utah Lake to be drained, reducing the average annual evaporation by 60,000 acre-feet.

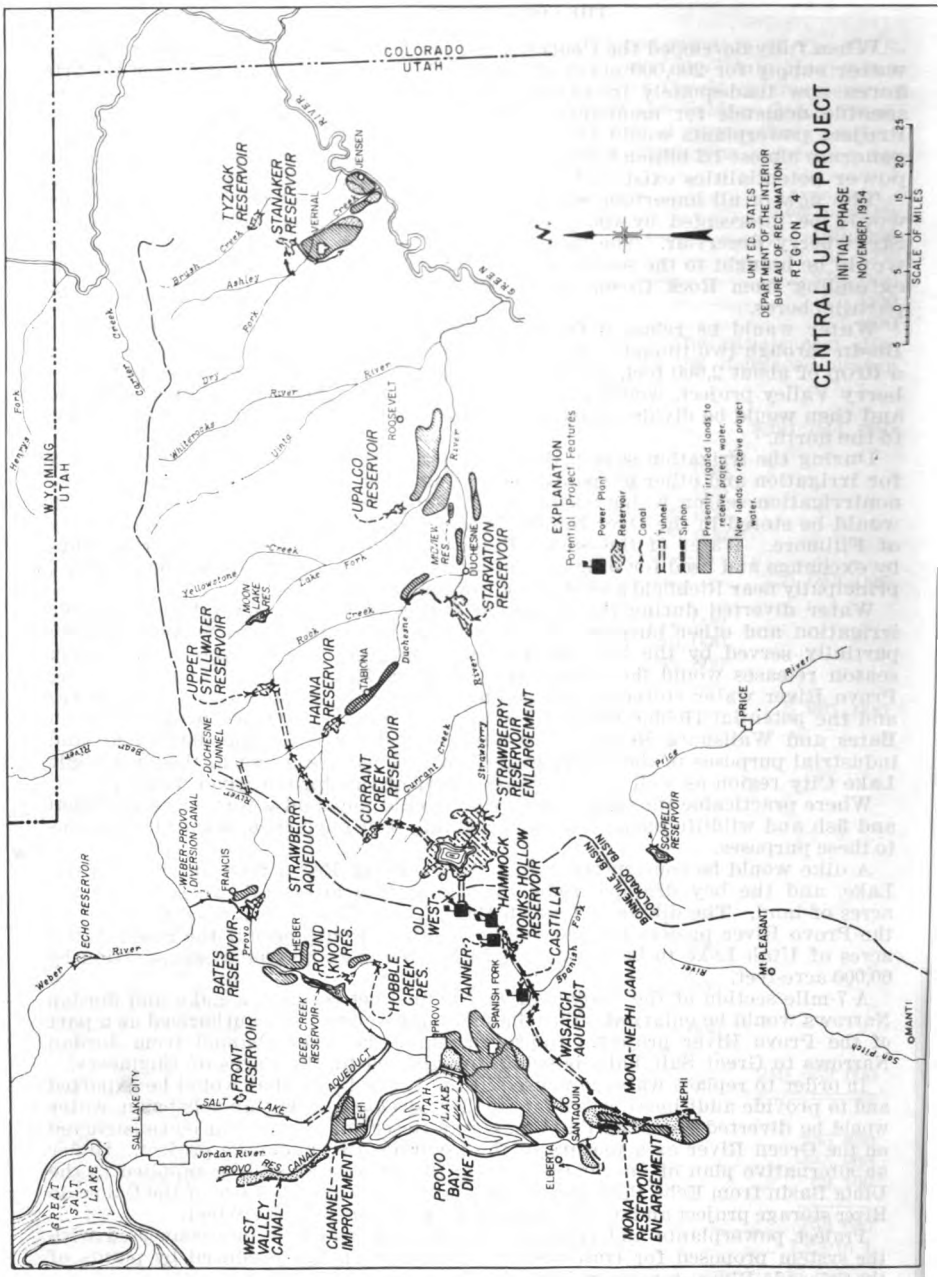
A 7-mile section of the Jordan River Channel between Utah Lake and Jordan Narrows would be enlarged. The channel improvement was authorized as a part of the Provo River project. Improvement of the river channel from Jordan Narrows to Great Salt Lake is being investigated by the Corps of Engineers.

In order to replace water now used in the Uinta Basin that would be exported and to provide additional water for further development within this basin, water would be diverted from the Flaming Gorge Reservoir that would be constructed on the Green River as a feature of the Colorado River storage project. Under an alternative plan of development Green River water could be supplied to the Uinta Basin from Echo Park Reservoir, another potential feature of the Colorado River storage project and would be pumped an average lift of 170 feet.

Project powerplants and transmission systems would be interconnected with the system proposed for transmission of electric energy produced by plants of the Colorado River storage project.

Rights to flows of Uinta Basin streams have been acquired by both white settlers and Indians. The Central Utah project would largely control the Uinta Basin's surplus waters. Much of the water would be exported, but that needed for further development in the Uinta Basin would be provided directly from the Green River.

Annual depletions to the Colorado River at the sites of use are expected to average 800,600 acre-feet, or one-half of the water available to Utah under the terms of the upper Colorado River Basin compact.



Statement on Hammond Project, New Mexico

The potential Hammond project would divert waters of San Juan River to provide an irrigation supply for 3,670 acres of arable land now unirrigated. The lands lie along the south side of the river in a narrow 20-mile strip opposite the towns of Blanco, Bloomfield, and Farmington, in northwestern New Mexico.

The principal crops that would be grown on the lands with project development would be alfalfa, apples, corn, beans, and barley. Most of the farms are of the fruit-crop and dairy-field-crop types.

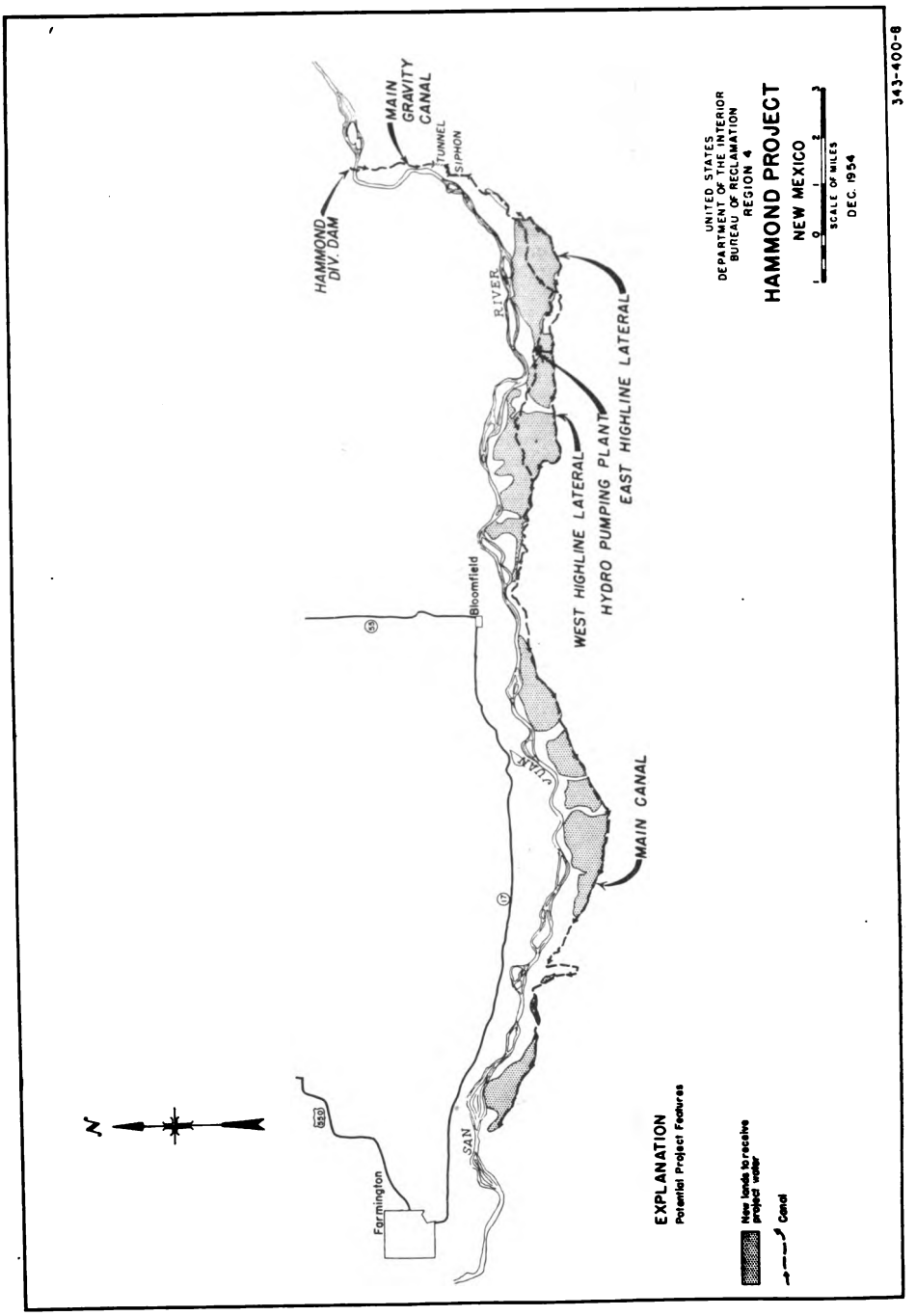
Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification would be necessary to confirm the suitability of all the lands.

Water-supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply of 18,400 acre-feet annually would be available for the project from direct flows with permissible shortages occurring in occasional drought years. A water right for the project can be obtained under New Mexico State law.

Project works would include the Hammond diversion dam on San Juan River, a 28-mile main gravity canal, a hydraulic turbine-driven pumping plant, the east highline lateral, the west highline lateral, minor distribution ditches, and a drainage system. A period of about 2 or 3 years would be required to complete definite plan investigations and construction of project works except the drains. A few years' operation of the project would be necessary to determine the extent of drainage actually required.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the Hammond project, New Mexico, dated November 1950, a supplement to the Colorado River storage project report dated December 1950. Results of current (January 1953) estimates for this project plan are summarized in the following project summary tabulation.

Studies of the potential nearby Navaho project subsequent to 1950 indicate that it might be found desirable to materially modify the plan for serving the Hammond project lands during the definite plan investigations.



Summary data, Hammond project, New Mexico

Irrigated acreage:		*Acres*
New land		3,670
Principal agricultural production:		
Alfalfa grains, beans, some fruit—dairy cows and sheep.		
Water supply:		*Acre-feet*
Average annual increase in direct flow diversion		18,400
Average annual increase in storage yield		None
Stream depletion (average annual)		7,900
Project works:		
Construction features include Hammond diversion dam on San Juan River, a 28-mile 86-second-foot main gravity canal, a small hydraulic turbine-driven pump, distribution laterals, and drains.		
Construction cost and repayment:		
Estimated cost		$2,302,000
Reimbursable allocation to irrigation		2,302,000
Nonreimbursable allocation		None
Repayment by—		
Irrigation water users	$370,000	
Power revenues from Colorado River storage project	1,932,000	
Total		2,302,000
Annual operation, maintenance and replacement costs		16,100
Benefit-cost ratio		2.8 to 1

STATEMENT ON EDEN PROJECT, WYOMING

When completed the Eden project in southwestern Wyoming will divert water from the Big and Little Sandy Creeks in the upper Colorado River Basin to irrigate 10,660 acres of arable lands not now irrigated and will replace or otherwise rehabilitate the major features of the irrigation system that heretofore was utilized to irrigate 9,540 acres.

Climatically adapted crops in the area such as alfalfa, pasture grasses, and small grains, will be produced on the project lands largely in conjunction with livestock operations centered around dairy cows, beef, and farm flocks of sheep and of chickens.

Construction of the Eden project was originally approved by the President on September 18, 1940, as a water conservation and utilization project under the act of August 11, 1939 (53 Stat. 1418). Work on the project was about 16 percent completed when stopped by order of the War Production Board in December 1942. Completion of the project was subsequently authorized by act of June 28, 1949, (Public Law 132, 81st Cong., 1st sess.). Construction of the project under the latter authorization is now well advanced with two major features of the project already completed and work currently underway on some of the other project features. The latter act provided for "such modification in the physical features as the Secretary of the Interior may find will result in greater engineering and economic feasibility: *Provided*, That of the construction costs of the irrigation features of the project not less than $1,500,000 for the project of twenty thousand irrigable acres, or a proportionate part thereof based on the actual irrigable area as determined and announced by the Secretary of the Interior upon completion of the project, shall be reimbursed by the water users in not to exceed sixty years * * * *Provided further*, That construction costs of the irrigation features of the project which are not hereby made reimbursable by the water users shall be set aside in a special account against which net revenues derived from the sale of power generated at the hydroelectric plants of the Colorado River storage project in the upper basin shall be charged when such plants are constructed."

The current plan of the project is covered in a definite plan report prepared by the Bureau of Reclamation and dated May 1953. Construction features of the project include:

Big Sandy Dam and dikes (now completed) on Big Sandy Creek to form Big Sandy Reservoir of 39,700 acre-feet total storage capacity.

Means Canal (now completed) to convey water from Big Sandy Reservoir to the west side lateral and to the existing Eden Canal.

West side lateral to serve lands on the west side of Big Sandy Creek.

Eden Creek enlargement and relocation below the terminus of the Means Canal to serve lands east of Big Sandy Creek.

Little Sandy Canal rehabilitation and extension to connect with the upper section of the Eden Canal.

Enlargement of existing lateral system served by Eden Canal to serve both presently irrigated and new lands under that canal.

Project drainage system.

A detailed classification survey shows the lands of the project to be suitable for sustained crop production under irrigation farming.

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project area from direct flows and storage with permissible shortages in occasional drought years.

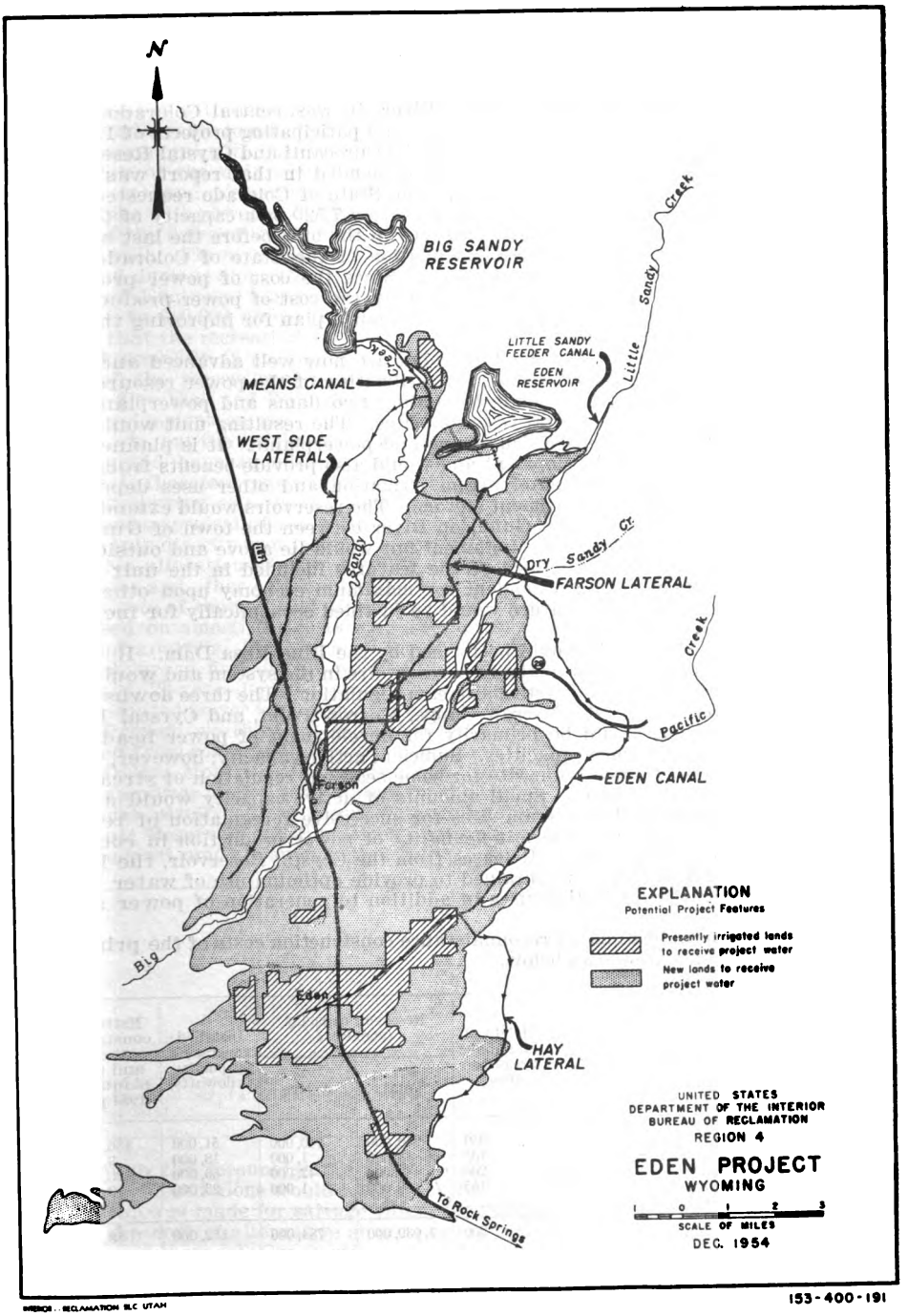
Project construction costs based on January 1953 prices are estimated at $7,287,000. The project repayment was established by the project authorizing act of June 28, 1949, as $1,500,000 to be repaid over 60 years. This amount deducted from total project costs leaves $5,787,000 to be repaid from Colorado River storage project net power revenues under the general repayment plan of the latter project and in accordance with the Eden project authorizing act of 1949.

Data on the project are summarized in the following tabulation.

Summary data, Eden project, Wyoming

Irrigated acreage:		*Acres*
New land		10,660
Supplemental		9,540
Total		20,200
Principal agricultural production:		
Hay, pasture; dairy cows, sheep, beef.		
Water supply:		*Acre-feet*
Increase in average annual direct flow diversions		39,600
Increase in average annual storage yield		20,400
Total		60,000
Stream depletion (average annual)		32,400
Project works:		
Construction features include the Big Sandy Dam, dikes, and reservoir with 39,700 acre-feet total storage capacity (now completed), Means Canal (now completed), laterals and improvements in existing distribution system, along with drainage to serve the project area.		
Construction costs and repayment:		
Estimated cost		$7,287,000
Reimbursable cost allocated to irrigation		7,287,000
Nonreimbursable cost		None
Repayment by:		
Irrigation [1]	$1,500,000	
Power revenues from Colorado River storage project	5,787,000	
Total		7,287,000
Annual operation, maintenance and replacement costs		40,400
Benefit-cost ratio		1.3 to 1

[1] Based on 60-year repayment period as provided under Project Authorizing Act of 1949.



INTERIOR - RECLAMATION SLC UTAH

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STATEMENT ON CURECANTI UNIT, COLORADO, OF COLORADO RIVER STORAGE PROJECT

(Modified plan)

The Curecanti unit of the Colorado River storage project is located on Gunnison River, a tributary of the Colorado River, in west-central Colorado. The report of the Colorado River storage project and paticipating projects of December 1950 included plans for development of the Curecanti and Crystal Reservoirs and powerplants. The Curecanti unit recommended in that report was for a reservoir capacity of 2,500,000 acre-feet. The State of Colorado requested that the reservoir water surface is limited to elevation 7,520 or a capacity of 940,000 acre-feet. As a result the committee reports on the bills before the last session of the Congress contained the recommendation of the State of Colorado that the Curecanti unit be limited accordingly. Since the cost of power produced by the smaller dam was somewhat higher than the cost of power produced by alternate means, we have endeavored to work out a plan for improving the economic feasibility of this unit.

Reconnaissance studies of a modified plan are now well advanced and indicate that a greater and more economical utilization of the power resources on the Gunnison River could be made by adding two dams and powerplants between the Curecanti and Crystal reservoir sites. The resulting unit would consist of an integrated system of four dams and powerplants. It is planned primarily for hydroelectric development and would also provide benefits from flood control, recreation, and ultimately from irrigation and other uses dependent upon river regulation or replacement storage. The reservoirs would extend some 40 miles along a section of the Gunnison River between the town of Gunnison and the Black Canyon National Monument but would lie above and outside the boundary of the monument. Each of the features included in the unit under the modified plan would be dependent for maximum economy upon other features of the unit, and each feature would be justified economically for inclusion in the unit.

The Curecanti Reservoir would be formed by the Blue Mesa Dam. It would be the largest and uppermost of the four reservoirs in the system and would provide the major portion of the system's stream regulation. The three downstream reservoirs referred to as the Narrow Gauge, Morrow Point, and Cyrstal Reservoirs, in that order, would be primarily for development of power head with only nominal active storage capacities. Sufficient active capacity, however, would be provided at the Morrow Point site for some seasonal regulation of stream inflows below Blue Mesa Dam. Small amounts of active capacity would also be necessary at the three downstream sites for successive reregulation of releases from upstream reservoirs to permit flexibility of power production in conformance with powerload patterns. Releases from the Crystal Reservoir, the lowest site in the system, would be maintained to provide optimum use of water downstream for irrigation and other uses in addition to generation of power at the Crystal site.

Physical data and estimated reconnaissance construction costs of the principal features in the unit are shown below.

Dam and powerplant or other feature	Height of dam above streambed (feet)	Reservoir capacity (acre-feet)		Installed generating capacity (kilowatts)	Estimated construction cost of dam and power plants (July 1954 prices)
		Total	Active		
Blue Mesa	350	940,000	740,000	51,000	$36,500,000
Narrow Gauge	135	8,000	1,000	18,000	9,100,000
Morrow Point	260	82,000	42,000	60,000	20,700,000
Crystal	155	9,000	1,000	23,000	10,700,000
Transmission system					11,500,000
Total	900	1,039,000	784,000	152,000	88,500,000

Operation, maintenance, and replacement costs for the unit are estimated at a total of $863,000 annually.

Stream depletion (reservoir evaporation) attributable to development of the unit would total approximately 17,000 acre-feet annually.

An average of approximately 645 million kilowatt-hours of energy deliverable to powerload centers after allowing for transmission losses would be produced annually. Of the total, about 213 million kilowatt-hours would be produced at the Blue Mesa powerplant. Market studies show that the potential power could be marketed within a reasonable period after completion of construction. The plan is adaptable to scheduling construction of the dams and powerplants to conform in general with growing market conditions. The most practical initial construction of the unit would probably include the Blue Mesa Dam (Curecanti Reservoir) and powerplant with the other dams and powerplants added later consistent with powerload growth.

All of the flows of the Gunnison River would not be controlled by the reservoirs of the unit. Flows of flood magnitude, however, could be reduced and much of the flood damage along the river under present conditions would be reduced. The Corps of Engineers has tentatively estimated that flood control benefits would amount to $10,000 annually. The National Park Service has tentatively estimated that the recreational value of Curecanti Reservoir would amount to about $20,000 annually if adequate recreational facilities were provided. No evaluation of the recreational potentialities of the other three reservoirs has been made. The Fish and Wildlife Service is presently studying effects of the potential development on fish and wildlife values. No monetary appraisal has yet been made, but the studies made by the Service to date indicate that the development would have an adverse effect on present fish and wildlife values. The Service is therefore opposed to the development.

The following criteria and assumptions were used in the preliminary reconnaissance appraisal of the unit:

(*a*) Only direct power benefits are considered.

(*b*) No allocation of costs is made at this time to river regulation for future irrigation and other consumptive uses.

(*c*) Costs of the unit and of alternative steam power for comparative purposes are based on amortizing costs with an interest rate of 2.5 percent over a 50-year period of analysis. Taxes are not included in the analysis.

(*d*) Average firm energy production deliverable to load centers is based on estimated 20-year depleted streamflows for the 1931-44 streamflow conditions and estimated power transmission losses.

(*e*) Present worth of the estimated salvage value at the end of 50 years was deducted from construction costs in computing the benefit-cost ratio.

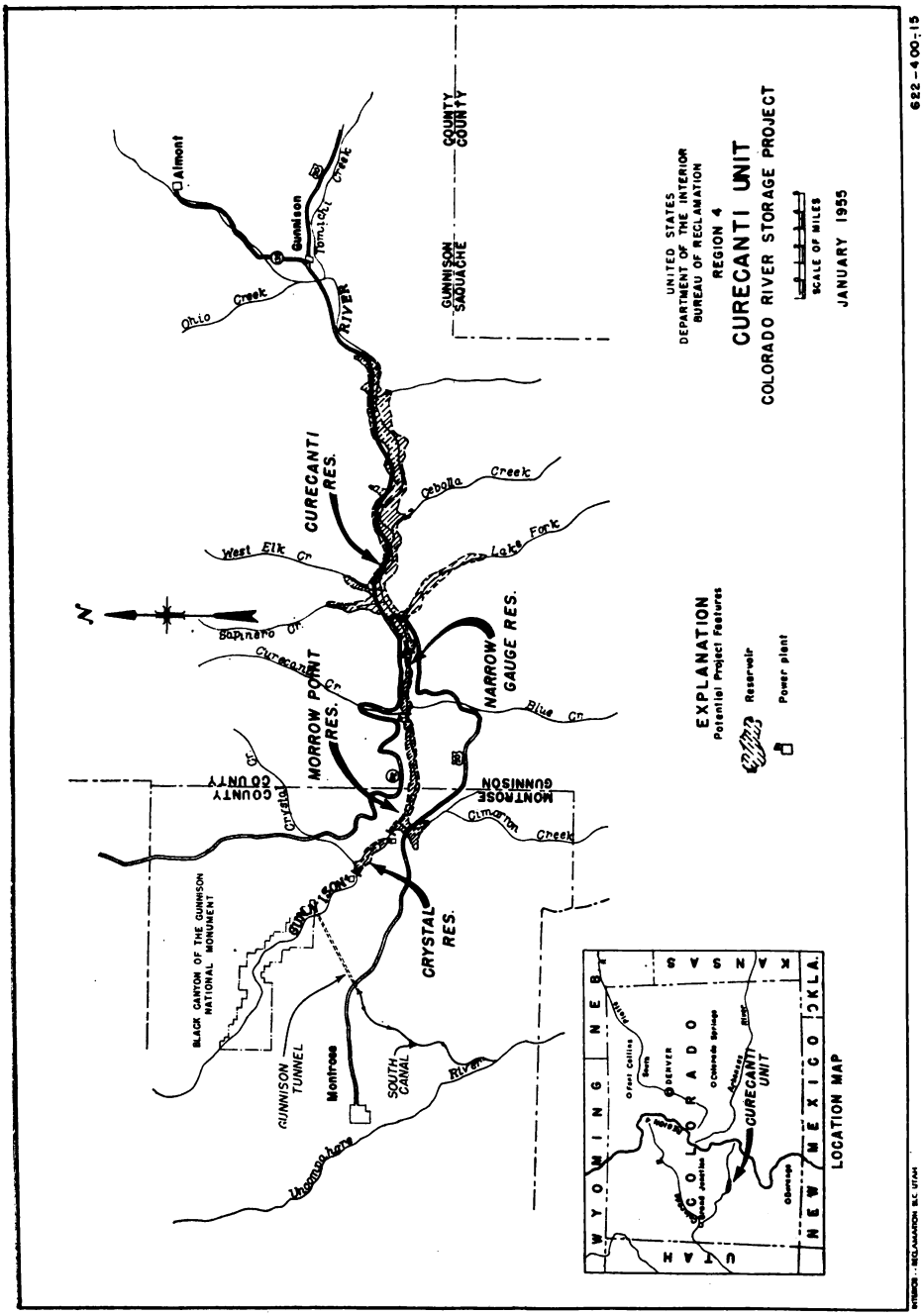
(*f*) Delta, Montrose, Grand Junction, Nucla, and Gunnison, Colo., were assumed as power market load centers for the study.

General results of the reconnaissance appraisal on the above basis for the Curecanti Reservoir and Blue Mesa Dam and powerplant alone and for the overall Curecanti unit are summarized below.

	Scale of development	
	Curecanti Reservoir, Blue Mesa Dam and powerplant alone	Curecanti unit (4 dams and powerplants)
Average cost per kilowatt-hour ..... mills	9.4	6.5
Cost per kilowatt-hour of alternative steam power ..... do	9.0	8.3
Benefit-cost ratio	1.1 to 1	1.4 to 1

Although the reconnaissance studies indicate that the Blue Mesa powerplant when considered alone would have a benefit-cost ratio slightly greater than unity if allowance is made for salvage value, the average cost of energy would slightly exceed the cost of alternative steam power. On the other hand, the benefit-cost ratio for the overall Curecanti unit would be well over unity and the average cost of energy would be 22 percent less than the cost of alternative steam power.

Detailed studies are necessary to refine the economic scale of development and to confirm the present reconnaissance appraisal.


UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
CURECANTI UNIT
COLORADO RIVER STORAGE PROJECT
SCALE OF MILES
JANUARY 1955
EXPLANATION
Potential Project Features
Reservoir
Power plant
LOCATION MAP
WYOMING
NEBR.
COLORADO
UTAH
KANSAS
OKLA.
NEW MEXICO
Denver
Grand Junction
Durango
Colorado Springs
Pueblo
Fort Collins
Cheyenne
CURECANTI UNIT
GUNNISON COUNTY
SAGUACHE COUNTY
MONTROSE COUNTY
GUNNISON COUNTY
Almont
Gunnison
Ohio Creek
Tomichi Creek
GUNNISON RIVER
CURECANTI RES.
Cebolla Creek
West Elk Cr.
Lake Fork
Soapstone Cr.
Curecanti Cr.
MORROW POINT RES.
NARROW GAUGE RES.
Blue Cr.
Cimarron Creek
CRYSTAL RES.
BLACK CANYON OF THE GUNNISON NATIONAL MONUMENT
GUNNISON TUNNEL
Montrose
SOUTH CANAL
Uncompahgre River
N
622-400-15

JUNIPER UNIT, COLORADO

(Analysis based on reconnaissance data)

The Juniper Dam site is on the Yampa River about 10 miles upstream from the town of Maybell and about 24 miles downstream from the town of Craig. A reservoir to impound 1,500,000 acre-feet would back water to within 3 miles of Craig. The dam site is located within the potential Cross Mountain Reservoir and if constructed would limit the height of the Cross Mountain Dam to 145 feet with a reservoir of about 600,000 acre-feet. As a result the construction of Juniper would reduce the amount of storage now contemplated on the Yampa River by about 2.5 million acre-feet. The combined Juniper and small Cross Mountain developments would be less attractive for power production than the large single Cross Mountain unit. Also, their combined capacities, being only slightly greater than the average annual flow of the Yampa River, would contribute little to the regulation at Lee Ferry.

The Juniper Dam could be utilized as a diversion and storage dam to serve lands in the Deadman Bench project southwest of the dam site. An irrigation canal would divert from the dam at elevation 6,100. The canal would run generally southwest to irrigate approximately 29,000 acres of new land in Colorado and 61,000 acres of new land in Utah between the Yampa and White Rivers.

A reservoir of 1,500,000 acre-feet would permit the generation of about 125 million kilowatt-hours of energy annually with existing streamflows. The relatively uniform power releases from the powerplant could probably then be utilized for energy generation at 2 or 3 potential power drops downstream above the Echo Park Reservoir.

Power from the Juniper Dam would be marketed through the Colorado River storage project system.

Reconnaissance data on the Juniper unit are listed below. (Costs are based on October 1954 price levels.)

Cost of dam, access road and construction camp	$10,514,000
Cost of powerplant	4,584,000
Cost of transmission system	1,250,000
Total	16,348,000
Annual operation and maintenance and replacement cost	$155,200
Installed capacity of powerplant ... kilowatts	25,000
Maximum power head ... feet	205
Type of dam	(1)
Initial firm annual energy output ... kilowatt-hours	125,000,000
Estimated future annual water use upstream ... acre-feet	124,000
Estimated annual diversion to Deadman Bench ... do	270,000
Reservoir capacity ... do	1,500,000
Maximum water surface area ... acres	20,000
Average annual evaporation (1931–47) ... acre-feet	38,000

[1] Earth fill.

STATEMENT ON GOOSEBERRY PROJECT, UTAH

The potential Gooseberry project would divert water from a headwater tributary in the Colorado River Basin to improve the irrigation water supply and thus the agricultural production of 16,400 acres of arable lands in the Bonneville Basin in Sanpete County, central Utah. The project would also enhance recreational values for the population in the general vicinity of the project. A small net loss would probably result in fish and wildlife values. A net benefit to forest resource development would result from relocation of roads in connection with construction of project storage facilities.

The general type of farming now practiced in the area would be continued with project development. Agriculture would continue to center around the livestock industry with more than 95 percent of the irrigated area producing alfalfa, pasture, and small grains for livestock feed. Principal livestock would include dairy cows, beef cattle and sheep.

Under the project plan surplus flows of Gooseberry Creek would be regulated at the 17,200 acre-foot capacity reservoir that would be constructed at the Mammoth site on the creek and would then be conveyed in the potential 2.4-mile Mammoth tunnel through the Colorado-Bonneville Basin Divide to Cottonwood Creek. The water would be diverted from Cottonwood Creek into existing canals

and the potential Gooseberry Highline Canal for conveyance to project lands. The water would be distributed to individual farm tracts by existing laterals that would be rehabilitated as necessary as a part of the project development. Usable return flow would be collected in natural channels that would be cleaned and improved as part of the project. Drains would be provided for land with a high water table and the San Pitch River channel would be improved as necessary to provide an outlet for the drainage system. Boating, camping, and picnicking facilities would be provided at Mammoth Reservoir as recreational features of the project. As part of the reservoir construction, 3 miles of forest roads and sheep corral would be relocated and 2 miles of connecting roads would be constructed. A 3- to 5-year period would be required to complete construction of the project.

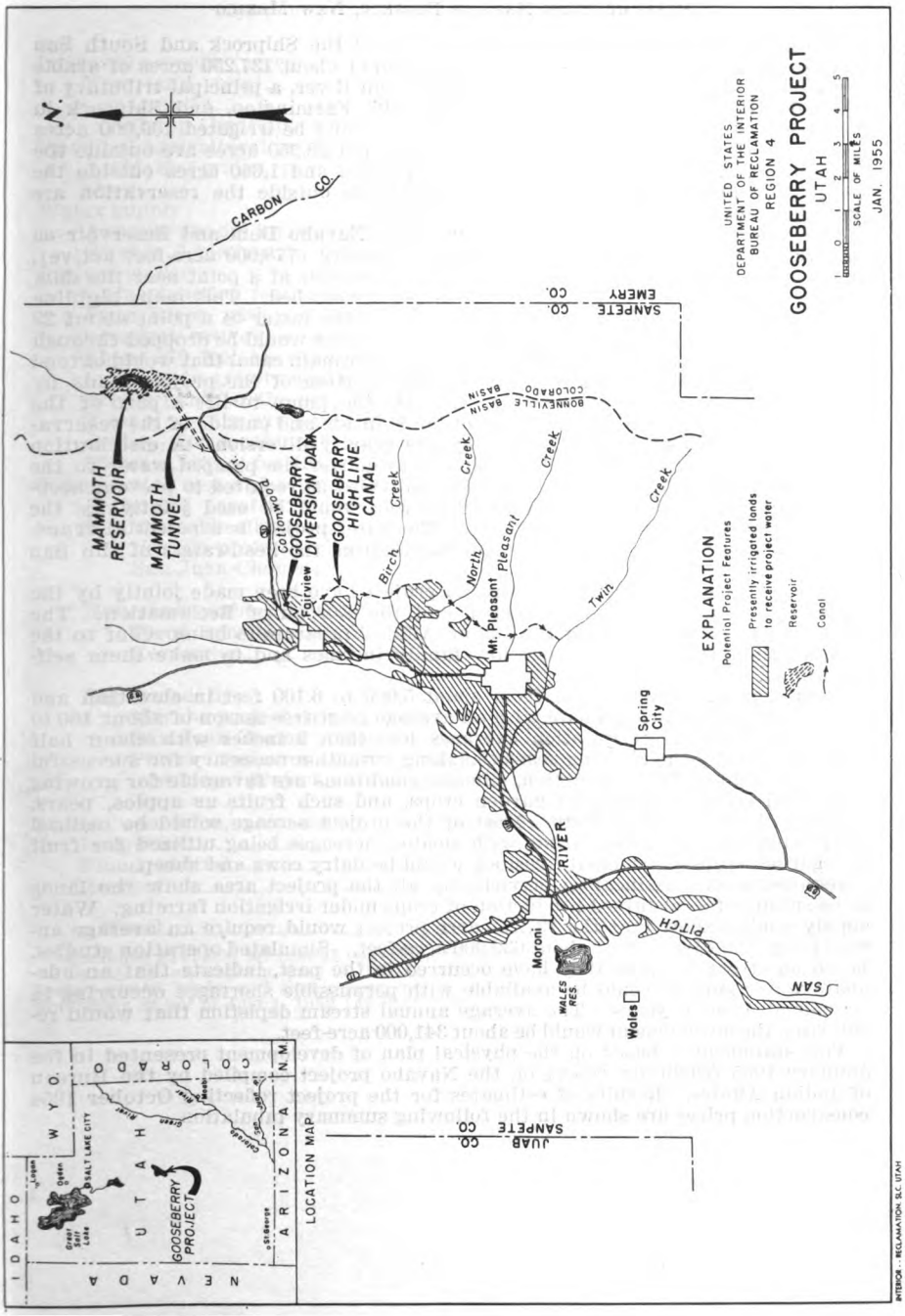
Water supply studies based on records of streamflows as they have occurred in the past indicate that with project development the irrigation supply for project lands would be increased by an average of 14,000 acre-feet annually including 11,700 acre-feet of direct diversion of storage water and an increase of 2,300 acre-feet of usable return flows. Water rights for the project can be obtained under Utah State law.

A preliminary land classification survey indicates that the project lands would be suitable for sustained production of crops under irrigation farming. Detailed land classification would be required to confirm the suitability of all the lands.

Results of current (January 1953) Bureau of Reclamation estimates for the physical plan of the project, as covered in the Gooseberry project report dated January 1953, are summarized in the following summary tabulation.

Summary data, Gooseberry project, Utah

Irrigated acreage:		*Acres*
New land		None
Supplemental		16,400
Total		16,400
Principal agricultural production:		
Alfalfa, pasture, grain, dairy cows, beef cattle, and sheep.		
Water supply:		*Acre-feet*
Average annual increase in return flow		2,300
Average annual increase in storage yield		11,700
Total		14,000
Stream depletion		12,500
Project works:		
The construction features would include the Mammoth Dam and Reservoir with a total capacity of 17,200 acre-feet, the 2.4-mile Mammoth tunnel, the Gooseberry Highline Canal, and some rehabilitation of existing canals and laterals.		
Construction cost and repayment:		
Estimated cost		$5,760,500
Reimbursable cost allocated to irrigation		5,727,500
Nonreimbursable cost allocated to recreation		33,000
Repayment by:		
Irrigation water users	$2,375,000	
Power revenues from Colorado River storage project	3,352,500	
Total		5,727,500
Annual operation, maintenance, and replacement costs:		
Irrigation	11,020	
Recreation	2,540	
Total		13,560
Benefit-cost ratio		1.2 to 1



Statement on Navaho Project, New Mexico

The potential Navaho project (formerly called the Shiprock and South San Juan projects) would provide for the irrigation of about 137,250 acres of arable dry lands lying along the south side of San Juan River, a principal tributary of Colorado River, near the towns of Bloomfield, Farmington, and Shiprock in northwestern New Mexico. Of the lands that would be irrigated 109,000 acres are located in the Navaho Indian Reservation and 28,250 acres are outside the reservation. All the lands within the reservation and 1,660 acres outside the reservation are Indian owned. Remaining lands outside the reservation are publicly owned or privately owned by non-Indians.

The general plan of the project includes the Navaho Dam and Reservoir on San Juan River of 1,450,000 acre-feet total capacity (778,000 acre-feet active), and a main highline canal to divert from the reservoir at a point near the dam and at an elevation about 270 feet above the stream bed. This main highline canal of 2,630 second-feet capacity would divert the water to a point about 29 miles downstream from Navaho Dam where the water would be dropped through a direct connected turbine pumping plant to a lower main canal that would extend westerly about 120 miles to serve the major portion of the project lands by gravity. The dropping water would energize the pump to lift a part of the water to serve the portion of the project lands inside and outside of the reservation that are too high to be served by the gravity diversion. A distribution system would extend beyond the pump lift to deliver the pumped water to the high lands. A system of drains would be provided as required to prevent seepage of project lands. The Navaho Reservoir would be used jointly by the Navaho and San Juan-Chama projects. The latter project is a potential transmountain diversion to the Rio Grande Basin from the headwaters of the San Juan River.

Planning investigations of the Navaho project have been made jointly by the Bureau of Indian Affairs and region 4 of the Bureau of Reclamation. The project is an integral part of the Indian Affairs' program to bring relief to the Navaho Indians from their very low family incomes and to make them self-sustaining.

Navaho project lands range from about 5,000 to 6,100 feet in elevation and have a semiarid to arid climate with an average frost-free season of about 160 to 170 days. Annual precipitation averages less than 9 inches with about half occurring during the growing season, making irrigation necessary for successful crop production. With irrigation, climatic conditions are favorable for growing most field crops, a variety of garden crops, and such fruits as apples, pears, peaches, cherries and apricots. Most of the project acreage would be utilized for production of livestock feeds with smaller acreages being utilized for fruit and garden crops. Principal livestock would be dairy cows and sheep.

Detailed land classification of virtually all the project area show the lands to be suitable for sustained production of crops under irrigation farming. Water supply studies show that the 137,250-acre project would require an average annual irrigation diversion of about 630,000 acre-feet. Simulated operation studies, based on streamflows as they have occurred in the past, indicate that an adequate water supply would be available with permissible shortages occurring in occasional drought years. The average annual stream depletion that would result from the development would be about 341,000 acre-feet.

This statement is based on the physical plan of development presented in the January 1955 feasibility report on the Navaho project compiled by the Bureau of Indian Affairs. Results of estimates for the project reflecting October 1954 construction prices are shown in the following summary tabulation.

Summary data, Navaho project, New Mexico

	Navaho Indian Reservation	*Nonreservation*	*Total*
Irrigated acreage (acres):			
New land—total	109,000	28,250	137,250
Gravity	90,240	2,800	93,040
Pump (hydraulic)	18,760	25,450	44,210

Principal agricultural production:

Alfalfa, grains, pastures, beans, some fruit and vegetables—dairy cows, sheep.

Water supply:	*Acre-feet*
Average annual increase in storage and direct flow diversions	630,000
Stream depletion (average annual)	341,000

Project works:

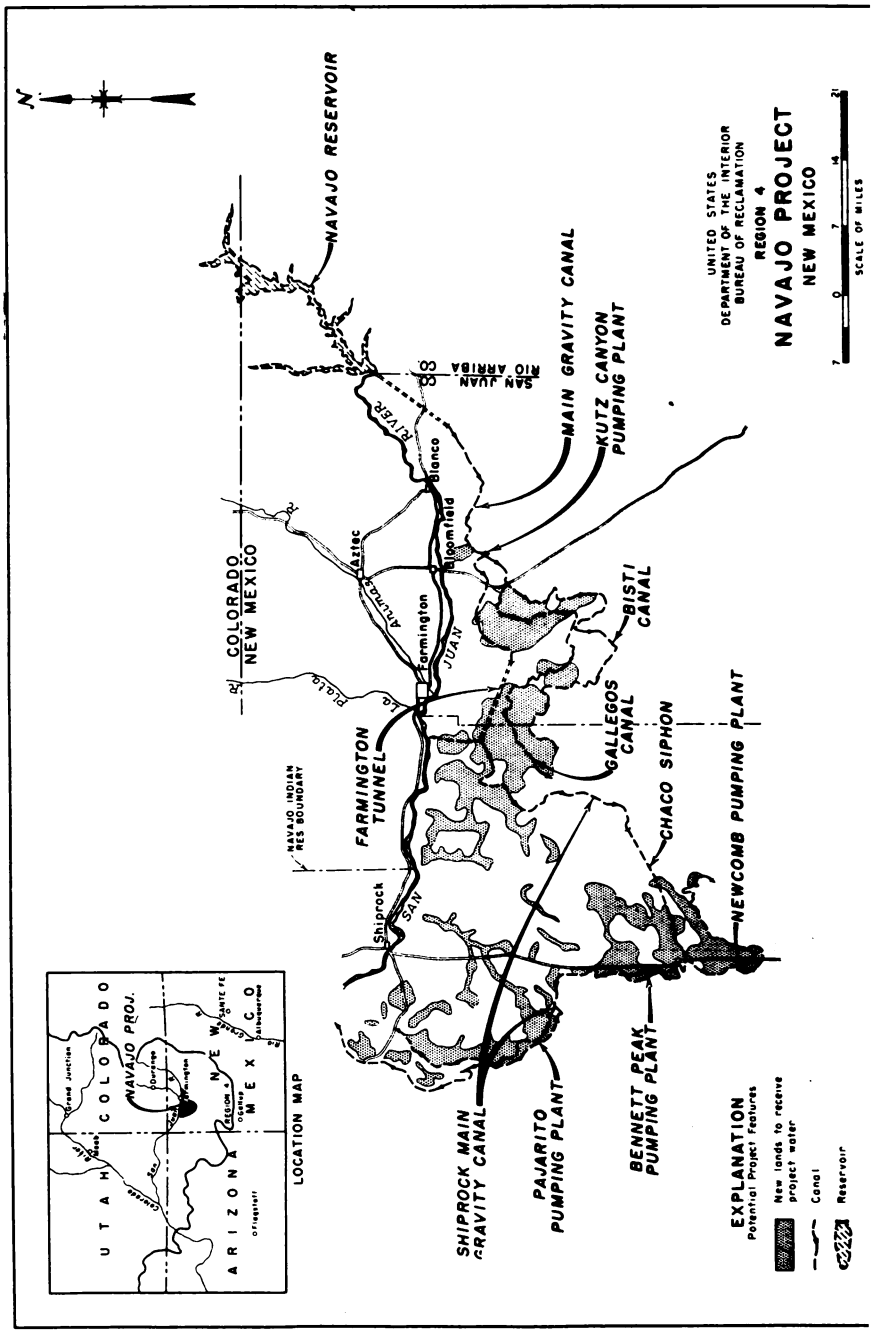
Construction features would include Navaho Dam and Reservoir on San Juan River, with approximately 1,450,000 acre-feet total capacity (778,000 acre-feet active), a 29-mile main highline canal to divert from reservoir about 270 feet above stream bed at dam, a drop from highline canal to a lower main gravity canal extending about 120 miles from the drop, a turbine-driven pump at the drop to lift water to about 32 percent of project lands, 2 main canals extending beyond the pump lift, distribution laterals, and drains. Reasonably efficient construction of the project would require about 15 years, except for drains.

Construction cost and repayment:		
Estimated construction cost		[1] $212,037,300
Reimbursable allocation to:		
Navaho project irrigation	$209,939,300	
San Juan-Chama project	800,000	
		210,739,300
Nonreimbursable allocation to:		
Flood control	1,106,000	
Recreation	192,000	
		1,298,000
Repayment by:		
Navaho project irrigation water users [2]	30,730,000	
San Juan-Chama project	800,000	
Power revenues from Colorado River storage project	179,209,300	
		210,739,300

Annual operation, maintenance, and replacement costs:	
Irrigation	370,600
Flood control	200
Recreation	65,000
Total	435,800

[1] Includes $192,000 for cost of recreation facilities.

[2] Based on assumption that all Indian-owned lands would repay at same rate as non-Indian-owned lands, and that repayment on Indian-owned lands would be deferred under provisions of act of July 1, 1932 (47 Stat. 564).



STATEMENT ON SAN JUAN-CHAMA PROJECT, COLORADO AND NEW MEXICO

The San Juan-Chama project would divert water from the headwaters of the San Juan River, a principal tributary of the Colorado River, into the Rio Grande Basin for the purposes of providing supplemental water for existing irrigation projects and for municipal and industrial uses. Although water for diversion would be collected from the tributaries of the San Juan located in both Colorado and New Mexico, all of the water would be used in New Mexico in the Rio Grande Basin. By exchange the project would also increase the use of water in New Mexico in the Canadian River Basin. The present plan provides for the diversion of 235,000 acre-feet of Colorado River Basin water annually out of the total amount allocated to New Mexico under the provisions of the upper Colorado River Basin compact.

With project development, an adequate supply of excellent quality water would be available to satisfy the rapidly growing municipal and industrial requirements of the Albuquerque metropolitan area, the population center of the Rio Grande Basin. Water would also be available to supplement the now deficient supply for some 225,000 acres of irrigated land in the area and to replace water depletions occurring throughout the basin from watershed improvement programs and ground-water pumping. In addition, the project would improve the conditions for recreation, fish, and wildlife activities in the Rio Grande Basin, which is the center of one of the more important tourist and recreational areas in the country.

1. *Collection and diversion features.*—This system would compromise three reservoirs having a total capacity of 190,000 acre-feet located on the West Fork, East Fork, and Rio Blanco tributaries of the San Juan River and a feeder canal and conduit system to collect and transport the water to the head of Willow Creek in the Rio Grande Basin. The conduit system would be about 49 miles in length and would have a terminal capacity at the outlet of the tunnel through the Continental Divide of 1,000 cubic feet per second.

2. *Regulatory features.*—Heron No. 4 Reservoir, having a 400,000 acre-foot capacity, located on Willow Creek, a tributary of the Rio Chama, would provide the storage required to regulate water releases for irrigation, municipal and industrial uses, and replacement of basin depletions. The outlet works of the existing El Vado Reservoir, downstream, would be enlarged to permit full transmissions of anticipated releases from Heron No. 4 Reservoir.

3. *Water-use features.*—Construction features for irrigation purposes would comprise regulatory reservoirs, rehabilitation of distribution systems, and some relocation and extension of canals and laterals on existing irrigation projects on Rio Grande tributaries. Water for these projects would be made available by operation under exchange agreements. Supplemental irrigation water would also be furnished the Middle Rio Grande project and the Elephant Butte district of the Rio Grande project, utilizing existing distribution facilities. The present plan does not include construction features for delivery of municipal and industrial water beyond the regulating reservoir. Such features could be added later as part of the project if the local interests desire Federal construction and financing. No facilities are required to be constructed for delivery of the water to replace basin depletions. Construction of project features would be accomplished over a period of about 6 years.

This statement is based on the physical plan contained in a Bureau of Reclamation project report now in the process of completion. The financial data and analysis of the project were made in January 1955 and conform to current policy and procedure. The project investigations are of adequate degree of detail to use in project authorization, with the construction costs based on October 1954 prices. Preliminary studies of the potentialities of fish and wildlife development indicate it may ultimately be desirable to make an allocation of water to this purpose. Results of current estimates for the project are included in the following summary tabulation.

Summary data, San Juan-Chama project, Colorado and New Mexico

Irrigated acreage:	*Acres*
New land	None
Supplemental land	225,000
Water supply:	
Allocation of diverted San Juan River water:	*Acre-feet*
Irrigation:	179,200
Irrigated lands	136,700
Replacement of Rio Grande Basin depletions	42,500
Municipal and industrial water	55,800
Stream depletion (average annual diversion from San Juan River Basin)	235,000

Project works:

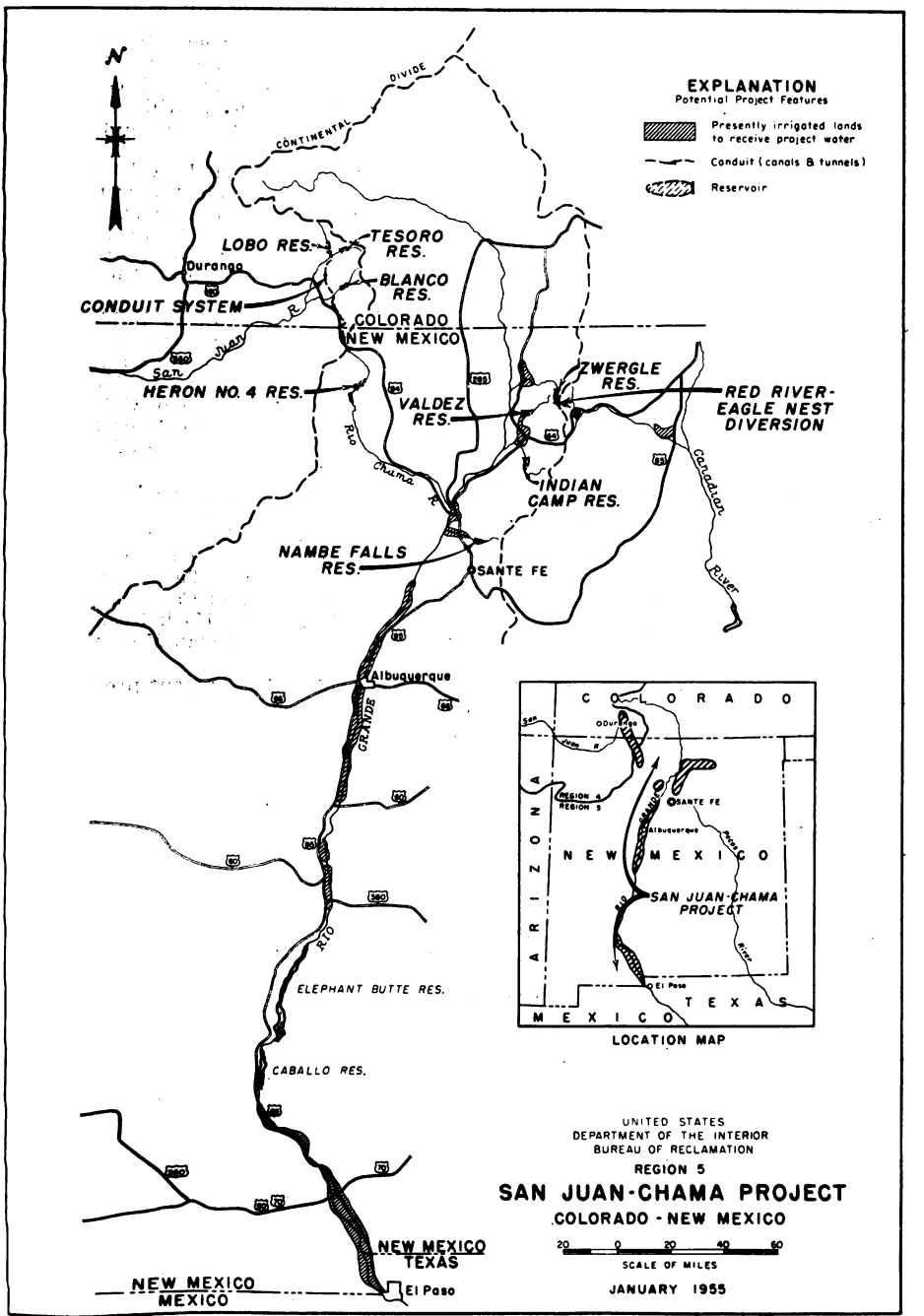
Principal construction features would include 3 reservoirs of 190,000 acre-foot total capacity in the headwaters of San Juan River, a 49-mile conduit system to collect and divert water from San Juan River Basin to Rio Grande Basin, a 400,000 acre-foot reservoir in Rio Grande Basin to regulate San Juan River diversions, some additional reservoirs, rehabilitation of distribution systems, and some relocation and extension of canals and laterals in existing systems on Rio Grande tributaries.

Construction cost and repayment:	
Estimated construction cost	[1] $135,169,000
Reimbursable allocation:	
Irrigation:	
Irrigated lands	87,531,000
Replacement of Rio Grande Basin stream depletions	20,393,000
Municipal and industrial water	26,775,000
Total reimbursable allocations	134,699,000
Nonreimbursable allocation	470,000
Total allocation	135,169,000
Repayment by:	
Irrigation water users	$21,290,000
Basin depletions (Rio Grande Basin)	6,600,000
Municipal and industrial water users	[2] 26,775,000
Power revenues from Colorado River storage project	80,034,000
Total	134,699,000
Annual operation, maintenance, and replacement costs:	
Irrigation:	
Irrigated land	234,100
Basin depletions (Rio Grande Basin)	41,400
Municipal and industrial water	54,300
Total	[3] 329,800
Benefit-cost ratio	1.84 to 1

[1] Includes $800,000 of cost of potential Navaho Dam and Reservoir on San Juan River, $110,000 for stream gaging and river operating facilities, and $360,000 for recreational facilities.

[2] Interest during construction amounting to $728,000 and interest on investment amounting to $27,539,000 would also be paid.

[3] Excludes $33,500 operation and maintenance of stream-gaging program.



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Statement on Savery-Pot Hook Project, Colorado and Wyoming

The potential Savery-Pot Hook project would provide supplemental irrigation water for 13,230 acres of presently irrigated lands and a new supply for 18,380 acres of nonirrigated lands located in northwestern Colorado and south central Wyoming. The additional water would be made available through utilization of surplus flows of streams of the Little Snake River Valley, a part of the upper Colorado River Basin.

Although an improved irrigation supply would permit new lands to be cultivated and result in better crop yields on presently irrigated lands, the cropping program is largely controlled by climatic, soil, and topographic conditions. Most of the acreage would continue to be utilized for the production of livestock feed with hay, small grains, and pasture predominating. Increased feed production in the area would result in substantial increases in dairy products with some increase in the production of sheep, beef cattle, hogs, and poultry.

Detailed land classification surveys show the project lands to be suitable for sustained production of crops under irrigation farming. Water supply studies, based on recorded streamflows of the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in drought years. Water rights for the project can be obtained under the laws of Colorado and Wyoming in accordance with article XI of the upper Colorado River Basin compact which deals specifically with water rights and interstate use of water of the Little Snake River and its tributaries.

Potential storage features of the project include the 65,000 acre-foot Pot Hook Reservoir located on Stater Creek and the 18,600 acre-foot Savery Reservoir located on Savery Creek. Part of the project water would be distributed by existing canals and ditches diverting from Savery Creek and the Little Snake River, including a 15.7-mile extension of the Westside Canal. The remaining project water would be distributed by the 19.2-mile Dolan Mesa Canal heading on Savery Creek and 58.2-mile Pot Hook Canal heading at Pot Hook Reservoir. Other construction features include the diversion dam for the Dolan Mesa Canal and about 5.3 miles of drains.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation proposed report of the regional director on the Savery-Pot Hook project dated July 1954. Results of the current (October 1954) Bureau of Reclamation plan are summarized in the following tabulation:

Summary data Savery-Pot Hook project, Colorado and Wyoming

	Wyoming	*Colorado*	*Tota*
Irrigated acreage (acres):			
Full irrigation service land	6,180	12,200	18,38(
Supplemental irrigation service land	9,970	3,260	13,23(
Total	16,150	15,460	31,61(

Principal agricultural production:

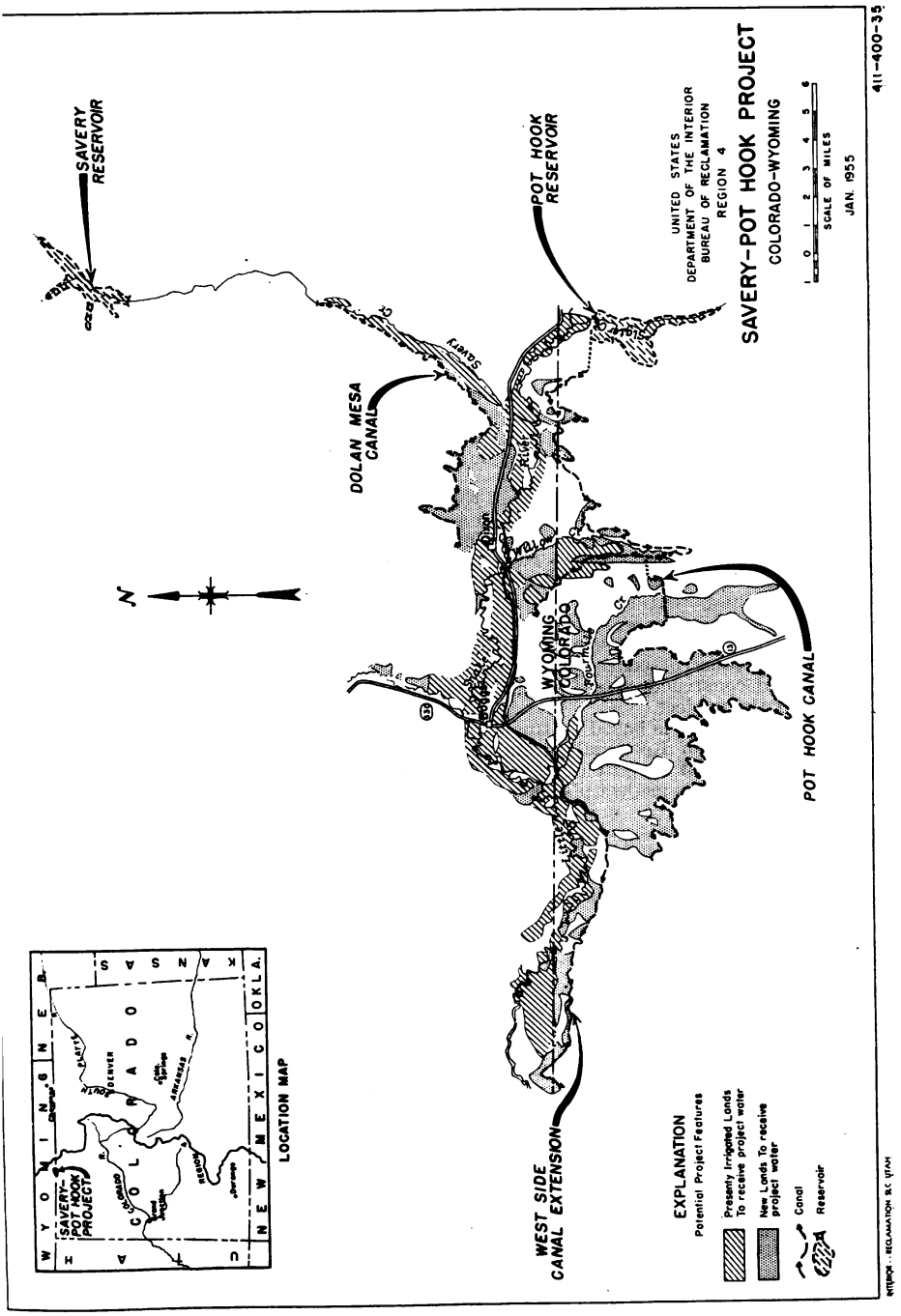
Alfalfa, small grains and pasture, dairy cattle and sheep.

	Acre-fee
Water supply:	
Average annual increase in irrigation supply	54,60(
Average annual increase in stream depletion	33,40(

Project works:

Construction features include the 65,000 acre-foot Pot Hook Reservoir 18,600 acre-foot Savery Reservoir, Dolan Mesa diversion dam and 19.2-mil canal, 58.2-mile Pot Hook Canal, 15.7-mile extension of Westside Canal Willow Creek lateral, and 5.3 miles of drains.

Construction cost and repayment:	
Estimated cost:	
Reimbursable allocation to irrigation	$10,814,00
Nonreimbursable allocation	Non
Repayment by:	
Irrigation water users	1,390,00
Net power revenues from Colorado River storage project	9,424,00
Total	10,814,00
Annual operation, maintenance, and replacement costs	65,60
Benefit-cost ratio	1.28 to


SAVERY RESERVOIR
DOLAN MESA CANAL
POT HOOK RESERVOIR
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
SAVERY-POT HOOK PROJECT
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WYOMING
COLORADO
POT HOOK CANAL
WEST SIDE CANAL EXTENSION
EXPLANATION
Potential Project Features
Presently Irrigated Lands To receive project water
New Lands To receive project water
Canal
Reservoir
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LOCATION MAP
SAVERY-POT HOOK PROJECT
WYOMING
NEBR.
COLORADO
KANSAS
OKLA.
NEW MEXICO
UTAH

Statement on Dolores Project, Colorado

(Reconnaissance data)

The potential Dolores project is planned primarily to store and divert waters of Dolores River to supply irrigation water for 66,000 acres of land in the San Juan River Basin in southwestern Colorado. The lands include 30,550 acres presently irrigated with only a partial water supply and 35,450 acres not now irrigated. The project lands lie near the towns of Cortez and Dove Creek, Colo.

With project development, the irrigated lands would be utilized largely for the support of the livestock enterprises as now practiced in the area. Climatically adapted crops such as alfalfa, pasture, small grains, corn, and pinto beans would be produced. Livestock would be mostly dairy cows and beef cattle.

Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification would be necessary to confirm the suitability of all the lands.

Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. The average annual water supply to full irrigation service land would be 131,620 acre-feet and the supply to supplemental irrigation service land would be 14,170 acre-feet for a total supply of 145,790 acre-feet. With the anticipated cooperation of present water users in the area, water rights for the project could be obtained under Colorado State law.

Principal construction features of the project would include the McPhee Reservoir with a total capacity of 328,000 acre-feet and an active capacity of 153,000 acre-feet that would be created by a dam on Dolores River 10 miles downstream from the town of Dolores. Two diversion outlets from the reservoir would replace two existing diversions from Dolores River to serve lands in Montezuma Valley. The potential Yellow Jacket Canal would convey water about 24 miles northwest from one of the reservoir outlets to the potential North and South Canals that would serve unirrigated lands in the Dove Creek area. Laterals would be constructed to serve all project lands not presently irrigated. An estimated construction period of 4 years would be required to complete all features of the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation status report on the Dolores project, dated May 1954. Results of current (October 1954) Bureau of Reclamation reconnaissance estimates for this project plan are summarized in the following project summary tabulation.

Summary reconnaissance data, Dolores project, Colorado

	Montezuma Valley area	*Dove Creek area*	*Total*
Irrigated acreage (acres):			
New lands	9,450	26,000	35,450
Supplemental lands	30,550	0	30,550
Total	40,000	26,000	66,000

Principal agricultural production:

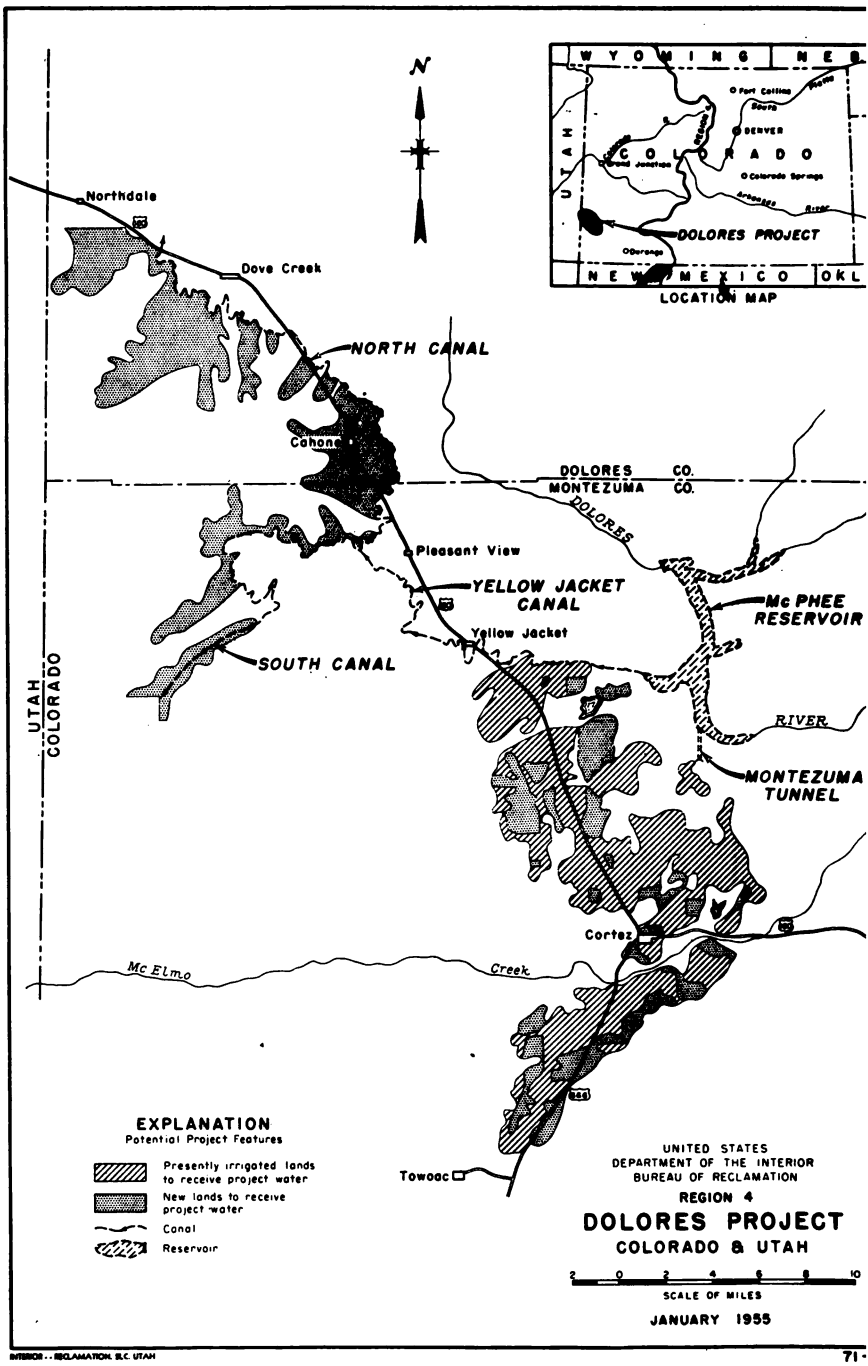
Alfalfa, small grains, pasture, and beans; dairy cows and beef cattle.

	Montezuma Valley area	*Dove Creek area*	*Total*
Water supply (acre-feet):			
Average annual project supply:			
New lands	31,780	99,840	131,620
Supplemental lands	14,170	0	14,170
Total	45,950	99,840	145,790
Average annual stream depletion			69,370

Project works:

Construction features would include McPhee Dam and Reservoir of 328,000-acre-foot total capacity on Dolores River; 24-mile, 440-second-foot Yellow Jacket Canal; 46.2 mile, 330- to 40-second-foot North Canal; 24.5-mile, 100- to 30-second-foot South Canal; laterals; and drains.

Construction cost and repayment:		
Estimated cost		$24,633,000
Reimbursable allocation to irrigation		24,633,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	1,533,000	
Power revenues from Colorado River storage project	23,100,000	
Total		24,633,000
Annual operation, maintenance, and replacement costs		109,300
Benefit-cost ratio		1.1 to 1



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Statement on Sublette Project, Wyoming

(Reconnaissance data)

The potential Sublette project is planned to store and divert waters of the upper Green River and its tributaries to supply irrigation water for about 72,000 acres of undeveloped lands and 12,000 acres of lands presently irrigated with an inadequate supply. The plan also includes a small hydroelectric powerplant. The project would be located in the Green River Basin in Sublette County, western Wyoming. Although reconnaissance studies to date indicate that the project would consist of two independent divisions (Buckskin and West Side divisions), the data presented herein are for the overall project.

With project development the irrigated lands would be utilized largely for the support of the livestock enterprises as now practiced in the area. Climatically adapted crops such as hay, pasture, and small grains would be produced. Livestock would be primarily beef cattle and sheep.

Preliminary land classification surveys indicate that the lands would be suitable for sustained crop production under irrigation farming. A detailed classification has been made for part of the area but completion of a detailed classification would be necessary to confirm the suitability of all the lands.

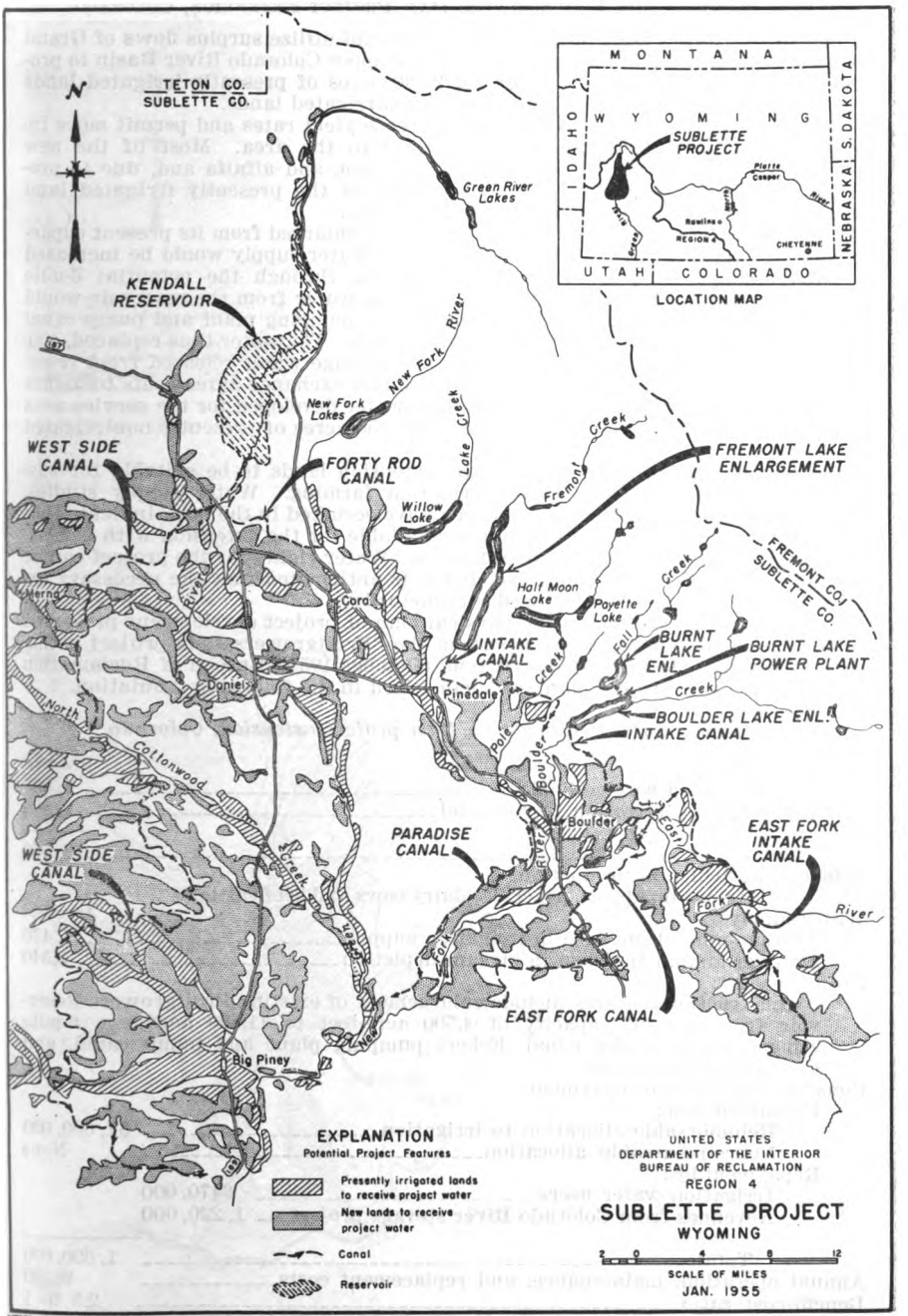
Studies of streamflow records and simulated operations indicate that an adequate irrigation supply would be available with moderate shortages in occasional drought years. The total increase in irrigation supply would approximate 268,000 acre-feet annually from direct flow diversions and storage yield. Water rights for the project could probably be obtained under Wyoming State law.

Principal construction features would include Kendall Dam and Reservoir, Fremont Lake Reservoir, Burnt Lake Reservoir, and Boulder Lake Dam and Reservoir to provide storage capacities of 162,000, 64,000, 30,000, and 165,000 acre-feet, respectively. A system of main canals, laterals, and drains and a 2,200-kilowatt powerplant would also be included.

This statement is based on a physical plan of project development formulated by the Bureau of Reclamation during the course of reconnaissance investigations now nearing completion. The reconnaissance report on these investigations has not yet been completed. Results of reconnaissance estimates at October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Sublette project, Wyoming

Irrigated acreage:		*Acres*
New land		72,000
Supplemental lands		12,000
Total		84,000
Principal agricultural production:		
Hay, pasture, and small grains. Beef cattle and sheep.		
Water supply:		*Acre-feet*
Increase in average annual direct flow diversions		142,000
Increase in average annual storage yield		126,000
Stream depletion (average annual)		108,000
Project works:		
Construction features would include Kendall Dam and Reservoir, Fremont Lake Reservoir, Burnt Lake Reservoir, and Boulder Lake Dam and Reservoir providing storage capacities of 162,000, 64,000, 30,000, and 165,000 acre-feet, respectively; a system of main canals and laterals; drains; and a 2,200-kilowatt powerplant.		
Construction cost and repayment:		
Estimated construction cost		$37,099,000
Reimbursable cost allocated to irrigation		36,146,000
Reimbursable cost allocated to power		953,000
Nonreimbursable allocation		None
Repayment in 50 years by:		
Irrigation water users	$1,350,000	
Project power revenues	953,000	
Power revenues from Colorado River storage project	34,796,000	
Total		37,099,000
Annual operation, maintenance, and replacement costs:		
Irrigation	$168,000	
Power	25,000	
Total		193,000
Benefit-cost ratio		1 to 1



INTERIOR--RECLAMATION, SLC, UTAH

152-400-59

Statement on the Fruitgrowers Dam Project Extension, Colorado

The Fruitgrowers Dam project extension would utilize surplus flows of Grand Mesa tributaries of the Gunnison River in the upper Colorado River Basin to provide supplemental irrigation water for 2,000 acres of presently irrigated lands and a new water supply for 1,850 acres of nonirrigated lands.

Development of the extension would increase yield rates and permit more intensive farming than is presently practiced in the area. Most of the new acreage would probably be devoted to fruit, corn, and alfalfa and, due to provision of additional late season water, much of the presently irrigated land would also be utilized for more intensive farming.

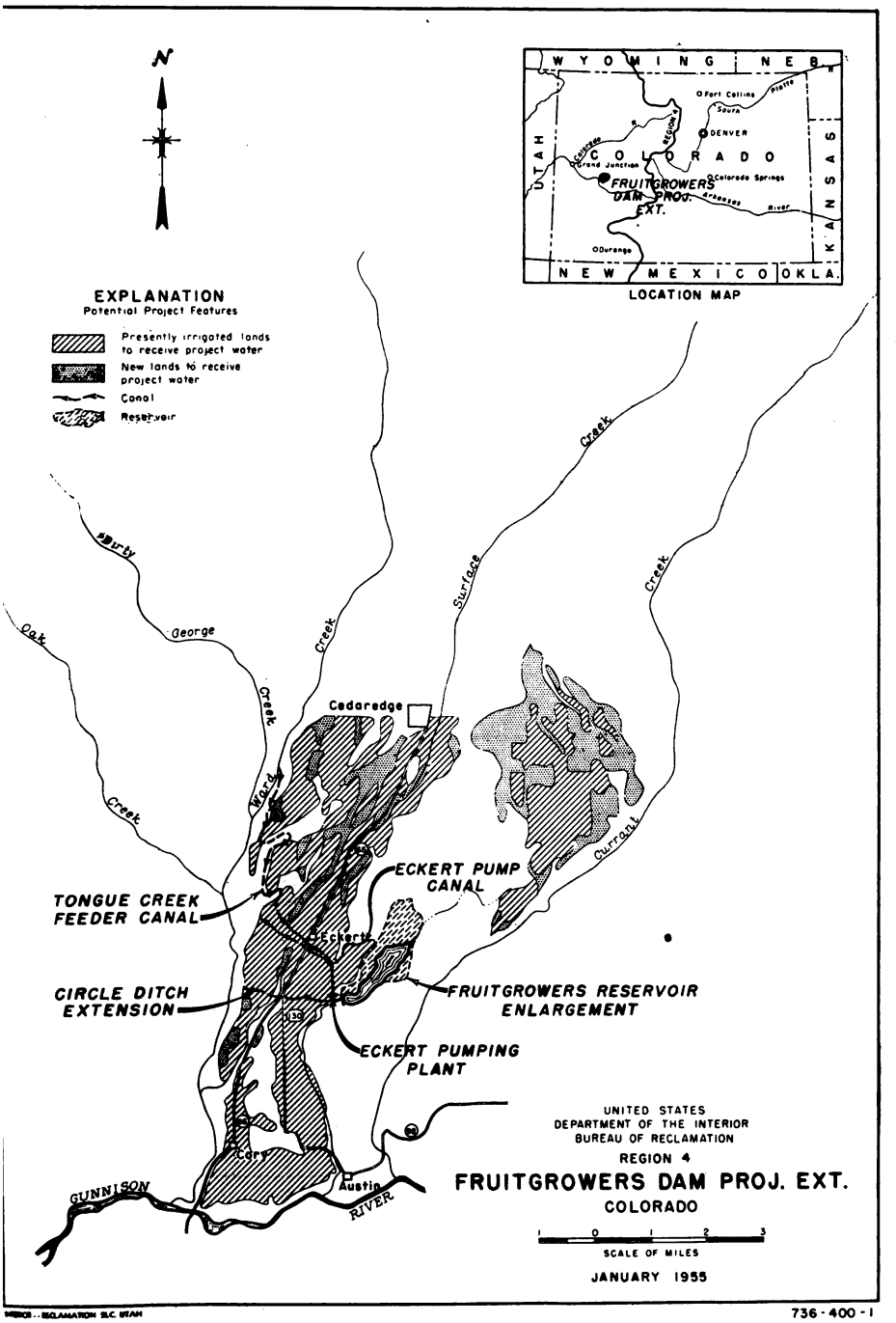
The existing Fruitgrowers Reservoir would be enlarged from its present capacity of 4,500 acre-feet to 11,500 acre-feet and its water supply would be increased by diversions from Ward and Surface Creeks through the potential 6-mile Tongue Creek feeder canal. The area receiving water from the reservoir would be enlarged through construction of the Eckert pumping plant and pump canal and enlargement and extension of the Circle ditch. The water thus replaced, consisting of natural flow of Surface Creek and storage water released from reservoirs on Grand Mesa, would be transferred under exchange agreements to higher lands in the extension area. The only new water developed for the service area of Fruitgrowers Reservoir would be used on 150 acres of presently nonirrigated land.

Land classification surveys show the extension lands to be suitable for sustained production of crops under irrigation farming. Water supply studies, based on records of stream flows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the extension with permissible shortages in occasional drought years. Water rights for the project can be obtained under Colorado State law and it is anticipated that the necessary exchange agreements can be arranged satisfactorily.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation report on the "Fruitgrowers Dam project extension, Colorado." Results of the current (October 1954) Bureau of Reclamation estimates for this project plan are summarized in the following tabulation.

Summary data, Fruitgrowers Dam project extension, Colorado

Irrigated acreage:		*Acres*
New irrigation service land		1,850
Supplemental irrigation service land		2,000
Total		3,850
Principal agricultural production:		
Alfalfa, grain, apples, peaches—dairy cows and beef cattle.		
Water supply:		*Acre-feet*
Average annual increase in irrigation supply		7,470
Average annual increase in stream depletion		5,540
Project works:		
Construction features include enlargement of existing Fruitgrowers Reservoir from present capacity of 4,500 acre-feet to 11,500 acre-feet, 6-mile Tongue Creek feeder canal, Eckert pumping plant and pump canal, and Circle ditch extension.		
Construction cost and repayment:		
Estimated cost:		
Reimbursable allocation to irrigation		$1,690,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$470,000	
Revenues from Colorado River storage project	1,220,000	
Total		1,690,000
Annual operation, maintenance, and replacement costs		9,300
Benefit-cost ratio		2.5 to 1



59799—55—pt. 1——9

Statement on Bostwick Park Project, Colorado

(Reconnaissance data)

The potential Bostwick Park project would provide a water supply for 1,040 acres of arable nonirrigated lands and supplemental water for 5,830 acres of presently irrigated lands. The lands are located along the west side of Cimarron Creek below the existing Cimarron Canal and in Bostwick and Shin Parks which lie about 10 miles east of the city of Montrose and also obtain their water supply through the Cimarron Canal. The source of the water supply for the project would be Cimarron Creek, a tributary of Gunnison River in the upper Colorado River Basin.

Development of the project would require construction of the potential 9,000-acre-foot Silver Jack Reservoir on Cimarron Creek and rehabilitation and extension of the existing Cimarron Canal and lateral system.

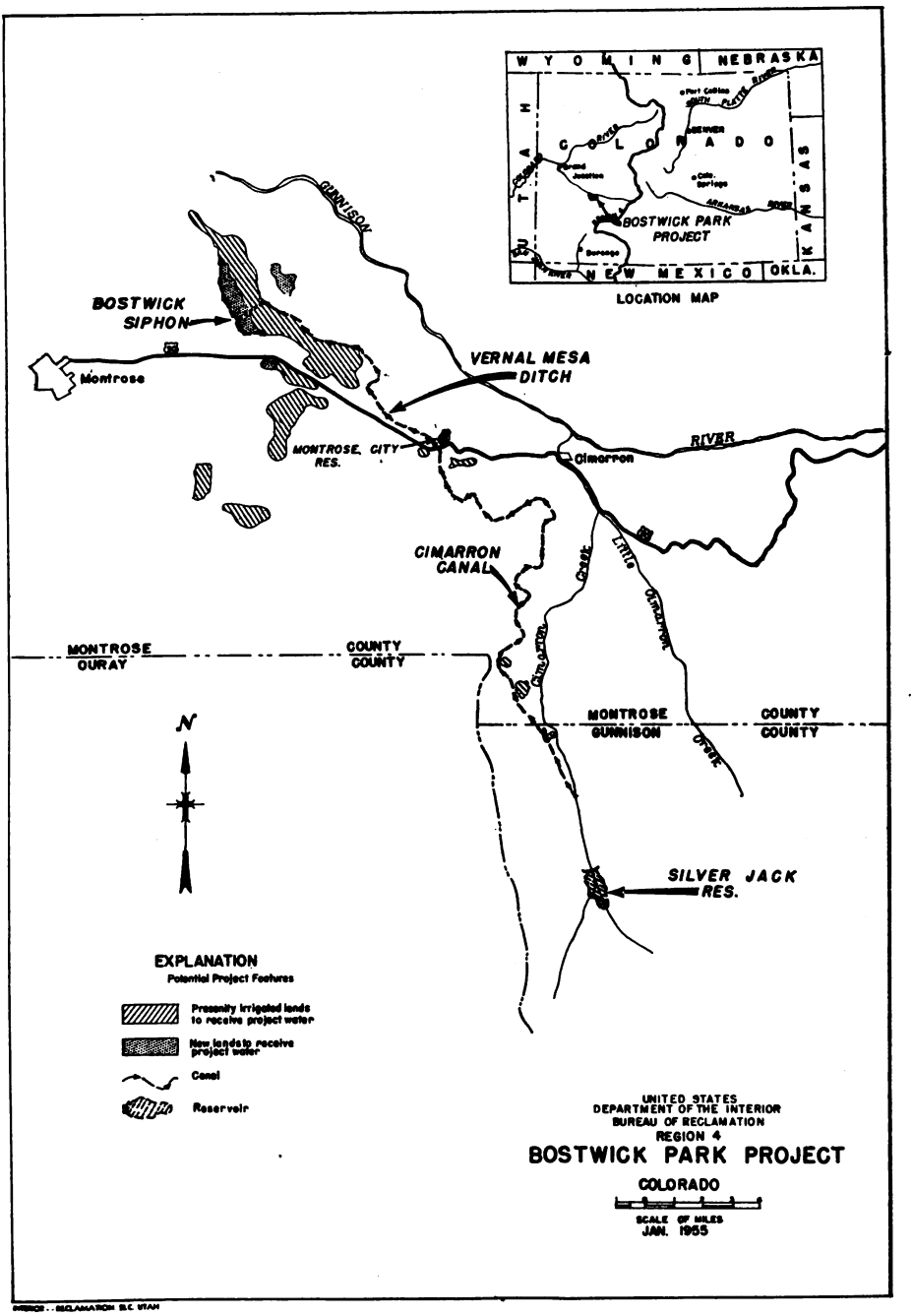
The present agricultural economy of the lands in the project is based principally upon dairying and the production of cash crops and farm livestock. No change in the type of farming is expected following development of the project.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alternations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Bostwick Park project, Colorado

Irrigated acreage:		*Acre-feet*
New land		1,040
Supplemental land		5,830
Total		6,870
Principal agricultural production:		
Hay and pasture. Beef cattle and sheep.		
Irrigation water supply:		*Acres*
Increase in annual irrigation supply		13,400
Increase in annual stream depletion		4,800
Project works:		
Development of the project would require construction of the potential 9,000-acre-foot Silver Jack Reservoir on Cimarron Creek and rehabilitation and extension of the existing Cimarron Canal and lateral system.		
Construction costs and repayment:		
Estimated construction cost		$2,634,000
Reimbursable allocation to irrigation		2,634,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$695,000	
Power revenues of Colorado River storage project	1,939,000	
Total		2,634,000
Annual operation, maintenance, and replacement costs		10,200
Benefit-cost ratio		2 to 1



INTERIOR - RECLAMATION SLC UTAH

496—400—20

Statement on Dallas Creek Project, Colorado

(Reconnaissance data)

The potential Dallas Creek project would provide an irrigation supply for 15,750 acres of arable nonirrigated lands and supplemental water for 6,190 acres of irrigated lands. The lands are located in the drainage basin of the Uncompahgre River, a tributary of Gunnison River in the upper Colorado River Basin. The water supply for the project would be made available through utilization of surplus flows of Uncompahgre River and two of its tributaries, Dallas Creek and Cow Creek.

Construction features of the project would consist of three storage reservoirs, a water collection system, and two service canals. The 5,000-acre-foot Willow Swamp Reservoir would be constructed on East Dallas Creek and would store flows of that stream in addition to diversions through a 4-mile section of the collection system from Beaver Creek, a tributary of Dallas Creek. From Willow Swamp Reservoir, the collection canal would continue a distance of 16 miles to the potential 11,200-acre-foot Dallas Divide Reservoir, located on another small tributary of Dallas Creek. The 19-mile Log Hill Mesa Canal would begin at Dallas Divide Reservoir and would supply lands on Log Hill Mesa, a high plateau west of Uncompahgre River. The potential Ridgeway Canal would head on Uncompahgre River about 2 miles below the town of Ouray and would convey water 18 miles to lands on lower Dallas Creek. Some of the water to be used on lands of the unit is presently used by lands lower on the Uncompahgre River. Replacement storage would, therefore, be necessary. Such storage could be constructed at either the Ramshorn site on Cow Creek or the Ridgeway site on Uncompahgre River. Although it is assumed in this statement that the Ramshorn Reservoir would be constructed to provide replacement storage, further studies will be necessary to definitely determine which of the two sites should be selected.

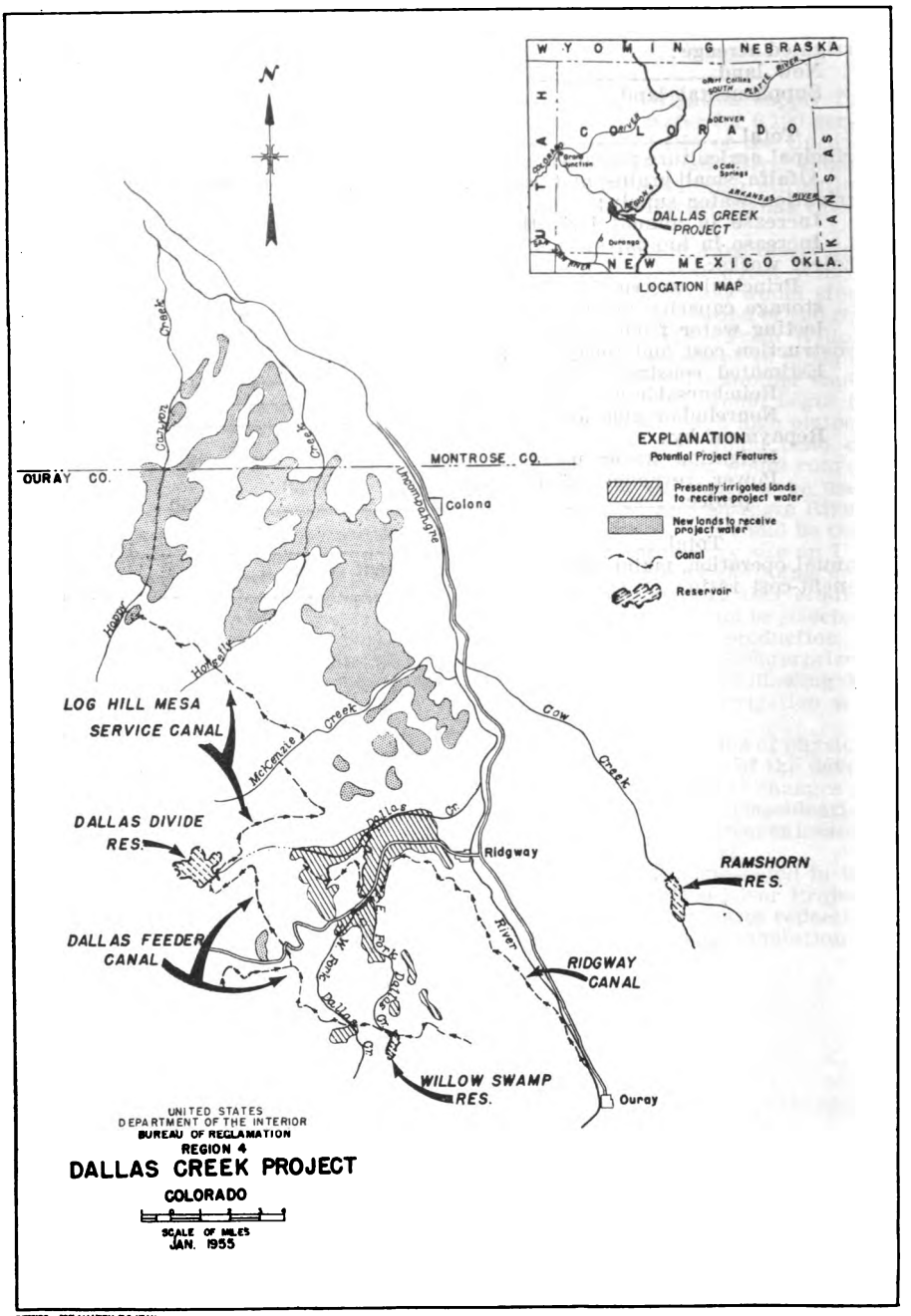
Present agricultural development in the area is based on the production of alfalfa, pasture, and small grains which support dairy and beef cattle enterprises. No change in the type of farming on existing farm units is expected following development of the project. New farm units to be brought under irrigation will probably be devoted to dairying and general farming.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Dallas Creek project, Colorado

Irrigated acreage:		*Acres*
New land		15,750
Supplemental land		6,190
Total		21,940
Principal agriculture production:		
Alfalfa, small grains, and pasture. Beef cattle, dairy cows, and sheep.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		62,500
Increase in annual stream depletion		29,900
Project works:		
Principal construction features would include three reservoirs with a total storage capacity in excess of 40,000 acre-feet, a system of canals for collecting water from several streams, and two main water delivery canals.		
Construction cost and repayment:		
Estimated construction cost		$10,330,000
Reimbursable allocation to irrigation		10,330,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$950,000	
Power revenues of Colorado River storage project	9,380,000	
Total		10,330,000
Annual operation, maintenance, and replacement costs		37,800
Benefit-cost ratio		1.6 to 1



INTERIOR - - RECLAMATION SLC UTAH

496—400—18

Statement on East River Project, Colorado

(Reconnaissance data)

Development of the potential East River project would provide for irrigation of 1,780 acres of nonirrigated lands and would provide supplemental water for 970 acres of presently irrigated lands north of the town of Gunnison in the upper Colorado River Basin. The water would be made available through construction of the 5-mile East River Canal which would divert from East River, one of the upper tributaries of Gunnison River. No storage facilities would be required to provide an adequate water supply for lands of the project.

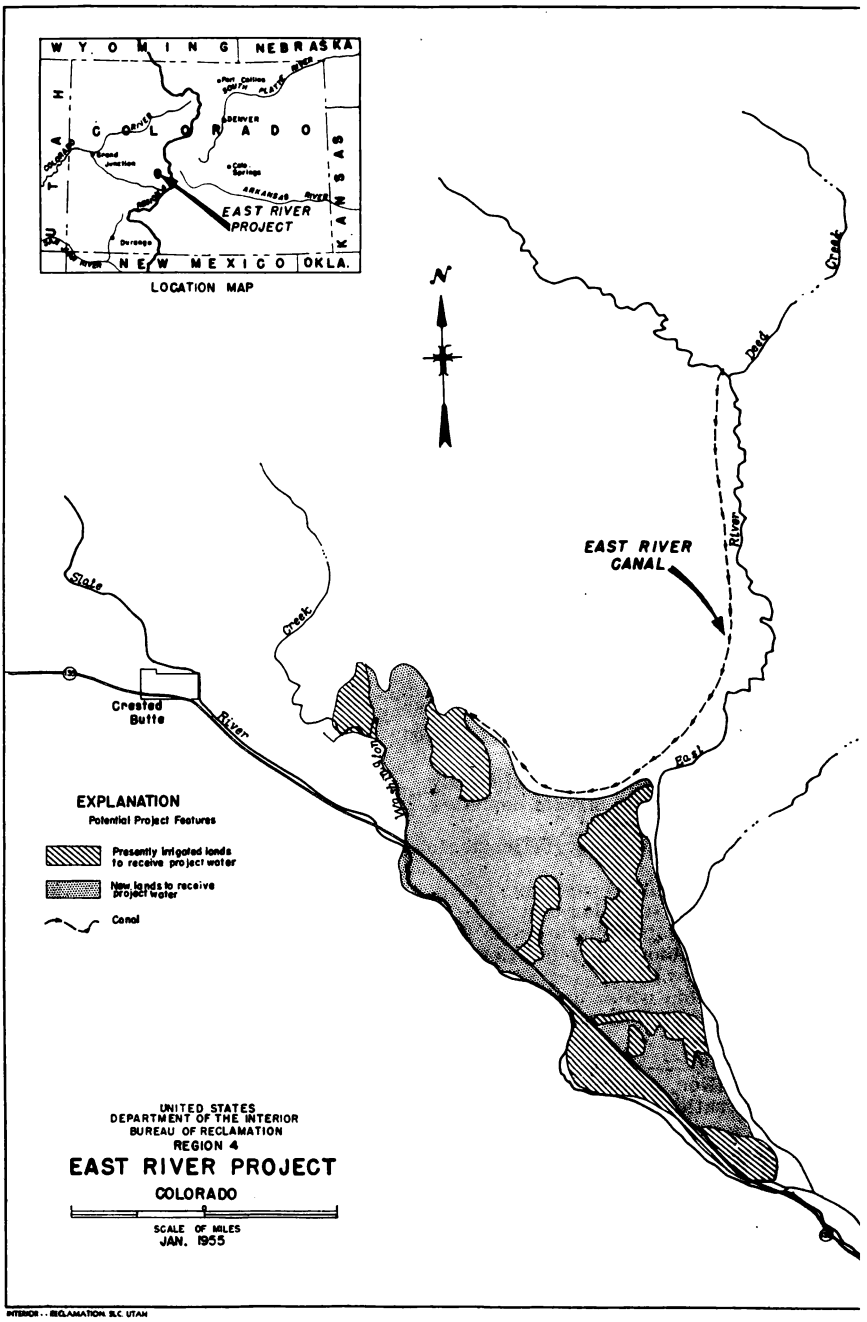
Present agricultural development in the area is limited largely to the production of hay and pasture for the dominant livestock industry. The cropping program of lands of the project is controlled principally by the short growing season and would not be expected to change following development.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, East River project, Colorado

Irrigated acreage:	*Acres*
New land	1,780
Supplemental land	970
Total	2,750
Principal agricultural production:	
Hay and pasture. Beef cattle, dairy cows, and sheep.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	8,500
Increase in annual stream depletion	2,100
Project works:	
The only major construction feature would be the 5-mile long East River Canal.	
Construction cost and repayment:	
Estimated construction cost	$212,000
Reimbursable allocation to irrigation	212,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	95,000
Power revenues of Colorado River storage project	117,000
Total	212,000
Annual operation, maintenance, and replacement costs	2,800
Benefit-cost ratio	3 to 1



INTERIOR - - RECLAMATION SLC UTAH

496-400-17

Statement on Fruitland Mesa Project, Colorado

(Reconnaissance data)

The potential Fruitland Mesa project would provide a water supply for 11,700 acres of arable nonirrigated land and supplemental water for 7,700 acres of presently irrigated land between the town of Crawford and the Black Canyon of the Gunnison National Monument. The water supply would be made available from Sapinero, Curecanti, Crystal, and Iron Creeks, tributaries of Gunnison River in the upper Colorado River Basin.

Construction features of the project would consist of a storage reservoir, enlargement of an existing reservoir, and construction of a system of waterways and distribution facilities. The new storage reservoir would be constructed on Sapinero Creek at the Soap Park site and would have a capacity of 25,000 acre-feet. A waterway system starting at the reservoir and consisting of 2.5 miles of bench flume and 7 miles of tunnel would divert flows of Sapinero and Curecanti Creeks to Crystal Creek. At a point lower on Crystal Creek, the water would be rediverted through the potential enlargement of the existing Gould Reservoir feeder canal. The feeder canal would be used to supply the potential Fruitland Mesa highline canal and to convey water for storage in Gould Reservoir which would be enlarged from its present capacity of 9,000 acre-feet to a capacity of 25,000 acre-feet. The Fruitland Mesa highline canal would be 14 miles in length and would serve lands above the service area of Gould Reservoir.

Present agricultural development in the area is based upon the production of alfalfa, pasture, and small grains which support dairy and beef cattle enterprises. No change would be expected in the type of farming following development of the project.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Fruitland Mesa project, Colorado

Irrigated acreage:	*Acres*
New land	11,700
Supplemental land	7,700
Total	19,400

Principal agricultural production:

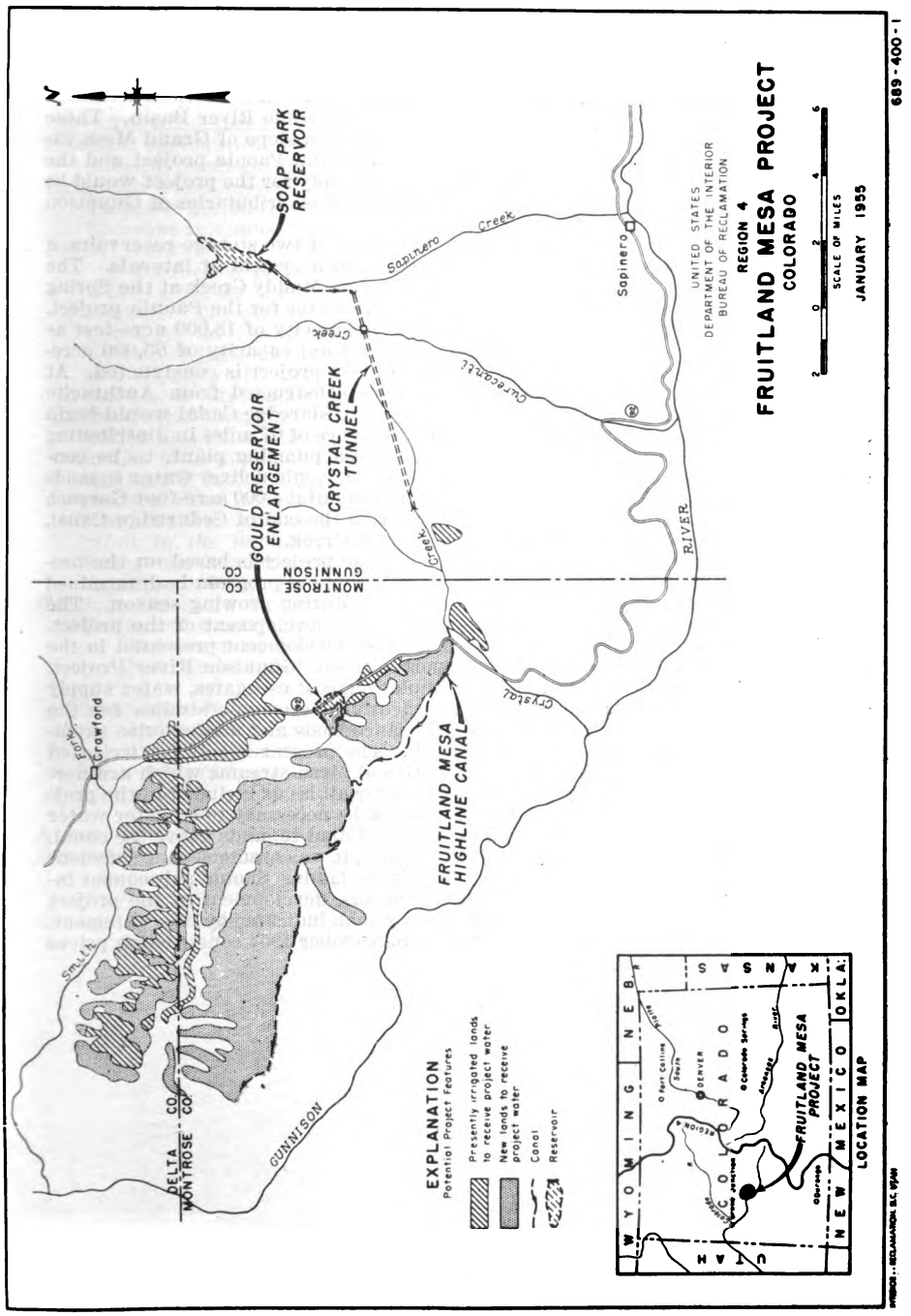
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.

Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	57,200
Increase in annual stream depletion	25,100

Project works:

Construction features of the project would consist of a storage reservoir, enlargement of an existing reservoir, and construction of a system of waterways and distribution facilities. The new storage reservoir would be constructed on Sapinero Creek at the Soap Park site and would have a capacity of 25,000 acre-feet. A waterway system starting at the reservoir and consisting of 2.5 miles of bench flume and 7 miles of tunnel would divert flows of Sapinero and Curecanti Creeks to Crystal Creek. At a point lower on Crystal Creek, the water would be rediverted through the potential enlargement of the existing Gould Reservoir feeder canal. The feeder canal would be used to supply the potential Fruitland Mesa highline canal and to convey water for storage in Gould Reservoir which would be enlarged from its present capacity of 9,000 acre-feet to a capacity of 25,000 acre-feet. The Fruitland Mesa highline canal would be 14 miles in length and would serve lands above the service area of Gould Reservoir.

Construction costs and repayment:	
Estimated construction cost	$11,551,000
Reimbursable allocation to irrigation	11,551,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	1,060,000
Power revenues of Colorado River storage project	10,491,000
Total	11,551,000
Annual operation, maintenance, and replacement costs	26,000
Benefit-cost ratio	1.3 to 1


N
SOAP PARK RESERVOIR
Sapinero Creek
Sapinero
Curecanti Creek
CRYSTAL CREEK TUNNEL
GOULD RESERVOIR ENLARGEMENT
MONTROSE CO.
GUNNISON CO.
Crystal Creek
RIVER
FRUITLAND MESA HIGHLINE CANAL
Crawford
Fork
Smith
GUNNISON
DELTA CO.
MONTROSE CO.
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
FRUITLAND MESA PROJECT
COLORADO
SCALE OF MILES
JANUARY 1955
689-400-1
WYOMING
NEB
KANSAS
COLORADO
UTAH
NEW MEXICO
OKLA.
DENVER
FRUITLAND MESA PROJECT
LOCATION MAP

Statement on Grand Mesa Project, Colorado
(Reconnaissance data)

The potential Grand Mesa project would provide a water supply for 11,070 acres of arable nonirrigated land and supplemental water for 14,230 acres of irrigated land in the Gunnison River drainage of the upper Colorado River Basin. These acreages include nearly all of the lands along the south slope of Grand Mesa except lands included in the service areas of the potential Paonia project and the Fruitgrowers Dam project extension. The water supply for the project would be made available from Muddy Creek and other Grand Mesa tributaries of Gunnison River.

Construction features of the project would consist of two storage reservoirs, a feeder canal, a service canal, a pumping plant, and a system of laterals. The principal storage for the project would be provided on Muddy Creek at the Spring Creek site which is also planned to provide storage water for the Paonia project. Should the reservoir be constructed initially to a capacity of 18,000 acre-feet as required for the Paonia project, enlargement to a total capacity of 85,000 acre-feet would be necessary at the time the Grand Mesa project is constructed. At that time, a 3.5-mile feeder canal would also be constructed from Anthracite Creek to augment natural inflow to the reservoir. Cedaredge Canal would begin at Spring Creek Reservoir and would extend a distance of 67 miles in distributing water to lands of the project. The Redlands Mesa pumping plant, to be constructed on the canal near the Leroux Creek crossing, would deliver water to lands above the canal in the Redlands Mesa area. The potential 4,000 acre-foot Gorsuch Reservoir, located on Currant Creek 12 miles from the end of Cedaredge Canal, would regulate flows of the canal as well as Currant Creek.

The present agricultural economy of lands of the project is based on the production of fruit and general crops. The overall cropping program is determined largely by local air drainage and frost conditions during growing season. The type of farming is not expected to change following development of the project.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River Project, Colorado," dated February 1951. Plan formulation, cost estimates, water supply studies, land classification surveys, and agricultural economic studies for the project have been made on a rough reconnaissance basis and may require extensive alterations during future planning work. The present supply for irrigated lands under the unit is derived from small Grand Mesa streams which are now highly developed as sources of water. In order for all lands included in the project to obtain adequate supplies of water, it would be necessary to transfer water now used on lands below the potential Cedaredge Canal to lands above the canal. In formulating the plan outlined in this statement, it was assumed that sufficient water could be made available to supply the higher lands. Should subsequent investigations prove this assumption to be erroneous, development of the project could be considerably less desirable economically than indicated by this statement.

Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Grand Mesa project, Colorado

Irrigated acreage:		*Acres*
New land		11,070
Supplemental land		14,230
Total		25,300

Principal agricultural production:

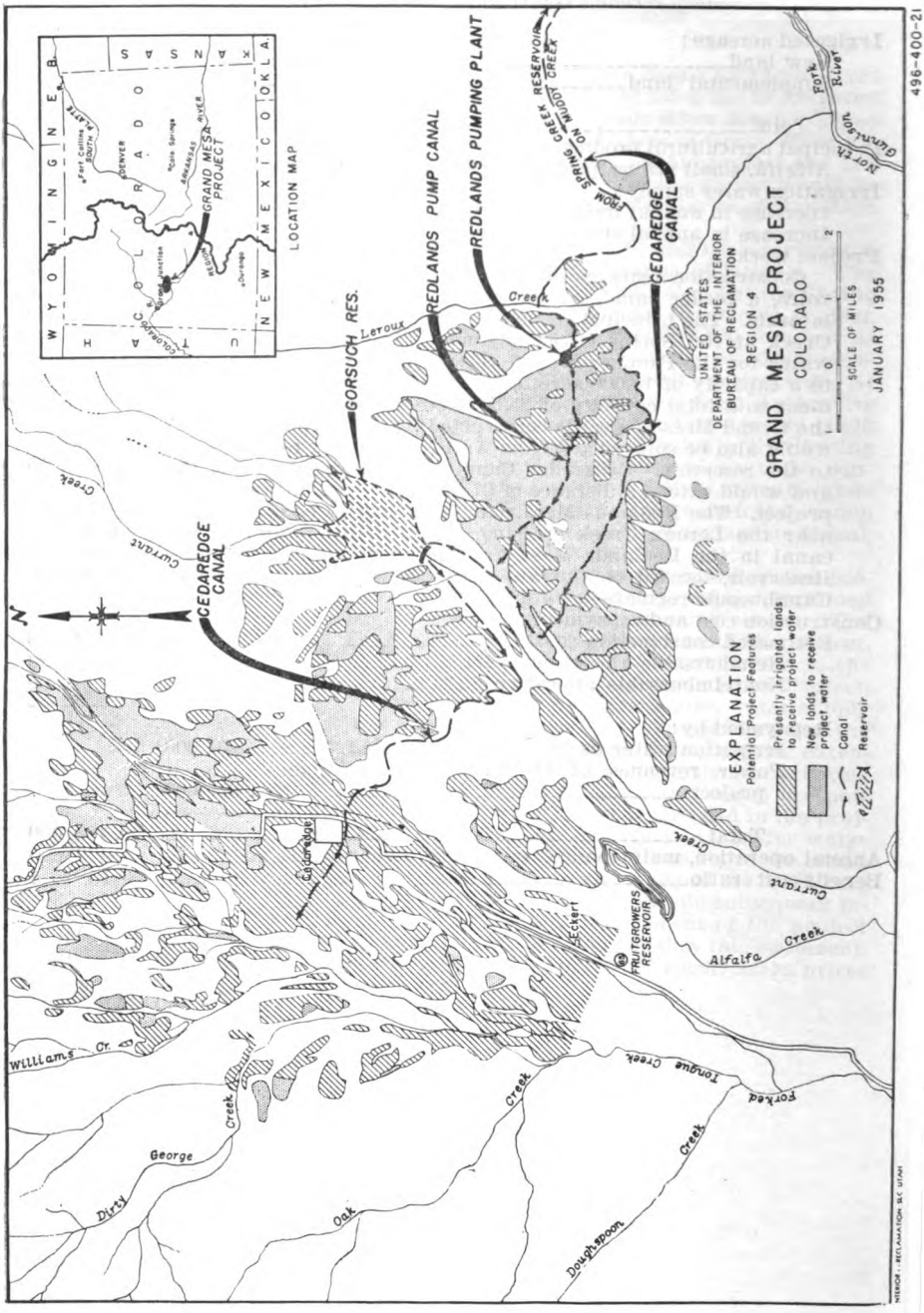
Alfalfa, small grains, pasture, and fruit. Dairy cows, beef cattle, and sheep.

Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		59,100
Increase in annual stream depletion		26,300

Project works:

Construction features of the project would consist of two storage reservoirs, a feeder canal, a service canal, a pumping plant, and a system of laterals. The principal storage for the project would be provided on Muddy Creek at the Spring Creek site which is also planned to provide storage water for the Paonia project. Should the reservoir be constructed initially to a capacity of 18,000 acre-feet as required for the Paonia project, enlargement to a total capacity of 85,000 acre-feet would be necessary at the time the Grand Mesa project is constructed. At that time, a 3.5-mile feeder canal would also be constructed from Anthracite Creek to augment natural inflow to the reservoir. Cedaredge Canal would begin at Spring Creek Reservoir and would extend a distance of 67 miles in distributing water to lands of the project. The Redlands Mesa pumping plant, to be constructed on the canal near the Leroux Creek crossing, would deliver water to lands above the canal in the Redlands Mesa area. The potential 4,000-acre-foot Gorsuch Reservoir, located on Currant Creek 12 miles from the end of Cedaredge Canal, would regulate flows of the canal as well as Currant Creek.

Construction cost and repayment:		
Estimated construction cost		$20,164,000
Reimbursable allocation to irrigation		$20,164,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$30,000	
Power revenues of Colorado River storage project	20,134,000	
Total		20,164,000
Annual operation, maintenance, and replacement costs		132,000
Benefit-cost ratio		1.8 to 1


GRAND MESA PROJECT
COLORADO
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 4
SCALE OF MILES
JANUARY 1955
496-400-21
EXPLANATION
Potential Project Features
Presently irrigated lands to receive project water
New lands to receive project water
Canal
Reservoir
LOCATION MAP
WYOMING
COLORADO
UTAH
NEW MEXICO
KANSAS
NEBR.
OKLA.
Denver
Colorado Springs
Pueblo
Grand Junction
Durango
Fort Collins
Colo. Springs
Arkansas River
GRAND MESA PROJECT
CEDAREDGE CANAL
GORSUCH RES.
REDLANDS PUMP CANAL
REDLANDS PUMPING PLANT
FROM SPRING CREEK RESERVOIR ON MUDDY CREEK
CEDAREDGE CANAL
N
Cedaredge
Eckert
FRUITGROWERS RESERVOIR
Alfalfa Creek
Curtant Creek
Leroux Creek
Tongue Creek
Forked Tongue Creek
Dough Spoon Creek
Oak Creek
Dirty George Creek
Williams Cr.
North Fork Gunnison River

Statement on the Ohio Creek Project, Colorado

(Reconnaissance data)

The potential Ohio Creek project would provide for the irrigation of 6,200 acres of arable nonirrigated land and 10,710 acres of irrigated land in need of additional water. The source of the water would be Ohio Creek, a Gunnison River tributary in the upper Colorado River Basin.

Construction features would consist of a storage reservoir, irrigation service canal, and a lateral system. The potential Castleton Reservoir would be constructed to a capacity of 10,000 acre-feet to provide regulatory storage for the project. The Castleton site is located on Castle Creek, a tributary of Ohio Creek. The Ohio Creek Canal, 18 miles in length, would deliver the irrigation water to lands of the project.

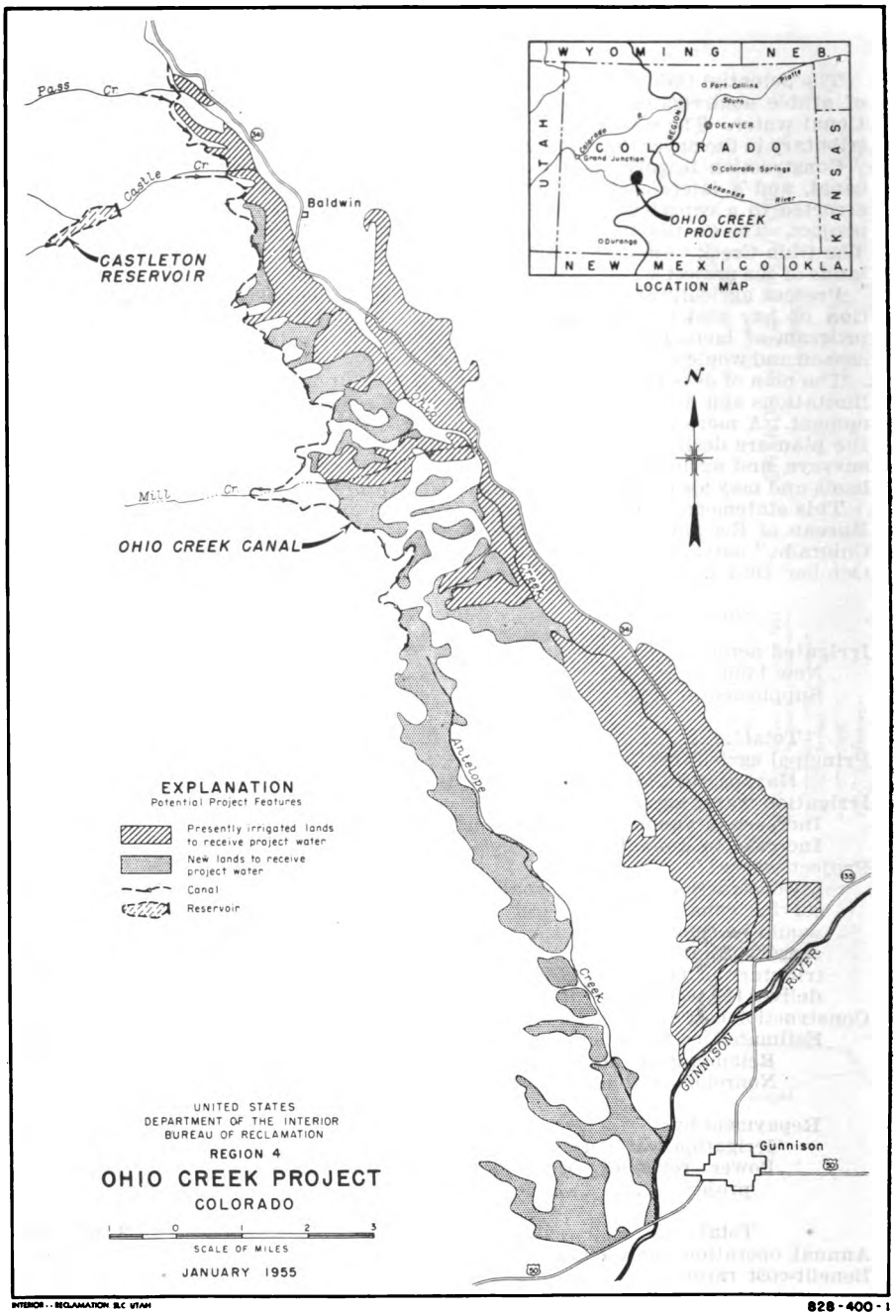
Present agricultural development in the area is limited largely to the production of hay and pasture for the dominant livestock industry. The cropping program of lands of the project is controlled principally by the short growing season and would not be expected to change following development.

The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alteration during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report entitled "Gunnison River project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Ohio Creek project, Colorado

Irrigated acreage:		*Acres*
New land		6,200
Supplemental land		10,710
Total		16,910
Principal agricultural production:		
Hay, pasture, and small grains. Beef cattle and sheep.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		36,700
Increase in annual stream depletion		9,300
Project works:		
Construction features would consist of a storage reservoir, irrigation service canal, and a lateral system. The potential Castleton Reservoir would be constructed to a capacity of 10,000 acre-feet to provide regulatory storage for the project. The Castleton site is located on Castle Creek, a tributary of Ohio Creek. The Ohio Creek Canal, 18 miles in length, would deliver the irrigation water to lands of the project.		
Construction cost and repayment:		
Estimated construction cost		$3,402,000
Reimbursable allocation to irrigation		3,402,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$35,000	
Power revenues of Colorado River storage project	3,367,000	
Total		3,402,000
Annual operation, maintenance, and replacement costs		19,500
Benefit-cost ratio		1.5 to 1



INTERIOR - - RECLAMATION SLC UTAH

828-400-1

Statement on Tomichi Creek Project, Colorado

(Reconnaissance data)

The potential Tomichi Creek project would provide supplemental irrigation water for 15,400 acres of presently irrigated land and a new supply for 12,180 acres of arable nonirrigated land located east of the town of Gunnison near the Continental Divide. Water would be made available from Tomichi and Quartz Creeks, tributaries of Gunnison River in the upper Colorado River Basin.

Construction features of the project would consist of 2 storage reservoirs, 2 main distribution canals, and a system of laterals. The potential Monarch and Ohio City Reservoirs, each with a storage capacity of 30,000 acre-feet, would be constructed on Tomichi and Quartz Creeks, respectively. The South Crookton Canal would head at Monarch Reservoir and would extend approximately 28 miles in a westerly direction to irrigate lands south of Tomichi Creek. Water from the Ohio City Reservoir would be distributed by the potential Quartz Creek Canal which would also be about 28 miles in length.

Present agricultural development in the area is limited largely to the production of hay and pasture for the dominant livestock industry. The cropping program of lands of the project is controlled principally by the short growing season and would not be expected to change following project development.

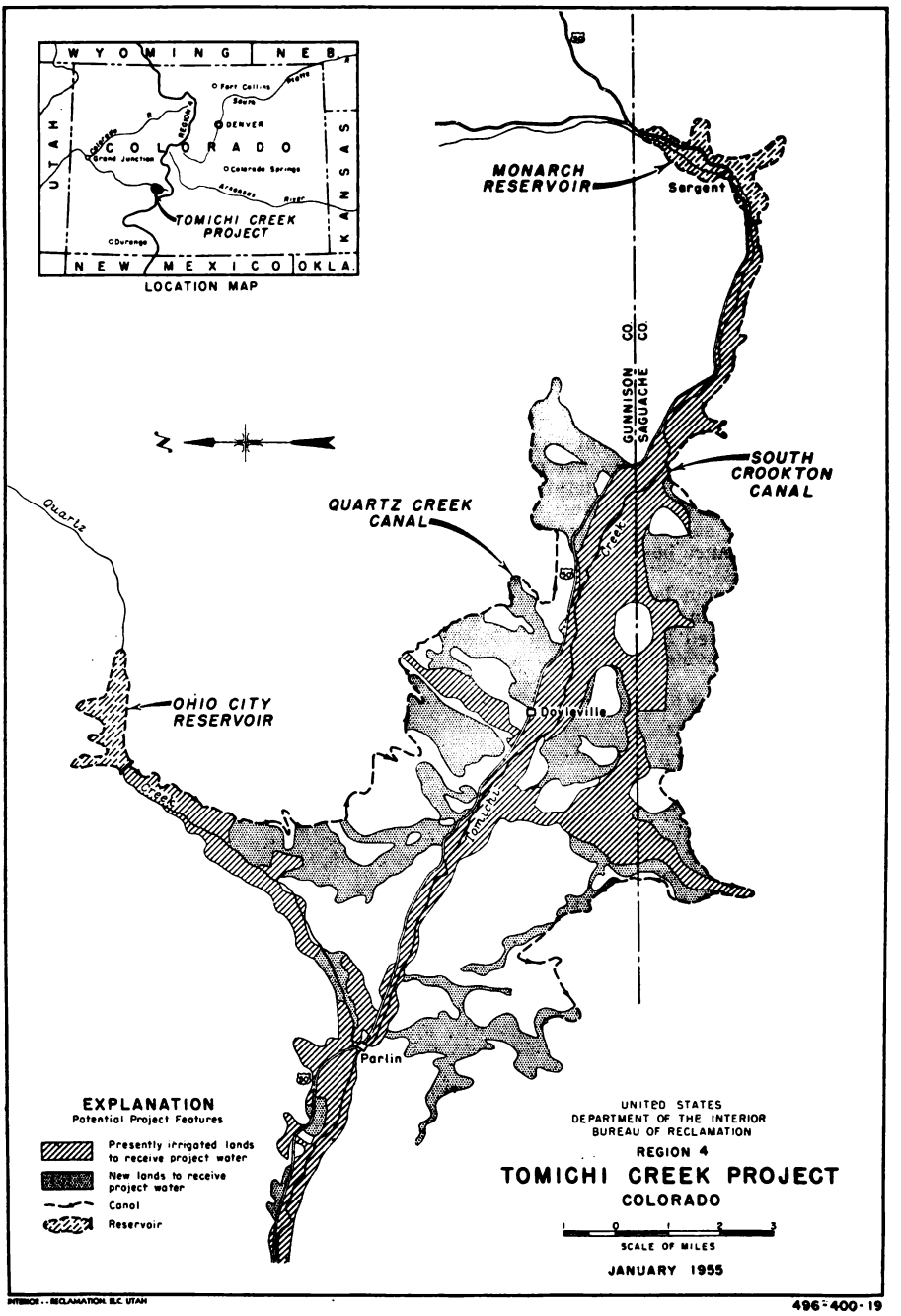
The plan of development has been formulated through consideration of physical limitations and does not necessarily define the economic limitations of the development. A more detailed investigation may, therefore, indicate that changes in the plan are desirable. Cost estimates, water supply studies, land classification surveys, and agricultural economic studies have been made on a reconnaissance basis and may also require alterations during future planning work.

This statement is based on the physical plan of development presented in the Bureau of Reclamation reconnaissance report, entitled "Gunnison River project, Colorado," dated February 1951. Results of reconnaissance estimates reflecting October 1954 construction prices are summarized in the following tabulation.

Summary reconnaissance data, Tomichi Creek project, Colorado

Irrigated acreage:		*Acres*
New land		12,180
Supplemental land		15,400
Total		27,580
Principal agricultural production:		
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		66,600
Increase in annual stream depletion		17,700
Project works:		
Construction features of the project would consist of 2 storage reservoirs, 2 main distribution canals, and a system of laterals. The potential Monarch and Ohio City Reservoirs, each with a storage capacity of 30,000 acre-feet, would be constructed on Tomichi and Quartz Creeks, respectively. The South Crookton Canal would head at Monarch Reservoir and would extend approximately 28 miles in a westerly direction to irrigate lands south of Tomichi Creek. Water from the Ohio City Reservoir would be distributed by the potential Quartz Creek Canal which would also be about 28 miles in length.		
Construction cost and repayment:		
Estimated construction cost		$11,523,000
Reimbursable allocation to irrigation		11,523,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users		0
Power revenues of Colorado River storage project	$11,523,000	
Total		11,523,000
Annual operation, maintenance, and replacement costs		47,840
Within payment capacity of water users [1]		36,700
Benefit-cost ratio		0.9 to 1

[1] The payment capacity of water users would not be sufficient to pay operation, maintenance, and replacement.



INTERIOR - RECLAMATION, SLC, UTAH 496-400-19

Statement on Battlement Mesa Project, Colorado

(Reconnaissance data)

The potential Battlement Mesa project in Mesa County, west-central Colorado, would regulate the surplus runoff in Buzzard Creek of the upper Colorado River drainage and two branches of Muddy Creek of the Gunnison River drainage to provide for the irrigation of 6,780 acres of full service land and 50 acres of supplemental service land located on the south slope of Battlement Mesa near the town of Collbran, Colo. The project would also aid in fishery and wildlife conservation.

Climatological conditions prevailing in the project area would probably limit crop production to livestock feeds, such as alfalfa, small grains, and pasture. The principal type of farming after project development would be based on the ranging and feeding of livestock.

Principal construction features of the project would include the Owens Creek Dam and Reservoir on Buzzard Creek with a total capacity of 25,000 acre-feet, the Dyke Creek feeder canal which would divert surplus flows in Dyke and West Muddy Creek of the Gunnison River Basin into the channel of Buzzard Creek, and the Colorado Canal which would divert the reservoir releases from Buzzard Creek about 18 miles downstream from the Owens Creek Reservoir and convey the releases to the project lands. About 3 years would be required for construction of the project features.

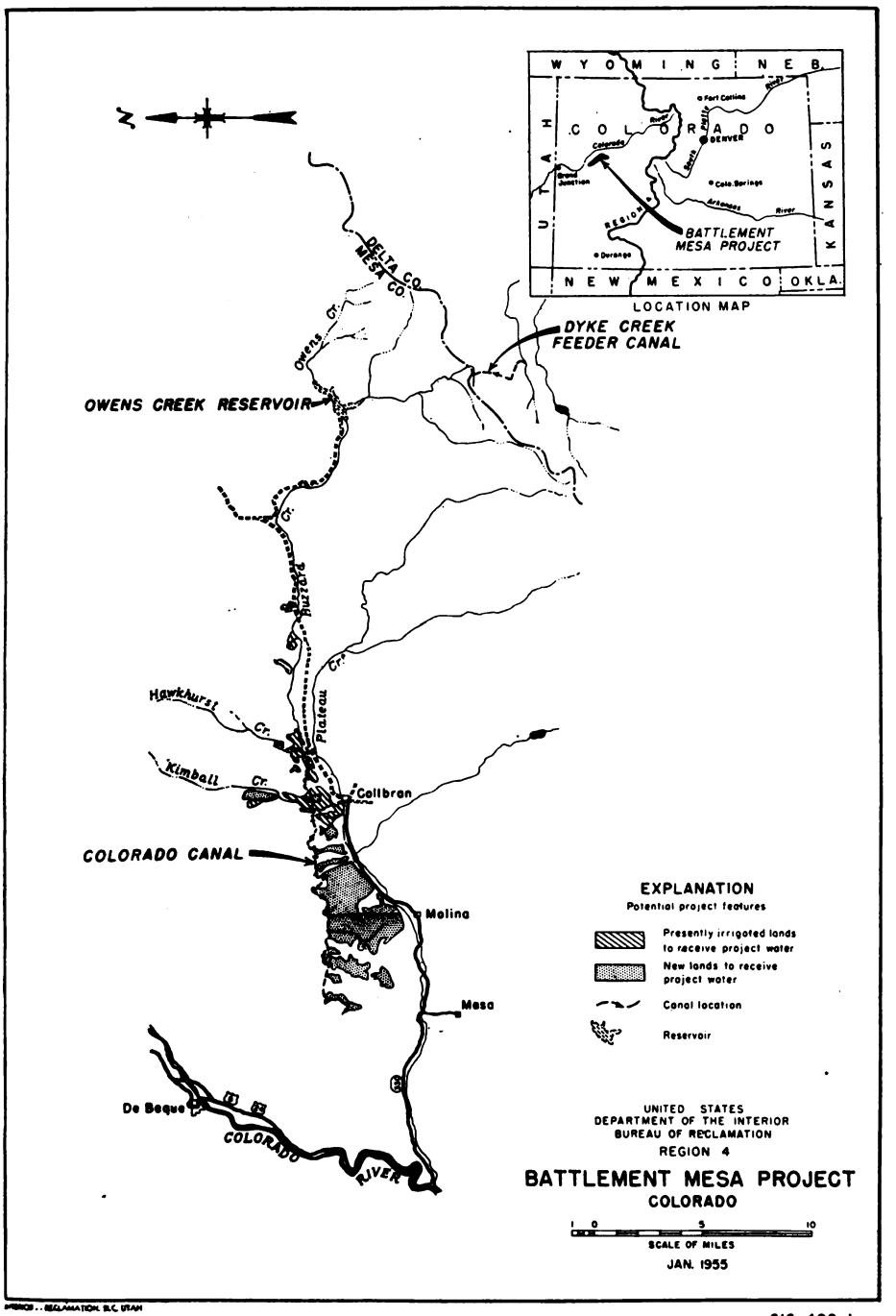
Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on streamflows as they occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Battlement Mesa unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The investigations leading to that report were of reconnaissance scope and detailed investigations of the Battlement Mesa project may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

Summary reconnaissance data, Battlement Mesa project, Colorado

Irrigated acreage:		*Acres*
New land		6,780
Supplemental land		50
Total		6,830
Principal agricultural production:		
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		22,800
Increase in annual stream depletion		10,700
Project works:		
Principal construction features of the project would include the Owens Creek Dam and Reservoir on Buzzard Creek with a total capacity of 25,000 acre-feet, the Dyke Creek feeder canal which would divert surplus flows in Dyke and West Muddy Creek of the Gunnison River Basin into the channel of Buzzard Creek, and the Colorado Canal which would divert the reservoir releases from Buzzard Creek about 18 miles downstream from the Owens Creek Reservoir and convey the releases to the project lands. About 3 years would be required for construction of the project features.		
Construction cost and repayment:		
Estimated construction cost		$5,853,700
Reimbursable allocation to irrigation		5,853,700
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$645,000	
Power revenues of Colorado River storage project	5,208,700	
Total		5,853,700
Annual operation, maintenance, and replacement costs		21,300
Benefit-cost ratio		1.1 to 1



616-400-1

Statement on Bluestone Project, Colorado

(Reconnaissance data)

The potential Bluestone project in Garfield and Mesa Counties, west-central Colorado, would divert water from Colorado River to provide for the irrigation of 8,660 acres of new land and 2,215 acres of supplemental service land located in the Colorado River Valley between the town of Rifle and the head of DeBeque Canyon near DeBeque, Colo.

The principal land use on irrigated farms under present conditions is confined to the production of hay, grain, pasture, and alfalfa seed crops. With project development it is anticipated the cropping pattern would be expanded to include potatoes, sugar beets, and fruit. Livestock feeding during the winter months would continue in the area.

Principal construction features of the project would include two diversion dams on the Colorado River, one at the heading of the Havemeyer Canal near Rifle and the other at the heading of the Bluestone ditch near DeBeque; the complete restoration, enlargement, and extension of the Havemeyer Canal system; the Webster Hill pumping plant and lateral branching from the Havemeyer Canal about 5 miles below its heading; the Monument lateral branching from the Havemeyer Canal near Grand Valley; and rehabilitation of the Bluestone ditch. One to two years would be required for construction of the project features.

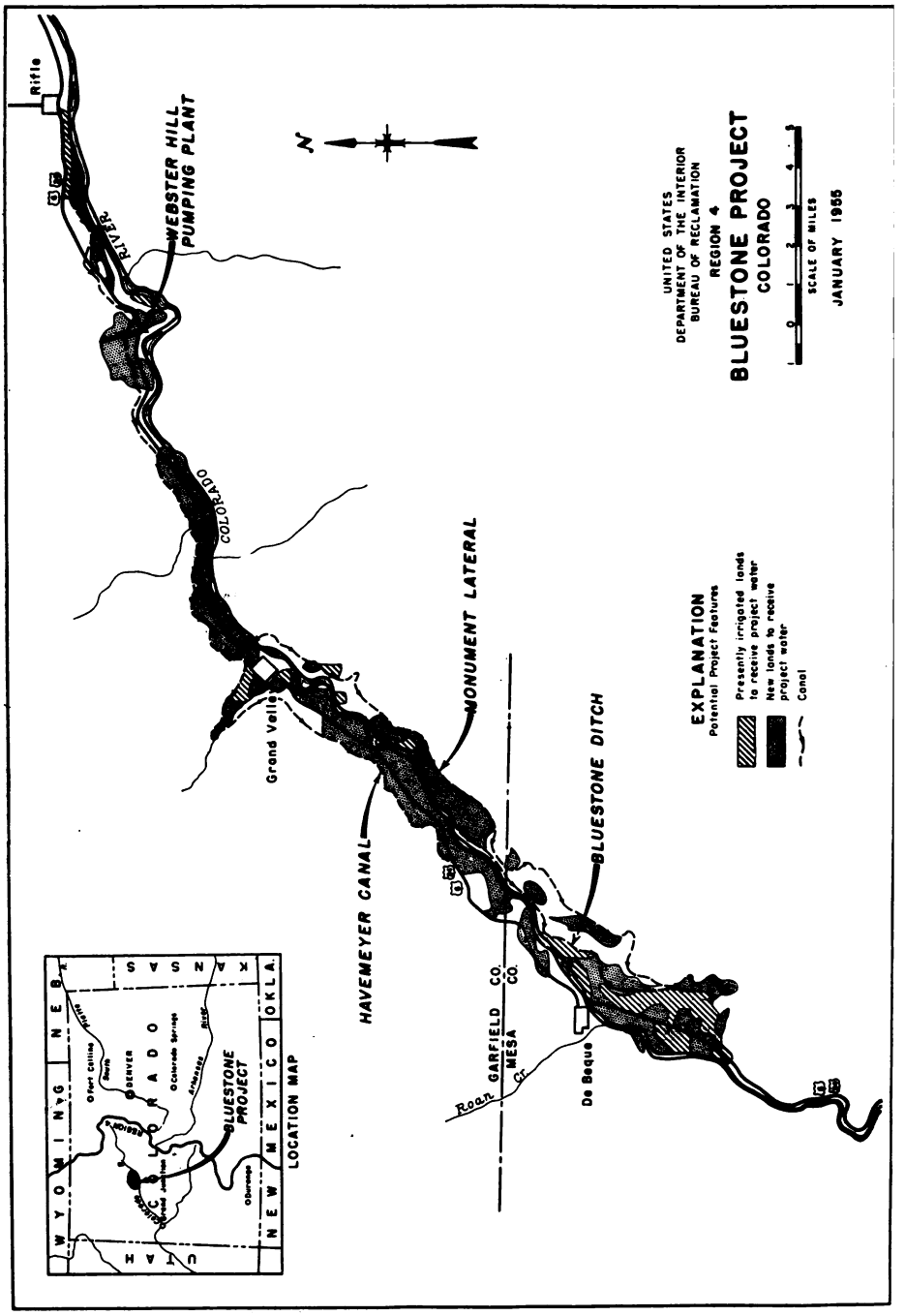
Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available at all times for the project by virtue of absolute decrees to the Havemeyer and Bluestone irrigation systems. Operation of the project as tentatively planned would depend on court approval of expansion of the irrigated acreage under these two systems.

This statement is based on the physical plan of development for the Bluestone unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigations of the various features presented therein may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

Summary reconnaissance data, Bluestone project, Colorado

Irrigated acreage:		*Acres*
New land		8,660
Supplemental land		2,215
Total		10,875
Principal agricultural production:		
Alfalfa, grain, vegetables, fruit, and sugar beets. Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		42,900
Increase in annual stream depletion		19,900
Project works:		
Principal construction features of the project would include 2 diversion dams on the Colorado River, 1 at the heading of the Havemeyer Canal near Rifle and the other at the heading of the Bluestone ditch near DeBeque; the complete restoration, enlargement, and extension of the Havemeyer Canal system; the Webster Hill pumping plant and lateral branching from the Havemeyer Canal about 5 miles below its heading; the Monument lateral branching from the Havemeyer Canal near Grand Valley; and rehabilitation of the Bluestone ditch. One to two years would be required for construction of the project features.		
Construction cost and repayment:		
Estimated construction cost		$3,329,900
Reimbursable allocation to irrigation		3,329,900
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$370,000	
Power revenues of Colorado River storage project	2,959,900	
Total		3,329,900
Annual operation, maintenance, and replacement costs		32,900
Benefit-cost ratio		2 to 1



Statement on Eagle Divide Project, Colorado

(Reconnaissance data)

The potential Eagle Divide project in Eagle County, northwestern Colorado, would regulate surplus runoff in Piney River, tributary to the Colorado River, and would divert surplus flows from several small streams, tributaries to the Piney and Colorado Rivers below the planned reservoir, to provide for the irrigation of 8,990 acres of new land and 1,885 acres of supplemental service land. The project lands are located on the divide between the Eagle and Colorado Rivers in the vicinity of the following towns: Eagle, Wolcott, McCoy, and Burns. The project would increase fishery, wildlife, and recreational values of the area.

Ranging and feeding of livestock is the predominant type of agriculture followed in the project area. A short growing season, resulting from the high elevation of the project lands, limits crops to hay, small grain, and pasture. It is anticipated that continued production of these crops would prevail with project development. Most of the crops produced would be locally fed to livestock.

Principal construction features of the project would include the Red Standstone Dam and Reservoir on Piney River with a total capacity of 12,800 acre-feet; the Catamount Canal extending eastward about 32 miles from Piney River below the reservoir along the Eagle-Colorado Divide to Catamount Creek, tributary to the Colorado River near Burns; and the Willow Creek lateral, a branch of the Catamount Canal which would serve lands in the Willow Creek and Little Alkali Creek drainages that are tributaries to Eagle River near Walcott. About 3 years would be required for construction of the project features.

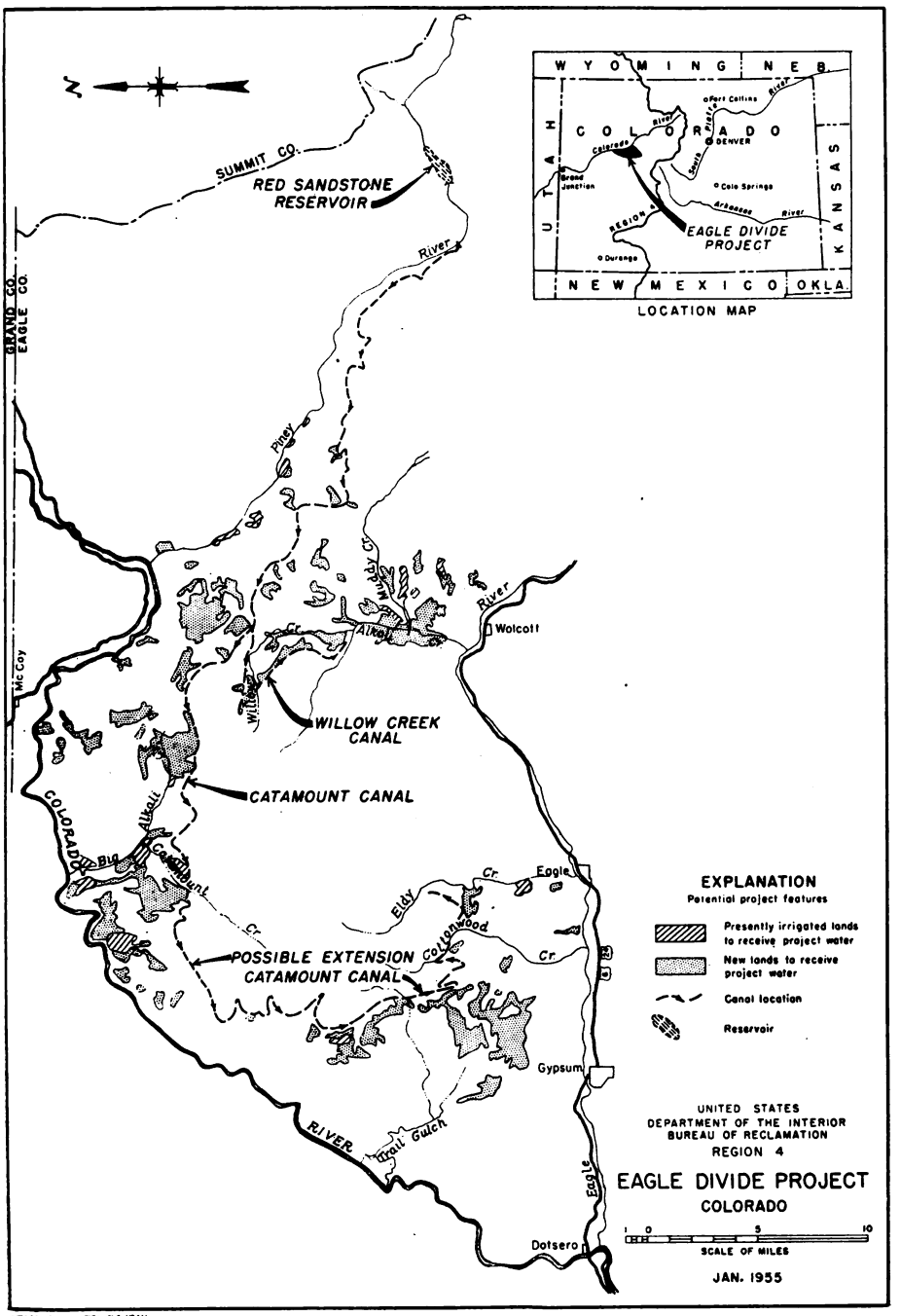
Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies based on streamflows as they occurred in the past indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Eagle Divide unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project dated February 1954. The investigations leading to that report were of reconnaissance scope and detailed investigations of the Eagle Divide project may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

Summary reconnaissance data, Eagle Divide project, Colorado

Irrigated acreage:		*Acres*
New land		8,990
Supplemental land		1,885
Total		10,875
Principal agricultural production:		
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		23,900
Increase in annual stream depletion		12,000
Project works:		
Principal construction features of the project would include the Red Sandstone Dam and Reservoir on Piney River with a total capacity of 12,800 acre-feet; the Catamount Canal extending eastward about 32 miles from Piney River below the reservoir along the Eagle-Colorado Divide to Catamount Creek, tributary to the Colorado River near Burns; and the Willow Creek lateral, a branch of the Catamount Canal which would serve lands in the Willow Creek and Little Alkali Creek drainages that are tributaries to Eagle River near Wolcott. About 3 years would be required for construction of the project features.		
Construction cost and repayment:		
Estimated construction cost		$3,411,700
Reimbursable allocation to irrigation		3,411,700
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$305,000	
Power revenues of Colorado River storage project	3,106,700	
		3,411,700
Annual operation, maintenance, and replacement costs		15,400
Benefit-cost ratio		1.1 to 1



INTERIOR - RECLAMATION, SLC UTAH

616-400-3

Statement on the Parshall Project, Colorado

(Reconnaissance data)

The potential Parshall project would provide for the full irrigation of 24,410 acres of new land and would supply supplemental water to 3,100 acres of partially irrigated land along Williams River, Little Muddy Creek, and the lower east side of the Blue River Valley in the vicinity of the communities of Parshall and Kremmling, Grand and Summit Counties in northcentral Colorado. The project would also aid in fishery and wildlife conservation.

The basic type of agriculture in the area, which is the ranging and feeding of livestock, would remain virtually unchanged with project development because of climatic limitations on crop diversification and the availability of extensive areas of summer range in the adjacent mountains. Some of the project lands, however, are devoted to cash crops such as small grain and truck. With project development, hay and grain would continue to be the principal crops grown. These would generally be utilized locally for winter feed for livestock.

Principal construction features of the project would include the Ute Park Dam and Reservoir of 43,000-acre-foot total capacity on Williams River; the Skylark Canal, approximately 45 miles in length, extending westward from the reservoir outlet to lands along the west side of the Williams River Valley and the east side of the lower Blue River Valley; the Sylvan Canal extending eastward about 17 miles from the reservoir outlet along the east side of the Williams River Valley into the valley of the Little Muddy Creek; and enlargement and extension of the existing Big Lake ditch which serves lands on the west side of the Williams River. About 3 years would be required for construction of the project features.

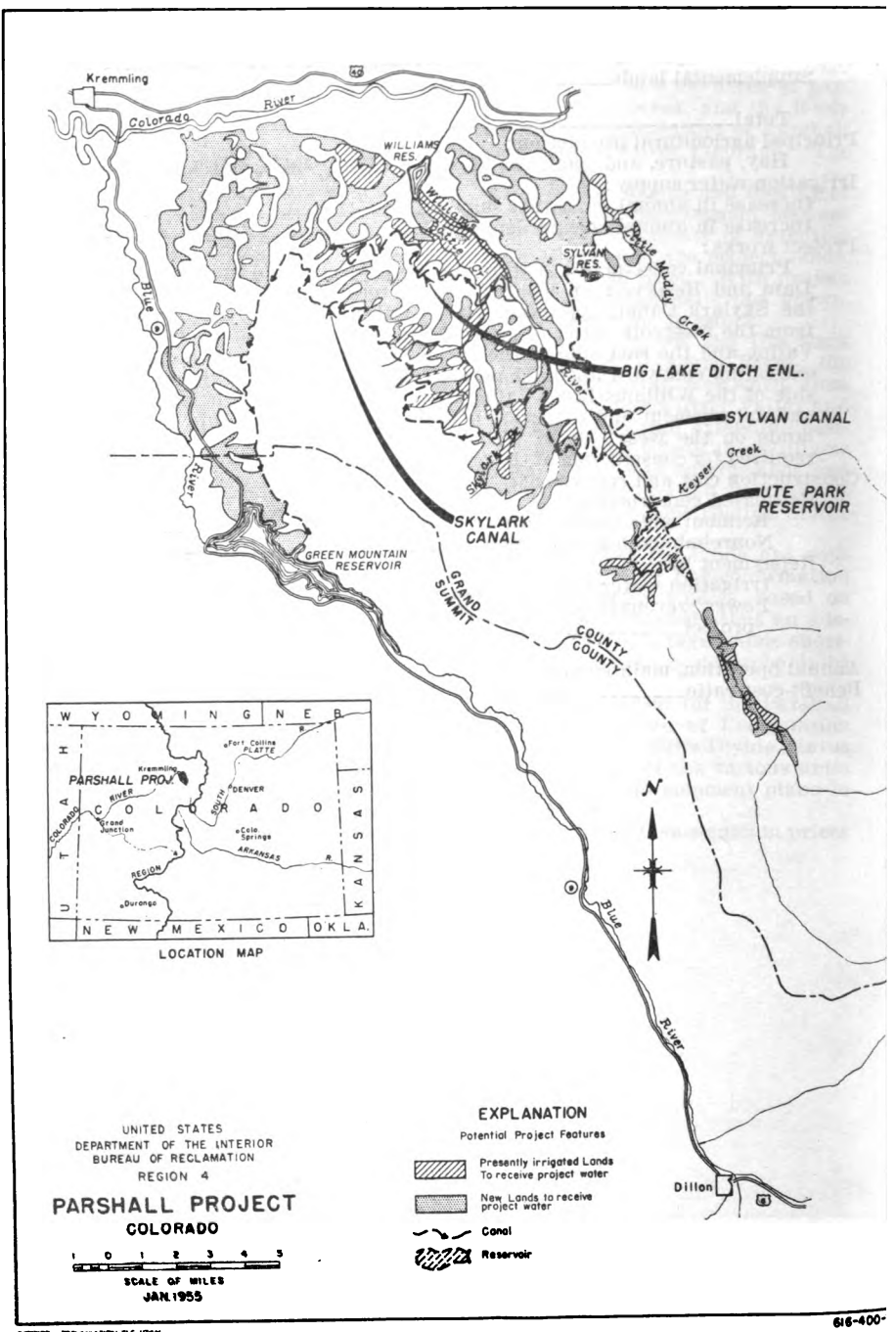
Reconnaissance land classification surveys indicate that the lands are suitable for sustained crop production under irrigation farming but confirmation can be made only by detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Parshall unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigation of the various units presented therein may show the need for modification of development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

Summary reconnaissance data, Parshall project, Colorado

Irrigated acreage:		*Acres*
New lands		24,410
Supplemental lands		3,100
Total		27,510
Principal agricultural production:		
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		68,700
Increase in annual stream depletion		28,600
Project works:		
Principal construction features of the project would include the Ute Park Dam and Reservoir of 43,000 acre-feet total capacity on Williams River; the Skylark Canal, approximately 45 miles in length, extending westward from the reservoir outlet to lands along the west side of the Williams River Valley and the east side of the lower Blue River Valley; the Sylvan Canal extending eastward about 17 miles from the reservoir outlet along the east side of the Williams River Valley into the valley of the Little Muddy Creek; and enlargement and extension of the existing Big Lake ditch which serves lands on the west side of the Williams River. About 3 years would be required for construction of the project features.		
Construction cost and repayment:		
Estimated construction cost		$11,881,900
Reimbursable allocation to irrigation		11,881,900
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$1,420,000	
Power revenues of Colorado River storage project	10,461,900	
		11,881,900
Annual operation, maintenance, and replacement costs		32,700
Benefit-cost ratio		1 to 1



Statement on the Rabbit Ear Project, Colorado

(Reconnaissance data)

The potential Rabbit Ear project in Grand County, north-central Colorado, would regulate surplus runoff of Muddy Creek, tributary to the Colorado River near Kremmling, Colo., to provide for the irrigation of 13,955 acres of new service land and 5,235 acres of supplemental service land. The project lands are located in the Muddy Creek drainage, south and west of Kremmling. The project would also provide some flood-control benefits and also increase fishery and wildlife values.

Ranging and feeding livestock is the predominant type of agriculture followed in the project area. A short growing season, resulting from the high elevation of the project lands, limits crops to hay, small grains, and pasture. It is anticipated that production of these crops would continue to redominate with project development. Most of the crops produced would be locally fed to livestock.

Principal construction features of the project would include the DeBerard Dam and Reservoir with a total capacity of 22,500 acre-feet, the DeBerard Canal extending from the reservoir outlet 28 miles along the west side of the Muddy Creek Valley, and the Gunsight Canal extending from the reservoir outlet about 38 miles along the east side of the Muddy Creek Valley. About 3 years would be required for construction of the project features.

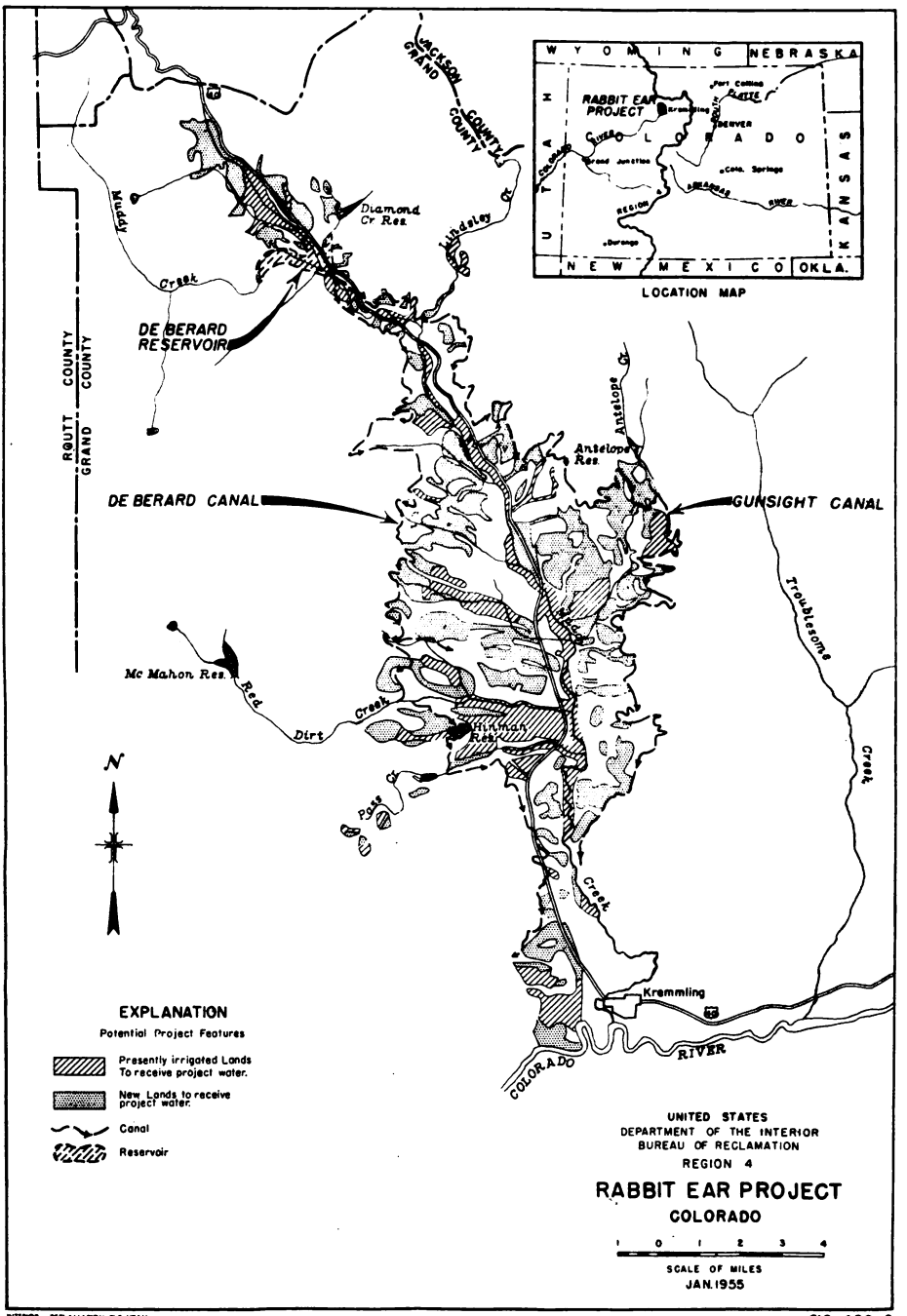
Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on streamflows as they occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Rabbit Ear unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The investigations leading to that report were of reconnaissance scope and detailed investigations of Rabbit Ear project may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

Summary reconnaissance data, Rabbit Ear project, Colorado

Irrigated acreage:	*Acres*
New land	13,955
Supplemental land	5,235
Total	19,190
Principal agricultural production:	
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	38,000
Increase in annual stream depletion	16,400
Project works:	
Principal construction features of the project would include the DeBerard Dam and Reservoir with a total capacity of 22,500 acre-feet, the DeBerard Canal extending from the reservoir outlet 28 miles long the west side of the Muddy Creek Valley, and the Gunsight Canal extending from the reservoir outlet about 38 miles along the east side of the Muddy Creek Valley. About 3 years would be required for construction of the project features.	
Construction cost and repayment:	
Estimated construction cost	$4,733,500
Reimbursable allocation to irrigation	4,733,500
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	760,000
Power revenues of Colorado River storage project	3,973,500
Total	4,733,500
Annual operation, maintenance, and replacement costs	19,000
Benefit-cost ratio	1.3 to 1



INTERIOR - RECLAMATION, SLC, UTAH 616-400-2

STATEMENT ON TROUBLESOME PROJECT, COLORADO

(Reconnaissance data)

The potential Troublesome project in Grand County, north-central Colorado, would regulate surplus runoff in East Troublesome Creek, tributary to the Colorado River, and would divert surplus flows of the Williams River at the existing Williams Reservoir to provide for the irrigation of 8,990 acres of new land and 4,650 acres of supplemental service land. The project lands are located in the Troublesome Creek Valley and on river benches north of the Colorado River between the towns of Parshall and Kremmling, Colo. The project would also increase fishery, wildlife, and recreational values of the area.

Ranging and feeding of livestock is the predominant type of agriculture followed in the project area. The short growing season, resulting from the high elevation of the project lands, limits crops to hay, small grains, and pasture. It is anticipated that production of these crops would continue to predominate with project development. Most of the crops produced would be locally fed to livestock.

Principal construction features of the project would include the Haypark Dam and Reservoir on East Troublesome Creek with a total capacity of 20,100 acre-feet; the Haypark Canal which would convey water released from the reservoir to the west branch of Troublesome Creek above the heading of the existing Kurtz No. 2 ditch; enlargement and extension of the Kurtz No. 2 ditch; and the Kremmling Canal which would extend from an outlet from the Williams Reservoir on Williams River across the Colorado River by siphon and along the benchlands north of the Colorado River from near Parshall westward to Kremmling. About 3 years would be required for construction of the project features.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project, with permissible shortages in occasional drought years under the Kurtz No. 2 ditch and no shortages under the Kremmling Canal. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the Troublesome unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigations of the various features presented therein may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

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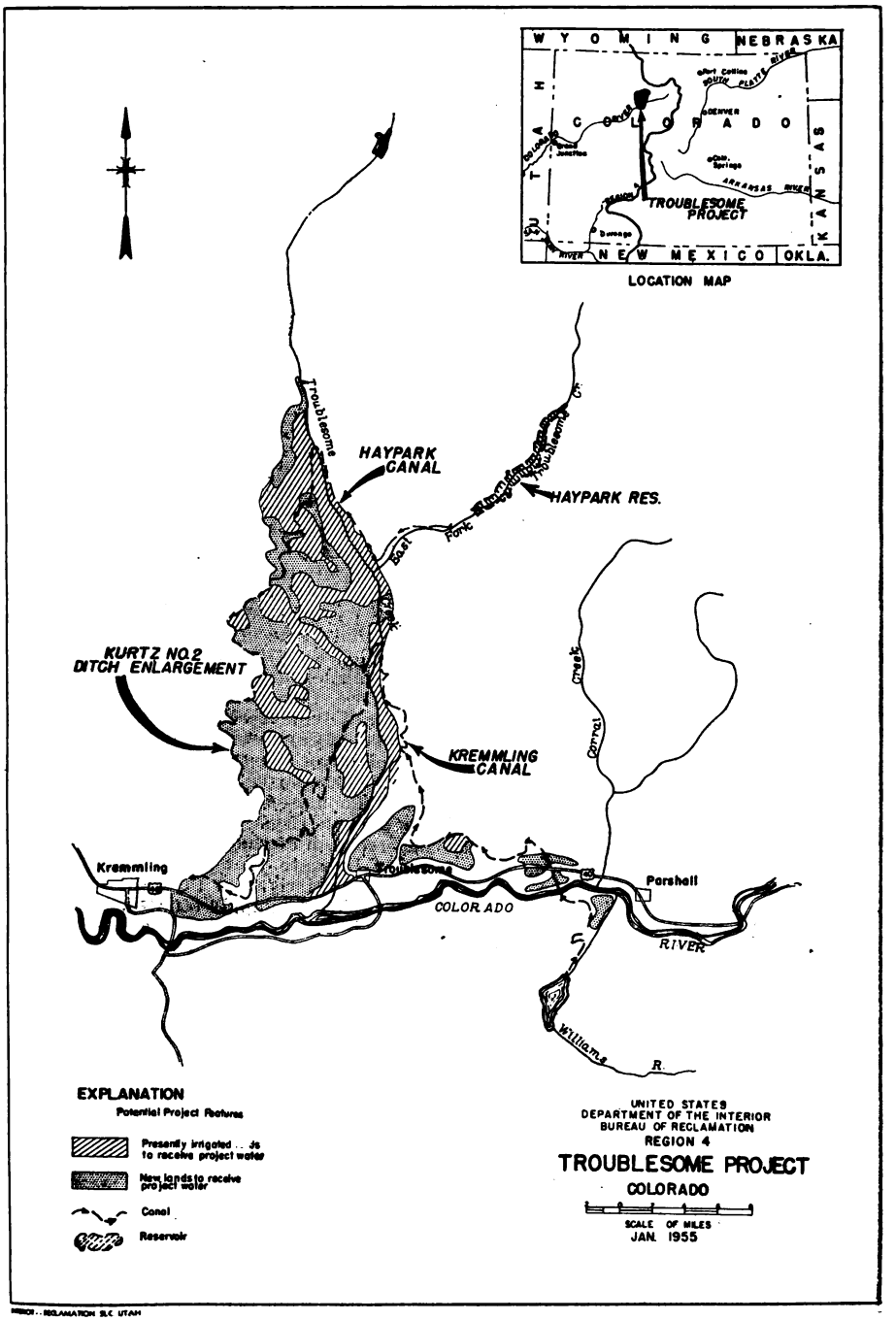
Summary reconnaissance data, Troublesome project, Colorado

Irrigated acreage:	*Acres*
New lands	8,990
Supplemental lands	4,650
Total	13,640
Principal agricultural production:	
Hay, pasture, and small grains. Beef cattle, sheep, and dairy cows.	
Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	29,200
Increase in annual stream depletion	13,000
Project works:	
Principal construction features of the project would include the Haypark Dam and Reservoir on East Troublesome Creek with a total capacity of 20,100 acre-feet; the Haypark Canal which would convey water released from the reservoir to the west branch of Troublesome Creek above the heading of the existing Kurtz No. 2 ditch; enlargement and extension of the Kurtz No. 2 ditch; and the Kremmling Canal which would extend from an outlet from the Williams Reservoir on Williams River across the Colorado River by siphon and along the benchlands north of the Colorado River from near Parshall westward to Kremmling. About 3 years would be required for construction of the project features.	
Construction cost and repayment:	
Estimated construction cost	$5,243,000
Reimbursable allocation to irrigation	5,243,000
Nonreimbursable allocation	None
Repayment by:	
Irrigation water users	725,000
Power revenues of Colorado River storage project	4,518,000
Total	5,243,000
Annual operation, maintenance, and replacement costs	14,700
Benefit-cost ratio	1.2 to 1



616-400-5

Statement on the West Divide Project, Colorado

(Reconnaissance data)

The potential West Divide project would regulate and divert surplus runoff of Crystal River, Thompson Creek, West Divide Creek, and Mamm Creek and would divert surplus runoff of several tributaries of the Roaring Fork and Colorado Rivers in order to provide for the irrigation of 40,500 acres of new land and 25,110 acres of supplemental service land. The lands are located along the west side of the Roaring Fork drainage in the vicinity of Carbondale and Glenwood Springs, Colo., and along the south side of the Colorado River Valley in the vicinity of the towns of New Castle, Silt, Rifle, Grand Valley, and DeBeque, Colo. The project area is contained in Pitkin, Garfield, and Mesa Counties, west-central Colorado.

Ranging and feeding livestock is the principal type of agriculture followed in the project area along the Roaring Fork and in the higher elevations of the West Divide Creek drainages. It is anticipated that after project development these areas would continue to be used principally for livestock feeds, such as alfalfa, small grains, and pasture. More than 50 percent of the project lands, however, are suitable for general diversified farming including the production of potatoes, sugar beets, truck crops, and fruit.

Principal construction features of the project would include the Osgood Dam and Reservoir on Crystal River near Redstone, Colo., with a total capacity of 99,500 acre-feet; the Redstone conduit consisting of a series of tunnels and bench flumes extending from the Osgood Reservoir to North Thompson Creek near Carbondale, Colo.; the Four Mile Canal extending from the outlet of the Redstone conduit along the west side of the Roaring Fork Valley to Four Mile Creek near Glenwood Springs, Colo.; the West Divide tunnel, 15.7 miles in length, extending through a mountain range from the terminus of the Redstone conduit on North Thompson Creek to the channel of West Divide Creek; the Horsethief Canal diverting from West Divide Creek downstream from the outlet of the West Divide tunnel and extending along the south side of the Colorado River Valley to Horsethief Creek near DeBeque, Colo., the Garfield Canal diverting from West Divide Creek downstream from the outlet of the West Divide tunnel and extending to Garfield Creek near New Castle, Colo.; the Kendig Reservoir with a total capacity of 12,000 acre-feet on West Divide Creek downstream from the diversion works for the Horsethief and Garfield Canals; and the West Mamm Reservoir with a total capacity of 7,400 acre-feet on West Mamm Creek below the Horsethief Canal crossing on that stream. These latter two reservoirs would regulate the flows of West Divide, Mamm, and Thompson Creeks and would also reregulate releases from the Osgood Reservoir on Crystal River as required. About 6 years would be required for the construction of the project.

Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on records of streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available for the project with permissible shortages in drought years. Water rights for the project could probably be obtained under provisions of Colorado State law.

This statement is based on the physical plan of development for the West Divide unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is reconnaissance in scope. Development plans in the investigations leading to the report were formulated for maximum irrigation development. The West Divide project, however, offers an opportunity to better the municipal water supplies for the towns of Silt, Rifle, Grand Valley, and DeBeque as well as to provide water for potential new municipal and industrial demands which would arise with oil shale development in the Rifle-DeBeque area. The project would also afford the opportunity to develop hydroelectric energy in relation to municipal water supply and other potentialities of the development. Detailed studies of the project would point out these potential developments and show any need for modification of the reconnaissance irrigation development plan in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates for the irrigation plan reflecting October 1954 construction prices are shown in the following project summary.

Summary reconnaissance data, West Divide project, Colorado

Irrigated acreage:	*Acres*
New land	40,500
Supplemental land	25,110
Total	65,610

Principal agricultural production:

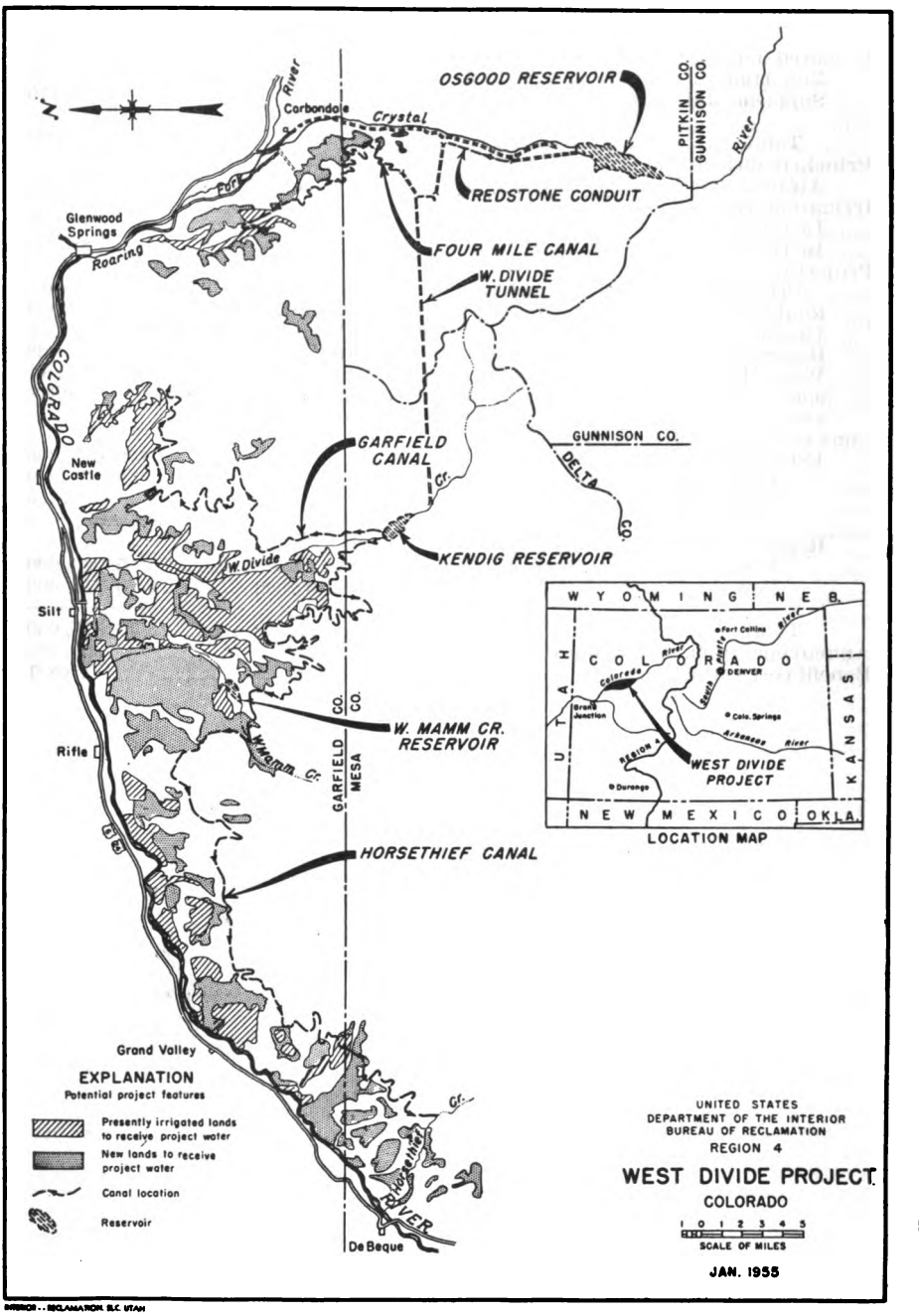
Alfalfa, small grains, and pasture. Beef catle, sheep, and dairy cows.

Irrigation water supply:	*Acre-feet*
Increase in annual irrigation supply	180,000
Increase in annual stream depletion	88,100

Project works:

Principal works would include Osgood Reservoir on Crystal River with total capacity of 99,500 acre-feet, Redstone conduit, Four Mile Canal, West Divide tunnel 15.7 miles long, Horsethief Canal, Garfield Canal, Kendig Reservoir on West Divide Creek with total capacity of 12,000 acre-feet, and West Mamm Reservoir on West Mamm Creek with total capacity of 7,400 acre-feet. Laterals and drains would be included as necessary. About 6 years would be required for constructing the project.

Construction cost and repayment:	
Estimated construction cost	$79,675,600
Reimbursable allocation to irrigation	79,675,600
Nonoreimbursable allocation	None
Repayment by:	
Irrigation water users	5,960,000
Power revenues of Colorado River storage project	73,715,600
Total	79,675,600
Annual operation, maintenance, and replacement costs	96,700
Benefit-cost ratio	1 to 1



INTERIOR - - RECLAMATION, SLC, UTAH

616-400-8

Statement on the Woody Creek Project, Colorado

(Reconnaissance data)

The potential Woody Creek project would provide an average of 3,900 acre-feet of water annually for the irrigation of 645 acres of new service land and 2,320 acres of supplemental service land located along the east side of the Roaring Fork River Valley and north of the town of Aspen, Pitkin County, west-central Colorado.

The major type of farm enterprise followed in the Woody Creek project area is general livestock. It is anticipated that the present crop production, consisting principally of hay, small grains, and pasture, would remain virtually unchanged with project development. Most of the crops produced would be locally fed to livestock.

Principal construction work would include the enlargement, extension, and rehabilitation of the existing Salvation ditch which diverts from the Roaring Fork River about 1 mile upstream from Aspen and the replacement of an inadequate diversion dam on Woody Creek, tributary to the Roaring Fork, about 12 miles downstream from Aspen. Construction of the Woody Creek project could readily be accomplished in 1 year.

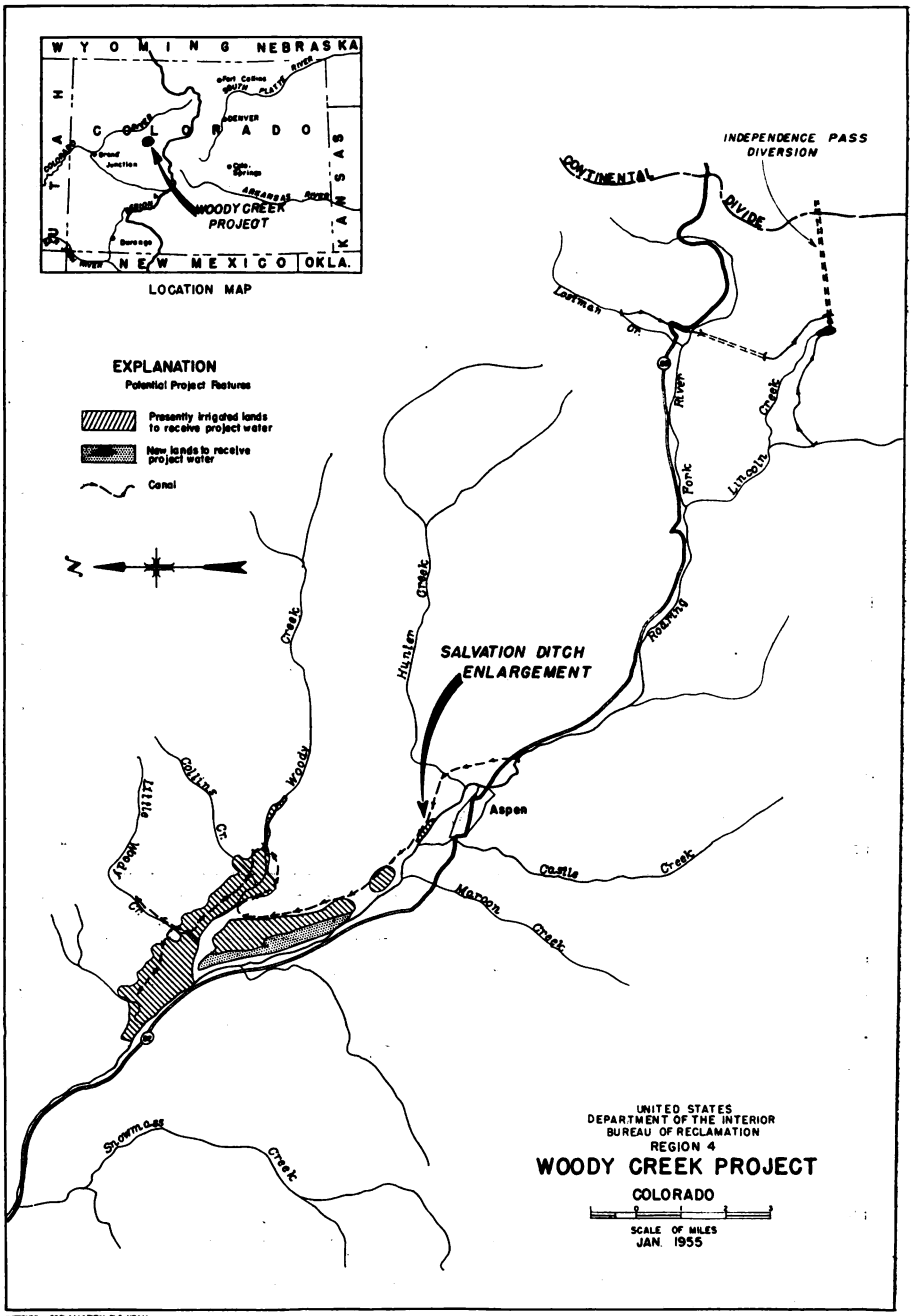
Reconnaissance land classification surveys indicate that the project lands are suitable for sustained crop production under irrigation farming but confirmation would require detailed classification. Water supply studies, based on streamflows as they have occurred in the past, indicate that an adequate irrigation supply would be available at all times for the project by virtue of absolute decrees to the existing canal systems under the project. Operation of the project as planned, however, would depend on certain exchanges in place of use of these decreed waters. It may therefore be necessary to make additional water filings to secure a full project water supply.

This statement is based on the physical plan of development for the Woody Creek unit of the Cliffs-Divide project as presented in the Bureau of Reclamation status report on that project, dated February 1954. The Cliffs-Divide status report is of reconnaissance scope and detailed investigations of the various features presented therein may show the need for modification of the development plans in order to provide the greatest degree of economic justification.

Results of reconnaissance estimates reflecting October 1954 construction prices are shown in the following tabulation.

Summary reconnaissance data, Woody Creek project, Colorado

Irrigated acreage:		*Acres*
New land		645
Supplemental land		2,320
Total		2,965
Principal agricultural production:		
Hay, pasture, small grains. Beef cattle, sheep, and dairy cows.		
Irrigation water supply:		*Acre-feet*
Increase in annual irrigation supply		3,900
Increase in annual stream depletion		1,400
Project works:		
Principal construction work would include the enlargement, extension, and rehabilitation of the existing Salvation ditch which diverts from the Roaring Fork River about 1 mile upstream from Aspen and the replacement of an inadequate diversion dam on Woody Creek, tributary to the Roaring Fork, about 12 miles downstream from Aspen. Construction of the Woody Creek project could readily be accomplished in 1 year.		
Construction cost and repayment:		
Estimated construction cost		$177,700
Reimbursable allocation to irrigation		177,700
Nonreimbursable allocation		none
Repayment by:		
Irrigation water users	$177,700	
Power revenues of Colorado River storage project	0	
Total		177,700
Annual operation, maintenance, and replacement costs		3,100
Benefit-cost ratio		3 to 1



INTERIOR - - RECLAMATION SLC UTAH

616-400-6

Statement on Animas-La Plata Project, Colorado and New Mexico

RECONNAISSANCE DATA

The potential Animas-La Plata project is planned primarily to store and divert waters of Animas and La Plata Rivers to supply irrigation water to 86,620 acres of land in the San Juan River Basin in southwestern Colorado and northwestern New Mexico. The lands include 25,640 acres presently irrigated with only a partial water supply and 60,980 acres not now irrigated. Of the total area 66,020 acres are in Colorado and 20,600 acres are in New Mexico.

With project development, farming in the project area is expected to be similar to that in other areas in the San Juan River Basin of Colorado and New Mexico where an adequate supply of irrigation water is available. Most of the acreage is expected to produce crops for livestock feed with a small percentage utilized for the production of cash crops such as small grains, beans, and some fruits and vegetables. Most of the livestock would consist of dairy cows and beef cattle.

Preliminary land-classification surveys indicate that project lands would be suitable for sustained production of crops under irrigation farming. A detailed classification would be necessary to confirm the suitability of the lands.

Water-supply studies based on records of streamflows as they have occurred in the past indicate that an adequate irrigation supply would be available for the project with permissible shortages in occasional drought years. The average annual supply that would be delivered to farm headgates in Colorado would be 105,300 acre-feet for full irrigation service land and 30,080 acre-feet for supplemental irrigation service land. In New Mexico the average annual supply would be 42,530 acre-feet for full irrigation service land and 6,980 acre-feet for supplemental irrigation service land. The total average annual supply delivered to farm headgates would be 184,890 acre-feet. Water rights for the project could be obtained under Colorado and New Mexico State laws.

Under the project plan Teft Reservoir, with an active capacity of 30,000 acre-feet, would be created on the Animas River by a dam 22 miles upstream from Durango, Colo. Project irrigation water would be conveyed from Teft Reservoir to the project area, in the La Plata River Basin, by the Animas-La Plata diversion canal, 49.2 miles in length and with a capacity of 600 second-feet. Two storage reservoirs would be created in the project area. Hay Gulch Reservoir with an active capacity of 50,000 acre-feet would be served by the Animas-La Plata diversion canal and by excess flood flows of La Plata River diverted into the same canal. Meadows Reservoir with an active capacity of 12,000 acre-feet would be served by the Meadows diversion canal which would divert return flows, flood flows, and releases from Hay Gulch Reservoir from La Plata River. The various project areas would be served by the Animas-La Plata diversion canal; the McDermott and Ring Cone Canals, supplied by the Animas-La Plata diversion canal; the Red Mesa and Dry Side Canals, supplied by the Hay Gulch Reservoir; Meadows diversion canal and canals supplied by Meadows Reservoir. Existing laterals, enlarged as necessary, would serve the presently irrigated lands. Laterals would be constructed to serve all project lands not presently irrigated. Project drainage would be provided for both full and supplemental service lands. An estimated construction period of 10 years would be required to complete all features of the project.

This statement is based on the physical plan of project development presented in the Bureau of Reclamation status (reconnaissance) report on the Animas-La Plata project, dated November 1954. Results of current (October 1954) Bureau of Reclamation estimates for this project plan are summarized in the attached project summary tabulation.

Summary Reconnaissance Data—Animas-La Plata Project, Colorado and New Mexico

Irrigated acreage

[Acres]

	Colorado	New Mexico	Total
New lands	45,920	15,060	60,980
Supplemental lands	20,100	5,540	25,640
Total	66,020	20,600	86,620

Principal agricultural production

Alfalfa, small grains, pasture, and beans.
Dairy cows and beef cattle.

Water supply

[Acre feet]

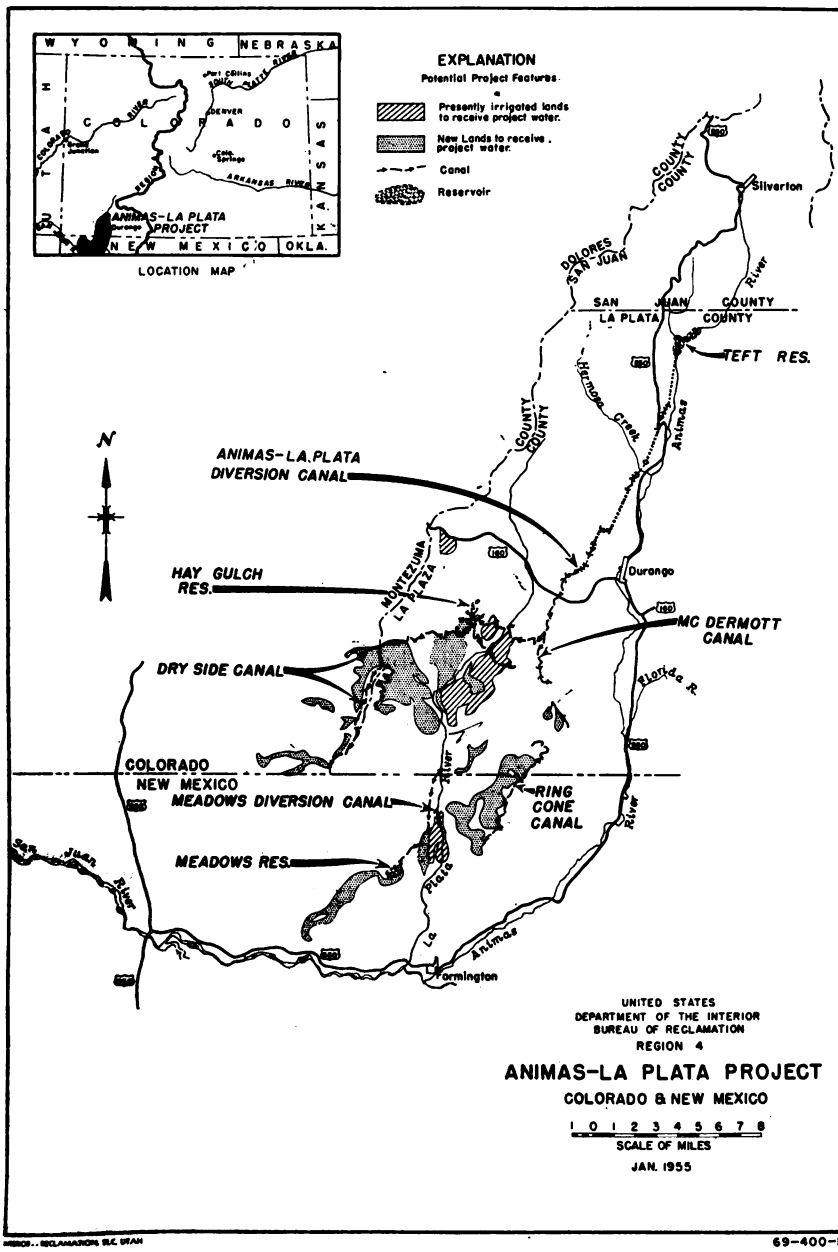
	Colorado	New Mexico	Total
Average annual project supply delivered to farm headgates:			
New lands	105,300	42,530	147,830
Supplemental lands	30,080	6,980	37,060
Total	135,380	49,510	184,890
Average annual stream depletion	82,680	33,420	116,100

Project works

Construction features include Teft Dam and Reservoir with 30,000-acre-foot active capacity; Hay Gulch Dam and Reservoir with 50,000-acre-foot active capacity; Meadows Dam and Reservoir with 12,000-acre-foot active capacity; the 49.2-mile, 600-second-foot Animas-La Plata diversion canal; 6.3-mile, 240- to 180-second-foot McDermott Canal; 20.5-mile 540- to 320-second-foot Dry Side Canal; 7.7-mile, 120- to 80-second-foot Red Mesa Canal; 14.6-mile, 160- to 10-second-foot Ring Cone Canal; 12.6-mile, 150-second-foot Meadows diversion canal; distribution canals; and drains.

Construction cost and repayment

Estimated construction cost		$77,383,000
Reimbursable allocation to irrigation		77,383,000
Nonreimbursable allocation		None
Repayment by:		
Irrigation water users	$14,875,000	
Power revenues from Colorado River storage project	62,508,000	
Total		77,383,000
Annual operation, maintenance, and replacement costs		210,000
Benefit-cost ratio		1.3 to 1



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Mr. LARSON. I would like to say, Mr. Chairman, that I have with me members of my staff, and, with your permission, when I am questioned it may be necessary to call on them to answer some of the more technical questions.

Mr. ASPINALL. That will be permissible.

Now, as I understand it, you wish to reserve the right to make an additional statement relative to participating projects later on in the presentation of the testimony. Is that correct?

Mr. LARSON. Yes. I will be prepared to answer, but I would like the assistance of my staff and also Mr. Elmer Bennett, if necessary.

Mr. ASPINALL. The Chair this morning made a note of the fact that we had some colleagues visiting these hearings. I wish to take note of the fact that Congressman Fernandez is with us this afternoon. He was here for a few minutes this morning.

We are glad to acknowledge your presence and are glad to have you with us.

The Chair suggested this morning that we would proceed with written statements filed with the committee before the presentation of evidence. However, the Commissioner has asked that a member of his staff, Mr. Bennett, be permitted to make a short oral statement at this time.

Unless there is objection from the committee, I would like to have permission to do that.

Mr. HOSMER. A point of inquiry, Mr. Chairman.

Is this to be the legal discussion by the Bureau of the factors involved in this bill?

Mr. ASPINALL. As I understand it, Mr. Bennett wishes to take 5 minutes. He has promised the Chair he would stay within the 5 minutes to present the evidence, and then he will be with the others before the witness stand for cross-examination when it comes the turn of each member of the committee.

Mr. HOSMER. I see no useful purpose in separating Mr. Bennett's statement from the examination upon it since it is a highly technical question, and I think that at least in my conversations with Mr. Bennett we assumed that we would take up the legal phases all at one time. And I will ask Mr. Bennett if that is not the purport of our discussion earlier.

Mr. BENNETT. Well, we would have no objection to covering all of the legal phases that you might want to raise in the form of questions, but in line with our conversation also, the basic points that I intended to cover in this 5-minute statement probably should be submitted in writing later to be put in the record along the lines of the suggestion you had in mind due to the length of time that it would take. On the Senate side it took 40 minutes to make a statement from notes on the subject. And, following your suggestion, I think probably the record should have a statement of that length. But whether it should be read is another question. I don't know.

Mr. HOSMER. I take it then that at the beginning of your testimony, whenever it is, that you would get permission to put in your written statement and also permission for us to make whatever comments we wanted on it for the record, and then proceed with the actual detailed discussion of the legal issues.

Mr. BENNETT. That is correct.

Mr. HOSMER. In other words, Mr. Bennett, at this time it probably would be the proper time to make a 5-minute statement. Is that right?

Mr. BENNETT. That is right. We could make a 5-minute statement indicating our position on those issues which we consider basic to the project, and then any others that you may want to open in the form of questions or otherwise we would be willing to undertake to answer.

Mr. HOSMER. You probably could not do it in 5 minutes.

Mr. BENNETT. No. Just stating the conclusions is all that is intended here. The reasons can be spelled out in memoranda or in response to questions.

Mr. HOSMER. Personally, I would prefer to hear Mr. Bennett at one sitting.

Mr. ASPINALL. Would the gentleman from California object to Mr. Bennett making a general presentation of 5 minutes to fill out what the Commissioner has requested?

Mr. HOSMER. I will not object to it if he wants to.

Mr. ASPINALL. Mr. Bennett, you will have 5 minutes.

Mr. HOSMER. Is this gentleman, like the others, going to have a written statement now on this, or is this something——

Mr. BENNETT. These are my files. I have no written statement.

Mr. ASPINALL. Proceed, Mr. Bennett.

Mr. BENNETT. It would be, of course, presumptuous to think that one could even begin to touch the complex issues which have been raised in connection with this project so far as the law of the river is concerned.

Certain of those issues, however, are considered basic by us. Others, as questions arise at a later time or even now, for that matter, will be covered in the form of an explanation as to why in the position we find ourselves with the bills before this committee we consider them not material to the legislative question.

To begin with, the Department has studied very carefully the question whether it could, consistently with the compact, store water above Lee Ferry for the purpose of regulating the flow of the stream and thus permit both the development of the upper basin's apportionment of water and simultaneously meet the commitment to the lower basin in article III (d) of the Colorado River compact.

Secondly, we also have examined the question whether we, consistently with the compact, could generate electricity by temporary reasonable storage of water as it flows down the river to the lower basin. Our conclusion on that is definitely in the affirmative.

Article IV (b) of the compact reads as follows:

> Subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of electric power, but such impounding and usage shall be subservient to the usage and consumption of such water for agriculture and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

I might point out that that subsection or that section of the compact does not say that waters may be impounded and used for the generation of electric power exclusively in the lower basin. It is a provision of the compact which is without limitation so far as indicating where the generation of electricity may take place in the basin as a whole.

The contemporary statements by the negotiators of the compact, as we are prepared to document in the written statement which we have

indicated we would like to submit, show that it was the general understanding of the negotiators of that compact that electric energy could be generated anywhere on the stream, and that any water could be used for that purpose, subject, of course, to the general policy, both of reclamation law and of the States in the basin under which uses for domestic and agricultural purposes are dominant.

The project which the Department is proposing here will not be managed under the provisions of this bill in any way to interfere with the dominant purposes of domestic and agricultural development in the lower basin.

We feel that the provisions of all of these bills are fully adequate for that purpose, and in particular do we feel that the provisions of 3383 are adequate for that purpose.

I think now that I should make at least a statement of the conclusion that we have reached with respect to the materiality of the Indian right question to the passage of this legislation.

To begin with, in the present litigation between Arizona and California, the United States has intervened. Its petition of intervention lists diversions in the lower basin which it claims as a right for the benefit of Indians in the amount of some 1.7 million acre-feet of water.

I might say to begin with that those are diversions and do not constitute either a measurement of the depletion of the stream or a measurement of diversion less returns. Consequently, it is manifest that when you take into account the return flows from those diversions that the actual uses, consumptive uses of water, would be far less than that figure.

We are not prepared at this time to refine the figure to give you anything like a specific modification of it.

Among other things, of course, the presentation of the Government's case in that litigation is the responsibility of the Department of Justice and not the Department of the Interior.

It should also be pointed out that of the 1.7 million acre-feet of diversions listed in that petition over 700,000 acre-feet are listed on the Gila tributaries of the stream. That being the case, it does not appear to us that those diversions, however the court might find so far as priorities are concerned, could possibly affect the upper basin.

Thirdly, we would like to point out that, insofar as upper basin uses for the benefit of the Indians are concerned, article VII of the upper Colorado River compact expressly provides that Indian uses shall be charged to the States where the uses take place.

Our engineers advise us that approximately 80 percent of the known or believed irrigable lands held or owned for Indians are planned to be served out of projects which would be authorized in one or more of the bills that are before this committee.

Mr. ASPINALL. Your 5 minutes are up, Mr. Bennett.

Mr. BENNETT. Well, I am through, actually.

The point being, in conclusion, that the Indian question, however it should be decided by the court, could not in our judgment have any bearing on the availability of water for the supply of the projects which had been named and proposed for authorization here.

Mr. ASPINALL. Thank you very much, Mr. Bennett.

Now, Mr. Dexheimer, if you will get your staff about you, we will proceed with the questioning.

Do you wish to have anybody else with you at the table besides those who have testified?

Mr. DEXHEIMER. I do not think so at this time. There may be a few technical questions, Mr. Chairman, that we might ask some of our other staff to answer particularly, but otherwise I think we can manage.

Mr. ASPINALL. The Chair will reserve his time for questioning until after the members of the committee have had their opportunity.

The Chair recognizes the gentleman from California, Mr. Engle.

Mr. ENGLE. No questions at this time, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Nebraska, Dr. Miller.

Dr. MILLER. I only had one legal question I wanted to raise, and have wanted to for some time, that Mr. Bennett or someone might be able to answer.

The park was established in 1915 creating the 80-acre Dinosaur Monument, and then it was enlarged later. The question always comes up as to whether we are invading the national parks and monuments and whether the general law on invading parks and monuments applies here.

Was an exception made when the President signed the proclamation relative to the right to use the water or build dams in this enlarged area? That is No. 1.

And, second, did it specify that the dam might be built at Brown's Park instead of some other location as we are presently doing?

I am not a legal mind, and I am not sure how to interpret some of the findings and conclusions that legal minds seem to find.

Mr. DEXHEIMER. I should like to answer that, if I may, by reading from that proclamation in 1938 which extended the monument.

Dr. MILLER. Do you have the hearings on the upper Colorado River storage project?

Mr. DEXHEIMER. Yes, sir.

Dr. MILLER. What page is that on?

Mr. DEXHEIMER. Page 733.

That provides, for those who do not have copies, an extension aggregating 203,885 acres total, and I quote from the language of that proclamation:

Warning is hereby expressly given to any unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument, and not to locate or settle upon any of the lands thereof.

The reservation made by this proclamation supersedes, as to any of the above-described lands affected thereby, the temporary withdrawal for classification and for other purposes made by Executive Order No. 5684 of August 12, 1931, and the Executive order of April 17, 1926, and the Executive order of September 8, 1933, creating water reserves No. 107 and No. 152.

The director of the National Park Service, under the direction of the Secretary of the Interior, shall have the supervision, management, and control of this monument as provided in the act of Congress entitled "An act to establish a National Park Service, and for other purposes," approved August 25, 1916, 39 Stat. 535, et cetera, and acts supplementary thereto or amendatory thereof, except—

and this is in italics—

except that this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920, 41 Stat. 1063, as amended, and the administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904, for the Brown's Park Reservoir site in connection with the Green River project.

Dr. MILLER. At that point, Mr. Commissioner, it specifically mentions the Brown's Park Reservoir site. In other words, the Echo Park Dam is not at the Brown's Park Reservoir site. Or is it?

That is the thing I wanted to get clear.

Mr. DEXHEIMER. That is correct. But the power withdrawals covered under the mention of the Federal Water Power Act cover power filings made prior to 1938, and therefore we contend that they were specifically excepted in this establishment of the enlarged monument.

Dr. MILLER. In other words, the mentioning of the Brown's Park Reservoir site in connection with the Green River project in the President's proclamation, July 14, 1938, does not confine building the reservoir at the Brown's Park site for the purposes of furnishing power.

Mr. DEXHEIMER. No, sir.

Dr. MILLER. Is that the opinion of your legal counsel?

Mr. DEXHEIMER. Mr. Bennett might speak for the Solicitor of the Department on that.

Dr. MILLER. He may provided he has some divergent opinions from our legal setup here. I would like to hear Mr. Bennett's conclusions.

Mr. BENNETT. Well, so far as the Browns Park withdrawal is concerned, it, of course, as I understand the facts of the matter, is not broad enough to constitute a reclamation withdrawal of the area where the Echo Park Dam would be constructed.

I think the question of the weight to be assigned to that reservation is one of policy rather than one of law. The intention, of course, could be argued that, having made a reservation for reclamation purposes in one part of the monument—and one which I understand is very beautiful, the Gates of Ladore being in that area—it might be argued, of course, that the policy question was equally applicable elsewhere. But that is not a legal question. That is strictly one of policy where I am sure this committee will find itself with divergent opinions.

Mr. HOSMER. Will the gentleman yield for a question?

Mr. ASPINALL. Will the gentleman yield to me?

I think that perhaps we have been missing the point in this question of invading the sanctity of the National Park Service in those areas under which it has jurisdiction.

Now do you know of any statute which states that the National Park areas or those areas under the jurisdiction of the National Park Service shall be exempt from encroachment other than a part of the provision relative to the amendments to the 1920 Water Power Act?

Mr. BENNETT. Well, I would say, Mr. Chairman, that, without some study, I would not want to give a general answer. I recall that only last year a specific exception was written into the multiple-purpose mining bill which, in effect, said that the Atomic Energy Commission could issue leases for the development of uranium almost anywhere in the United States, and could even get entry on private lands for that purpose. Yet it prohibited the use of that leasing authority in national parks and monuments.

So there may be other statutes with which I am not familiar. I could not give you a comprehensive answer to that.

Mr. ASPINALL. In the passage of the amendment to the 1920 Water Power Act, which was in 1921, there was specific reference, was there not, to this question of invading the jurisdiction of the park areas?

Mr. BENNETT. That is correct.

Mr. ASPINALL. Now did that provision apply only to then existing national park areas or was it projected into the future?

Mr. BENNETT. Well, at that time it was limited to those areas which had been designed as monuments and parks at the time of the enactment of the amendment to the Water Power Act.

Mr. ASPINALL. And in the consideration of the 1935 amendment of the Federal Water Power Act was there express provision that there would be no further reference to this question of invasion of the area under the jurisdiction of the National Park Service?

Mr. BENNETT. There probably could be some differences of opinion as to the interpretation of the language, but they did strike those words authorizing licenses in park areas.

Mr. ASPINALL. Let's go back now to pick up this policy. We got to the 1921 amendment to the Water Power Act. Is that correct?

Mr. BENNETT. That is correct.

Mr. ASPINALL. We had no other general policy in that respect before that time?

Mr. BENNETT. Other than possible interpretation of the Antiquities Act and the National Park Act itself in 1916.

Mr. ASPINALL. They relate to specific areas, do they not?

Mr. BENNETT. Yes, that is right.

Mr. ASPINALL. Not to general policy. Yet when they were considering the 1921 amendment they specifically limited it at that time to existing national park jurisdictional areas, did they not?

Mr. BENNETT. That is my understanding, sir.

Mr. ASPINALL. Then in consideration of the 1935 act they specifically struck out the provision that would have extended this idea of designating these areas as special areas?

Mr. BENNETT. They did take action affecting the statutory definition of Federal reservations.

Mr. ASPINALL. I will ask the counsel to help you. He is more familiar with that. We want to get this clear as we go on.

Dr. MILLER. You might defer the complete answer and look it over and bring the answer to us tomorrow maybe when we are in session. I think it is one that requires some study.

Every member of this committee, and I think every Member of Congress, is being approached by well-meaning folks saying in effect that we are violating the law by invading a national monument, and they even go so far as to say we are destroying some of the bones that are miles below where the dam would be. But they are well-meaning people nevertheless.

And I would like to have by tomorrow or before the hearings end—not tomorrow necessarily—an understanding of what the legal thinking is at least of the Department on whether we are violating any existing law or intent of Congress, and perhaps then the whole matter can be resolved instead of sort of thrashing around here in the dark as to what our position might be.

Mr. BENNETT. I would like to say in connection with getting an answer to that that we will deal specifically with the question whether that amendment was or was not broadened in 1935, but with the complete understanding that the amendment itself was limited to the

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applicability of the Federal Water Power Act and had only to do with the licensing of non-Federal projects.

It wasn't a congressional declaration that Congress itself could not authorize a Federal development there.

Dr. MILLER. I think the question of whether Echo Park stays in the bill revolves somewhat around the question of, is it a new departure or are we doing something we are not permitted to do under the law? And I think it will have a considerable amount of weight on the thinking of the members of the committee as to the rights we have to build a dam on a monument, and that it is specifically authorized and understood that dam sites could be used for storing water and the development of power.

Some time before these hearings are concluded I would like to have as clear a picture of it as we can get.

Mr. ASPINALL. You will be willing to furnish that information, Mr. Bennett? You understand what Dr. Miller and I are desirous of having.

Mr. BENNETT. Yes. We will deal specifically with the question of the effect of the 1935 amendment on the 1921 amendment, not conceding though, so far as we are concerned, that that had any legal effect, even in terms of trying to bind a succeeding Congress, on a Federal project. That is the point I am trying to make clear—we will deal with this question of the scope of that amendment. But we are not dealing with the question of whether it had any effect to bar the United States from developing a project of its own.

Mr. ASPINALL. The Chair recognizes Mrs. Pfost.

Mrs. PFOST. I observed in the statement of Mr. Larson that the dams are listed Glen Canyon first, and Echo Park next, and then the participating projects.

I would like to ask Commissioner Dexheimer if they are listed in the order the Department recommends their construction.

Mr. DEXHEIMER. The Glen Canyon and Echo Park are, I think. As to the participating projects, I don't believe that we have any scheduled order of construction at this time.

Mrs. PFOST. Once the project is authorized and appropriations are made, how long would it be from that time until the first unit of Glen Canyon Dam would be completed?

Mr. DEXHEIMER. Assuming we had adequate appropriations in time, we would probably be able to complete that in 5 to 6 years and start the generation of power.

Mrs. PFOST. Mr. Commissioner, is Echo Park essential to the economic feasibility of the upper Colorado project?

Mr. DEXHEIMER. Yes. Although, by elimination of parts of the project, the economic feasibility might be established for something less. But it would not be, we think, the proper way to meet the ultimate or even the present needs of the upper basin.

Mrs. PFOST. In other words, you feel that first Glen Canyon must be built, and then Echo Park, and in that order.

Mr. DEXHEIMER. The reasons for that are twofold on Glen Canyon. First we must begin to store water when it is available from the surplus flows. That filling is necessary in order to meet the commitments of the upper basin to the lower basin.

Secondly, of course, generation of power from Glen Canyon will start producing revenues to a much greater extent so as to aid in the financial feasibility.

Mrs. PFOST. One other question.

What will irrigation costs average per acre on this project?

Mr. DEXHEIMER. About $545.

Mrs. PFOST. I would call your attention to a little pamphlet entitled "What Price Federal Reclamation," by Raymond Moley, and on page 5 he shows a table in which the upper Colorado storage subsidy per 160-acre farm is $212,000.

Now that figures out about $1,325 per acre.

Mr. DEXHEIMER. I do not understand Mr. Moley's mathematics, and I do not agree with his assumptions.

First, he assumes no returns from many of these things. And, secondly, he assumes interest during construction, and, I believe, if I analyze the figures correctly, starts with the full cost of the project at the year that the construction is begun, rather than spreading it over a period of years.

And it, of course, could work out to fantastic figures if we applied the same type of analysis to the expenditures which the Federal Government makes for other public works. It would be so fantastic that we couldn't begin to do anything.

Mr. HOSMER. Will the gentlewoman yield?

Mrs. PFOST. Yes.

Mr. HOSMER. He also includes the cost of interest on the money borrowed for the nonreimbursable interest on irrigation.

Mr. DEXHEIMER. I really don't know how he arrives at the figures. I have been unable to logically follow his reasoning at all. But I assume that he had added interest on everything and in some way compounded it.

Mr. HOSMER. That is correct, according to my understanding of it. And also he takes a 10-year development period and takes the money that you would borrow on installments over that period of years, and then takes the accumulated interest during the 50 years at which electricity is being paid off and compounds that. Then the additional interest that is accumulating during the 50 years in which the irrigation allotment is actually being paid off each year on a decelerating basis is also into the thing. And, as I understand it, according to his figures, the total cost of this project on that basis would be around $4 billion instead of between $1 billion and $2 billion proposed by the various bills.

Mr. PILLION. Will the gentleman yield?

Mr. DEXHEIMER. I have spent the last 35 years of my life in engineering and mathematics, and I fail to understand his reasoning at all in how he arrived at his figures.

Mr. HALEY. Will the gentlewoman yield?

Mrs. PFOST. Yes.

Mr. HALEY. What does the Department figure will be the ultimate cost of this overall project?

Mr. DEXHEIMER. The initial phase which the Department is recommending is a little less than $1 billion.

Mr. HALEY. $1 billion?

Mr. DEXHEIMER. $1 billion.

Mr. HALEY. What will the ultimate completion of this project cost?

Mr. DEXHEIMER. We have no firm estimates on that now because we have not even planned what the ultimate development might include, nor do we know what the unit prices at that time might be.

Mr. HALEY. In other words, we are starting in on another project that we don't know where it is going to end? Is that right? As to cost?

Mr. DEXHEIMER. No, sir. The only part that the Secretary is recommending authorization for has a firm price put on it in this legislation. At any time that we propose to include one minor additional project a full report will be made to the Congress before we would start any construction, and the Congress would, of course, have full control over authorization and appropriations for it based on our reports.

Mr. HALEY. Using your own figures of the cost of, did you say five-hundred-and-some-odd dollars per acre?

Mr. DEXHEIMER. Yes, sir.

Mr. HALEY. Is that one of the highest costs ever entered in one of these projects?

Mr. DEXHEIMER. No, sir. We have higher cost-per-acre projects.

Mr. HALEY. Per acre?

Mr. DEXHEIMER. Yes, sir.

Mr. HALEY. That is rather expensive water.

Mr. DAWSON. Will the gentlewoman yield to me?

Mrs. PFOST. Yes.

Mr. DAWSON. Mr. Commissioner, in reply to the statement of the gentleman from Florida that that is expensive water to put on the land, that $500 per acre cost, of course, extends over a 50-year period, does it not? And if you figure the water that would be used and the revenue that would be produced over that full period of time it would be pretty cheap water. Isn't that correct?

Mr. DEXHEIMER. That is correct. It is reasonably cheap to the farmer who uses it.

Mrs. PFOST. Mr. Commissioner, does the $500 relate to the entire cost of irrigation in the full project?

Mr. DEXHEIMER. That relates to the cost of the participating or irrigation parts of the project. There are, in addition to that, irrigation costs of the conservation storage in the Glen Canyon and Echo Park Reservoir which are not included in that cost because they are exchange or replacement water.

Mrs. PFOST. Of this 500, do the water users pay any portion? In other words, of the $500, the so-called subsidy by the Government would be about how much?

Mr. DEXHEIMER. Whenever we build one of those we negotiate with the water users to pay the maximum of their ability on those costs. It varies. The remaining costs are repaid by excess power revenues over the amortization of the power features.

Mrs. PFOST. Therefore, when you speak of the $500 you are not deleting the amount that the water users would assist with?

Mr. DEXHEIMER. That is correct. They would pay part of that cost.

Mr. HOSMER. Will the gentlewoman yield?

Mrs. PFOST. Yes.

Mr. HOSMER. As a matter of fact, on these particular recommended projects, however, the figures work out so that the water users repay

only 15 percent of the cost of irrigation, and the power bears 85 percent. And if the irrigation allotments to the power dams are included then they only pay 12 percent and the power revenues bear 88 percent of the burden of these irrigation projects. Is that right or wrong?

Mr. DEXHEIMER. The general principle is correct. The figures, I think, are a little wrong. But this is our estimate of their ability to pay at this time.

Mr. HOSMER. Would you enlighten if my figures are wrong?

Mr. DEXHEIMER. Of that irrigation allocation on the 11 participating projects in the Secretary's recommended bill it would be 17½ percent paid by the water users.

Mr. HOSMER. In other words, they are paying then less than $100 of the $545 an acre estimated cost, if you are right. Or a little more than that if the cost that Mr. Moley estimates per acre is correct, of around $1,400.

Mr. DEXHEIMER. Our figures show about 17½ percent.

Mr. HOSMER. Does that include the irrigation allotment to the storage dams, or is this the irrigation allotment to the irrigation project only?

Mr. DEXHEIMER. It is to the participating projects only. It does not include the irrigation allocation to the storage dams.

Mr. HOSMER. What does it amount to when you include the irrigation allotment on the power project?

Mr. DEXHEIMER. We have not analyzed it on that basis, largely because a good part of that irrigation storage in those holdover reservoirs is for future projects.

Mr. HOSMER. I understand that, but you do have an irrigation allotment in the presently proposed power dam.

Mr. DEXHEIMER. We do have.

Mr. HOSMER. Yes.

Mr. DEXHEIMER. And until the full upper-basin development is completed you would not know how many acres to charge those costs against.

Mr. HOSMER. In other words, there is some additional cost to charge, but you don't know what it is at the present time.

Mr. DEXHEIMER. We know what the allocation is in those reservoirs to the irrigation or conservation part.

Mr. HOSMER. But you don't know the allocation in percentage with respect to what the irrigation users are repaying?

Mr. DEXHEIMER. We do not have it divided into costs per acre, as I pointed out, because we don't know how many acres to divide into it yet. But, in any event, that conservation and irrigation allocation in those reservoirs will be paid off by the power revenues long before we build the participating projects which we might use in dividing the per acre cost.

Mr. HOSMER. It does make a difference in the general cost to the taxpayer of these projects when you consider that you are paying off this irrigation allocation after the 50-year period in which the power is being repaid, and therefore are paying interest on the irrigation money meanwhile.

Mr. DEXHEIMER. Of course, if you analyze it that way, you are paying interest on the irrigation money; you are also paying interest on all civil works' money, which is a great deal more than the Bureau of Reclamation is spending, and so many other things. If you apply

that interest principle to those functions, too, you arrive at such fantastic figures that it would be almost impossible to compute, let alone to charge against the project.

Mr. HOSMER. May I ask this question:

Do you not consider that interest feature because it would make these things impossible, or because it is not a proper principle to apply to Government works?

Mr. DEXHEIMER. We consider that in determining the costs and benefits, and the benefit-cost ratio, of course.

Mr. HOSMER. Is that hidden interest included in your benefit-cost ratio?

Mr. DEXHEIMER. In the determination of the benefit-cost ratio.

Mr. HOSMER. I understand that you said that you did not even know what Mr. Moley's figures were based on, and you must have known that and calculated them in the cost-benefit ratio if you took them into consideration.

Mr. DEXHEIMER. Mr. Larson will give you the figures, as he has analyzed them. He has spent a great deal of time in working on that particular question.

Mr. LARSON. As I stated in my testimony, the analysis of a benefit-cost ratio is different from the repayment analysis.

In the benefit-cost ratio we estimate on the one side the benefits to the State and the Nation, you might say, of building the project; on the other side we take the construction costs, interest during construction, and then take the sum total of these costs and compute an annual equivalent cost, with interest over the life of the project, which is 100 years.

That includes the $98 million that you are talking about, which is a part of this estimated cost of all 7 of these dams. The allocation against the full 7½ million acre-feet can be expressed as so much an acre-foot.

We have used an appropriate part of the $98 million in the benefit-cost analysis as a cost against the project on one side, to compare with the benefits on the other side. And at the end of 100 years, the benefits to the State and Nation, the way we evaluate them, are over twice the total cost including the interest.

Mr. HOSMER. For the purpose of clarifying the record at this point, I wonder if it would be possible for you, in connection with the $178,825,000 cost of the Shiprock division of the Navaho project, to lay that figure out and show how it was arrived at—not now, but if you would insert it in the record later on.

I would ask unanimous consent that the witness have the privilege of doing that.

Mr. ASPINALL. As to the request of the gentleman from California, is there objection?

Mr. DAWSON. Yes, I object. I would like to state the reasons for my objection.

I think he is taking one project here which has a lot of other factors involved in it, to achieve the objectives which the gentleman wants he should take a typical project.

Mr. HOSMER. I ask unanimous consent that any project named by Mr. Dawson have that done to it.

Mr. ASPINALL. One unanimous consent request is before the committee.

Do I understand that the gentleman from Utah objects to it?

Mr. DAWSON. I understand the gentleman from California has modified his request, and is leaving it up to Mr. Larson——

Mr. HOSMER (to Mr. Dawson). You name any one of them.

Mr. DAWSON. I will leave it up to Mr. Larson to pick one of the projects and to use the analogy that you are requesting.

Mr. HOSMER. I will withdraw my unanimous consent request because I think it should be one taken now.

Mr. ASPINALL. Does the lady from Idaho desire any further time?

Mrs. PFOST. That is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Commissioner, do you or any member of your family own a $25 Government bond?

Mr. DEXHEIMER. No, sir.

Mr. SAYLOR. You are familiar with the fact that Uncle Sam is in the business of selling Government bonds for $18.75 which at the end of 10 years are worth $25?

Mr. DEXHEIMER. Yes, sir. I have had some and cashed them.

Mr. SAYLOR. I recommend to you that you study the matter, and the manner in which the Treasury of the United States finances repayment of those obligations, and extend it over a period of 50 years, and you might realize what compound interest is.

This morning when the Assistant Secretary was here, he made a statement on the record that the recommendations which were made to this committee last year were essentially unchanged.

Last year the committee was presented with a bill by the Department which called for the construction of the following storage projects: Echo Park, Flaming Gorge, Glen Canyon, Navaho, and Curecanti.

Am I correct in my understanding that the testimony that you are now giving to this committee is that there are only two storage projects being recommended?

Mr. DEXHEIMER. Yes, sir. That, I believe, is the limit that is recommended by the Secretary of the Interior this year, and last year also.

Mr. SAYLOR. In other words, am I correct, then, that they did not recommend the building of Flaming Gorge, Navaho, and Curecanti last year?

Mr. DEXHEIMER. That is correct; they did not recommend those.

We did have, I believe, a recommendation for provisional authorization of the Shiprock division of the Navaho Unit, but it was very provisional, and no report had been made, so the Secretary would not be in a position to make a firm recommendation for its authorization.

Mr. SAYLOR. Now, Mr. Commissioner, there have been a number of plans submitted with regard to the erection of Glen Canyon, as to the high dam or a low dam. Is that correct?

Mr. DEXHEIMER. I know of no plans for a low dam at Glen Canyon.

Mr. SAYLOR. What is the proposed elevation of the crest of the dam at Glen Canyon?

Mr. DEXHEIMER. An elevation above sea level of 3,700 feet would be the water surface at maximum capacity. The dam, then, would be approximately 700 feet above bedrock.

Mr. SAYLOR. From time to time in the testimony last year appears the figure of 3,735 feet elevation of the dam. What would that figure refer to?

Mr. DEXHEIMER. That figure referred to a proposal not made by the Bureau of Reclamation, as a possible substitute for Echo Park. We have never considered that as a possible substitute, for various reasons, mainly because our geological studies indicate that a dam higher than 700 feet above bedrock at that point might not be entirely safe from the standpoint of the geological formation.

Secondly, a higher water surface would encroach a great deal more upon the Rainbow Natural Bridge and the Monument. It would require a great deal higher dam to keep water from actually flooding out the base of that monument.

Third, it would spread water over and beyond the top rim of the canyon in a large part of that area, thereby increasing the water surface and greatly increasing the evaporation from that expanded surface.

Mr. SAYLOR. Mr. Commissioner, I am extremely interested in your statement that your survey shows, or preliminary investigation had disclosed, that you seriously doubt the advisability of building a dam above 700 feet. What has led you to that conclusion?

Mr. DEXHEIMER. A series of geological studies, drillings of the foundation, sampling cores of large diameter from the foundation, and the sides of the canyon, testing them in our laboratory, of which there is none finer in the world, nor are there any more expert in foundation evaluation than we have. When you get above a certain point, there are certain limitations of sound engineering practice which we will not go beyond.

We determined that it would not be, from our standpoint, at this time, practical to go above a 700-foot-high dam at that site.

Mr. SAYLOR. Mr. Commissioner, are you satisfied that you can build a dam at that site of 700 feet?

Mr. DEXHEIMER. We are entirely satisfied that we can. It will be adequate and safe.

Mr. SAYLOR. When did you have the last drillings that were made at the dam site?

Mr. DEXHEIMER. Mr. Larson, I think, can answer that. I am not familiar with the dates.

Mr. LARSON. A large part of the drilling was done in 1949, and the test was done after that. And some work in the Denver Research Laboratory has been continued off and on over the years, since that time.

Mr. SAYLOR. The reason I raise that question, Mr. Commissioner, is that I have before me a copy of a letter over your signature dated October 26, 1954, addressed to Mr. Richard C. Bradley, Department of Physics, Cornell University, Ithaca, N. Y., which contains this statment:

> There are physical limitations in each of the 6 sites which you suggest an increase of 15 feet more or less in the height of the respective dams. At the present, our design specialists are quite concerned as to whether or not the foundation characteristics of Glen Canyon and Gray Canyon sites are capable of safely supporting high dams, 700 feet and 575 feet, respectively.

If you have not made or had any drillings since the 26th day of October 1954, what has led you to now come before this committee and say

that you can now build a dam safely of 700 feet when in October you said there was doubt in your mind?

Mr. DEXHEIMER. We have an evaluation, Mr. Saylor, by our Assistant Commissioner and Chief Engineer in Denver.

Mr. SAYLOR. You have not answered my question, Mr. Dexheimer.

You have not told this committee what work you have done between October 26, 1954, and the 9th of March 1955 which would lead the statement which you have made in this letter to be incorrect.

Mr. DEXHEIMER. If the Congressman will permit, I would like to finish my statement that I have available a letter from our Assistant Commissioner and Chief Engineer, who has responsible charge of all our technical investigations and construction work, in which he has restudied the cores, the data available, and come to the conclusion in our laboratory tests and other things, that they are entirely satisfied we can go to the height of a 700-foot dam at the Glen Canyon site at this time.

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. Where is this letter?

Mr. DEXHEIMER. The letter is right here. It is dated February 24, 1955.

Mr. SAYLOR. May I see it?

Mr. DEXHEIMER. And I would like to point up some of the other things, and some of the "quotations" from questions that Mr. Brower asked, later on.

Mr. SAYLOR. Mr. Chairman, I will offer this letter, because it does not answer the question which I have asked. It is not in response to the letter which was sent to the Cornell University, and does not explain the Commissioner's statement which he made to a professor at Cornell University on October 26, 1954, that there is considerable doubt as to whether or not they can support a 700-foot dam.

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. Now I yield.

Mr. HOSMER. I would like to ask, in light of that too, about a week or 10 days ago there appeared an item in one of the Salt Lake papers quoting either Mr. Larson or Mr. Jacobson, I don't know which, who made a comment on the statement I had made relative to the geology at Glen Canyon, that if they got in and made further studies, and found out that the place wasn't a good place for a dam, they could move it around some place.

Are you or are you not settled on this site, because in that article also it said there was a difference between 700 and 735 feet in the height of the dam.

I would like to have that explained in relation to Mr. Saylor's line of questioning.

Mr. DEXHEIMER. You understand, of course, to the limit of the funds and personnel available to us, we keep working on these projects, and our investigations and our analyses of the work that is done previously in drilling and studying the foundations. That work has continued, and is continuing today.

Mr. SAYLOR. I ask you, Mr. Commissioner, specifically, what work has been done since the 26th of October 1954 up to the 9th day of March 1955, because I think this has raised a sufficient question when the Commissioner of Reclamation, over his signature, sends out a letter which raises a material doubt in the minds of the people, and

states that there is a doubt in his mind that a 700-foot structure can even be built.

This committee is entitled to know in minute detail what has happened since that date, so that you would now come before this committee of Congress and recommend the expenditure of a billion dollars?

Mr. DEXHEIMER. I do not have a copy of that letter you are speaking about available. There may be some things in it that would have some effect.

It may have been some other site, I am not sure, that we were speaking about.

Mr. SAYLOR. I will hand it to you.

Mr. DEXHEIMER. I may have been speaking about a question in a letter that we were answering. It might have been somewhat different.

I would say directly—to answer your question, Mr. Saylor, this letter was in answer to one, I believe, suggesting alternate sites from particularly Echo Park and Split Mountain, and it suggests, I believe, that they all should be raised 15 feet, which would take care of the storage that would be lost by not building Echo Park and Split Mountain.

With that background, the paragraph you read here was a proper answer at that time, we didn't feel that we could raise those dams, in some instances, 15 feet, to take care of the additional storage, rather than to build Echo Park and Split Mountain.

As I pointed out, we are continually studying the data that are available to us that we find in our field studies. We are analyzing our geological studies. And, since October 26, 1954, when this letter was written, the doubt that is expressed here as concern—and I will quote:

> At present, our design specialists are quite concerned as to whether or not the foundation characteristics of the Glen Canyon and Gray Canyon sites are capable of safely supporting high dams, 700 feet and 575 feet respectively.

Mr. SAYLOR. That is a correct statement. You are reading your letter back, and that is the question I have asked you.

What has happened since the 26th of October 1954 until the 9th day of March 1955, that removes any doubt that you can now build a 700-foot dam at Glen Canyon?

Mr. HOSMER. Will the gentleman from Pennsylvania yield?

Mr. SAYLOR. I will when I get an answer to this question.

Mr. DEXHEIMER. The additional studies of the data available to us from the field, in the laboratory, have now convinced our people, geologists and other experts in that field in Denver and in other places, that it is entirely feasible, safe and a sound dam site for a 700-foot dam at Glen Canyon.

Mr. SAYLOR. Mr. Commissioner, I ask you what you have done, either in your laboratories or anywhere else, from the 26th of October 1954, down until today, that would lead you or the men under you, to change their opinion?

Mr. DEXHEIMER. I do not have the details of that, Mr. Saylor. We will be glad to get them from Denver and furnish them for the record.

Mr. SAYLOR. Mr. Chairman, I do not want this furnished for the record.

I have seen time and time again when matters are furnished for the record they are not responsive to questions.

Now, certainly this committee, as a standing committee of Congress, is entitled to direct testimony, because there has been, within a period of 5 months, a complete change of policy in the Department in a key unit of this entire project, and the Assistant Secretary came here this morning with no mention of it, and now the Commissioner of Reclamation, a man who is charged with the overall function of carrying out this program, if authorized by Congress, has the effrontery to come here and tell this committee that he does not know what has removed the doubt in the minds of the people that work for him, so that what heretofore has been questioned as being a proper dam site for building to 700 feet now becomes a perfectly feasible and plausible dam site.

Mr. PILLION. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. Just a moment.

The Chair suggests that the gentleman from Pennsylvania has a right to his own observations; if the gentleman does not wish to have the information that the Commissioner has suggested he will try and furnish the committee, he will not be requested to furnish it.

Mr. SAYLOR. I desire that it be furnished, but it not be submitted as a part of the record, that the Commissioner be brought here so that he may be subjected to examination.

Mr. ASPINALL. I think the gentlemen is in order in that respect, and Mr. Commissioner, if you will prepare the information at a later time we will receive the information for the committee and have the Commissioner here to explain it.

Mr. DEXHEIMER. I will be glad to.

Mr. ASPINALL. Will the gentleman from Pennsylvania yield to the gentleman——

Mr. SAYLOR. I will yield to the gentleman from California.

Mr. HOSMER. I would like to have that question answered in the same manner, and at the same time you answer Mr. Saylor's question.

Mr. DEXHEIMER. Would you please restate that question? I am not sure I have it.

Mr. HOSMER. In light of the fact that about 10 days ago either Mr. Larson or Mr. Jacobson is quoted in the newspaper as stating that subsequent engineering and geological studies might make it necessary to move this Glen Canyon Dam some place else and also made a statement to the effect that it couldn't be increased from 700 to 735 feet, what has changed in the last 10 days that causes your testimony to be positive that the 700-foot dam can safely be built at that location?

Mr. DEXHEIMER. I see.

Mr. ASPINALL. Will you be able to furnish that, Mr. Commissioner, in the same manner you furnish the other?

Mr. DEXHEIMER. We will do our best; yes, sir.

Mr. SAYLOR. I yield to the gentleman from New York.

Mr. PILLION. In view of the seriousness of this question and the question of the structural soundness of this dam being questioned by the Commissioner himself, and in view of the very indefinite answers submitted here to the questions, I would suggest to the members of the committee we get more than a report on the factors that go into the question of structural soundness of this dam, that in addition to getting a report, a general report typical of the answers here today, that we receive a detailed report of the core drillings and the type of

geological formulation we have here, the porosity and all the other factors that go into the question of whether or not a sound structure can be built, the height of 700 feet, 600 feet, 500 feet, the margin of safety on an engineering basis that you are granting here, or making allowance for, because it would be a terrible thing to attempt the construction of a structure such as this if we did not have a complete agreement as to the 100-percent structural safety of whatever project we are contemplating.

I would suggest we get detailed reports and then we can question the gentleman who made the evaluation as to the safety of this structure based upon the details that we have a right to examine and cross-examine both the detail, the actual work upon which the conclusion has been made, and also question the conclusion made upon the facts. We can question both.

Mr. ASPINALL. The gentleman from Pennsylvania will proceed with his questioning.

Mr. PILLION. Mr. Chairman, I would like to make a request that information along the lines that are suggested here, that I suggested here, be given to this commitee and that this committee ask and request and demand that such information be submitted by competent qualified persons in the Department.

Mr. ASPINALL. Will the gentleman from Pennsylanvia yield to the Chair for an inquiry?

Mr. SAYLOR. Yes.

Mr. ASPINALL. Is it possible, Mr. Commissioner at the place that you have arrived in your work on these dams to furnish the information which the gentleman from New York requests?

Mr. DEXHEIMER. I think essentially we can, Mr. Chairman. We have had our geologists, our technicians and designers undertake a very elaborate series of drilling and testing, more elaborate than probably any other dam we have built, and we have consulting geologists who have made reports on the site based on those drillings, we have a wealth of data which as I pointed out has recently been analyzed by our people in Denver who are responsible for the technical parts of this thing and I believe we can furnish most of the information that has been requested.

We may not, however, be able to get the people that have prepared these reports during the time of these hearings because they are very busy men and might be in some other part of the world.

Mr. ASPINALL. The information will have to be delivered to the committee later on, at which time we can confer with the representatives of the Bureau. If you will receive from the reporter the question in detail that was asked by Mr. Pillion and then confer with him on any possibility that you are unable to meet his request and advise the Chair, he would appreciate it. Otherwise, is there any objection to the request of the gentleman from New York?

Hearing none, it is so ordered.

The gentleman from Pennsylvania will continue.

Mr. SAYLOR. Mr. Larson, in your statement on page 2 you have a sentence:

> Although the regulatory reservoirs proposed in the basin plan are generally below the points of diversion for the participating projects, they would serve essentially the same purposes as reservoirs above points of diversion. This would be achieved through a replacement practice quite common in western streams

where water is diverted upstream in exchange for water-storage releases from downstream reservoirs.

I would like you to tell members of this commitee you are going to use the waters from Glen Canyon and Echo Park dam sites to place any land under irrigation.

Mr. LARSON. That is a very common practice out in the West.

Several projects I have personally planned have been built and are operating something like this: If you have a stream where the water is needed to supply rights below a reservoir during the dry part of the year, the irrigation season, but having a much larger flow during the spring runoff season, and that varies from year to year, you could dispose of water from that reservoir upstream, saying it another way, if you had a reservoir that could store water when it was surplus in the stream you would release from that reservoir water to supply rights below in lieu of what was taken out above.

We have many reservoirs in the West where we dispose of and sell water from reservoirs to users upstream and they take water which would otherwise be demanded downstream. We replace the stream water with storage water. That is a very common practice.

So that Glen Canyon serves almost identical purposes of irrigation upstream that it would if it were above irrigation.

Mr. SAYLOR. So it is your contention that this can be used as you have indicated, notwithstanding the fact that you will not put a drop of water on an acre of ground from either Glen Canyon or Echo Park Reservoirs.

Mr. LARSON. That is correct. It is used by exchange. That is really the essential purpose of these two reservoirs, for irrigation, and, of course, power. We make use of a very valuable power resource and it happens to be the vehicle, you might say, to pay a large part of the costs.

Mr. DEXHEIMER. If I may, I would like to add this: In the lower basin that same principle is established by Hoover Dam and Lake Mead where the water is not served directly into irrigation diversions until it gets hundreds of miles downstream.

Mr. SAYLOR. I can understand it where you do use the water eventually downstream but I am at a loss, as Mr. Larson just explained, how you can do it when the two dams in question are below any possible point of diversion.

Mr. DEXHEIMER. This would act just the same as in the lower basin, the Glen Canyon would discharge water to meet the lower basin requirements just as though they were diverting water below Glen Canyon or any place and then the excess flow that is not needed during the peak season of the runoff could be utilized and diverted at some point far upstream.

Mr. DAWSON. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. DAWSON. In the central Utah project we take water from the mountains. That water ordinarily would go into the Green River, but if we divert it and take it down and irrigate some of our lands in the Bonneville Basin, we must replace that water which would go into the Green River and then on into the Colorado because we are taking it away. So in order to replace it we must have those storage dams at Echo and Glen Canyons in order to replace this water we take further up. It is simply exchange water.

Mr. SAYLOR. That is the next question. I was going to ask Mr. Larson to explain, the practice of exchange water or exchange storage.

Mr. LARSON. Explain the practice?

Mr. SAYLOR. Yes.

Mr. LARSON. I thought I did. It is a practice that is covered in most States by State law. In Utah, for example, where I am very familiar, we have already planned and built 2 such projects. There we have 2 reservoirs, the Echo Reservoir on the Weber River and Deer Creek Reservoir on the Provo River. We have disposed of water to irrigation companies upstream from both reservoirs and the farmers have used water for years by exchange.

When they bought that water they had a junior right and the water in the river couldn't be touched because it went to the lower valley to prior rights.

By storing floodwaters in the reservoir so we could replace the water to the prior rights that meant the junior appropriator upstream could buy water from the reservoir and divert that natural flow on the land which would otherwise have gone down to the prior rights below. It works the same way on the Colorado River under our plan.

Mr. ASPINALL. The hour of 4 o'clock has arrived. The committee will stand adjourned, to meet tomorrow morning at 10 o'clock to resume the hearings.

(Whereupon, at 4 p. m. the committee was recessed, to reconvene at 10 a.m., Thursday, March 10, 1955.)

COLORADO RIVER STORAGE PROJECT

THURSDAY, MARCH 10, 1955

House of Representatives,
Subcommittee on Irrigation and Reclamation of the
Committee on Interior and Insular Affairs,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:05 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. Aspinall. The Subcommittee on Irrigation and Reclamation will now be in session for further consideration of the bills having to do with the authorizing of the upper Colorado River project.

When the meeting adjourned yesterday afternoon the gentleman from Pennsylvania had control of the time. The Chair recognizes Mr. Saylor, of Pennsylvania.

Mr. Saylor. Mr. Chairman, I ask unanimous consent that a letter dated October 26, 1954, addressed to Mr. Richard C. Bradley, department of physics, Cornell University, Ithaca, N. Y., from W. A. Dexheimer, Commissioner, be made a part of the record at this point.

Mr. Aspinall. Mr. Saylor, this is a copy of a letter. Do you have the original letter?

Mr. Saylor. Do you want the original letter?

Mr. Aspinall. Mr. Dexheimer, will you and your staff take the stand?

STATEMENT OF W. A. DEXHEIMER, COMMISSIONER, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY E. O. LARSON, REGIONAL DIRECTOR, REGION 4, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR; AND CECIL B. JACOBSON, PROJECT ENGINEER, COLORADO STORAGE PROJECT, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR

Mr. Aspinall. Mr. McFarland, will you show this letter to Mr. Dexheimer so we can have it properly identified.

Is that a copy of the letter which you forwarded under that date to Mr. Bradley?

Mr. Dexheimer (after examining letter). Yes, sir.

Mr. Aspinall. Is there any objection to the request of the gentleman from Pennsylvania?

Hearing none, it is so ordered and the letter will be made a part of the record.

(The letter referred to follows:)

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D. C., October 26, 1954.

Mr. RICHARD C. BRADLEY,
Department of Physics,
Cornell University, Ithaca, N. Y.

MY DEAR MR. BRADLEY: This is in reply to your letter of September 13, 1954, addressed to Mr. C. B. Jacobson of our region 4 office at Salt Lake City, Utah, copy of which you forwarded to this office, concerning studies of alternates to the proposed Echo Park and Split Mountain storage units of the Colorado River storage project. You inquire specifically in connection with such studies whether we have considered increasing capacities of other storage reservoirs and desire to know how such an alternate would compare with our proposed plan of development insofar as system evaporation is concerned.

Our feasibility reports, such as prepared in 1950 for the Colorado River storage project, are based on preliminary designs and studies conducted under the authority and expenditure of limited general funds appropriated each year by Congress for reclamation investigations. The heights of dams and other similar data in these reports, being the result of preliminary studies, are generally shown in round numbers and are subject to any changes warranted by more detailed investigations. Detailed studies, designs and advance planning for our projects are not ordinarily undertaken until the project is authorized. At that time our preliminary studies and designs, to be used in support of requests for congressional appropriation of construction funds, are necessarily subject to modification within the limits of the legislation.

Important in the Colorado River storage project detailed studies will be the determination of the economic height of each dam in the system. Physical and economic factors such as costs, water yields and evaporation, power production, rights-of-way and structural limitations at each site, are major items in these economic height determinations.

In the preliminary selection of the reservoirs for the Colorado River storage project, considerable attention was given to the physical limits of water supply and the structural foundations at each site. Unless there were other obvious limitations, use of each site to its full capability was recommended in the 1950 report.

Economy in the plan, from the standpoint of cost and loss of water from evaporation, necessitates storage reservoirs as large and few as possible. In this respect we have already recognized, whenever possible, your suggested use of the ofttimes economical upper stratum of each reservoir site prior to turning to additional sites for the needed capacity.

There are physical limitations at each of the 6 sites where you suggest an increase of 15 feet, more or less, in the heights of the respective dams. At present our design specialists are quite concerned as to whether or not the foundation characteristics of the Glen Canyon and Gray Canyon sites are capable of safely supporting high dams 700 feet and 575 feet respectively. The towns of Gunnison and Craig, Colo., prohibit any increase in the contemplated reservoir stages at Curecanti and Cross Mountain respectively. Likewise the town of Green River, Wyo., limits the Flaming Gorge Reservoir to its contemplated stage. New Mexico's proposed use of water on the San Juan River renders the Navaho Reservoir site ineffective with respect to the delivery of water at Lee Ferry and thus it is no longer considered a prospective main stem regulatory feature in the system.

Echo Park capacity, therefore, cannot be compensated by merely raising the remaining dams in the system. Reservoir capacity at new sites, such as the Dewey site, would offer the only possible substitute in lieu of reservoir capacity at Echo Park.

W. A. DEXHEIMER, *Commissioner.*

Mr. ASPINALL. The gentleman from Pennsylvania.

Mr. SAYLOR. Now the first unit of the storage project which you have recommended is the Glen Canyon unit. Am I correct that the total capacity of this reservoir erected to a height of 700 feet will be 26 million acre-feet of water?

Mr. DEXHEIMER. Yes, sir.

Mr. SAYLOR. Can you tell the members of this committee what the evaporation losses, according to the best figures that you have in your Department at this time, will be annually upon that body of water?

Mr. LARSON. The average annual evaporation is 526,000 acre-feet.

Mr. SAYLOR. 526,000 acre-feet?

Mr. LARSON. Yes; that is correct.

Mr. SAYLOR. Am I correct in my arithmetic that that is roughly 126,000 acre-feet more than these projects which you have come here and recommended will put to beneficial use in the upper Colorado?

Mr. LARSON. Yes, sir, in the 11 participating projects.

Mr. SAYLOR. In the 11 participating projects?

Mr. LARSON. That is correct.

Mr. SAYLOR. Now, Mr. Commissioner, you have through your Department told the people in the West how tremendously valuable water is, and last year when you appeared before this committee you made a great to-do about the evaporation losses that would be saved at another dam. Now can you tell this committee how in good conscience you can come here and propose erecting a dam which will by evaporation alone use 126,000 acre-feet more a year than you are going to put to beneficial consumptive use in the 11 participating projects?

Mr. DEXHEIMER. Yes, sir, I think that is very simple. At the present time there is something over 4 million acre-feet of water going to waste down the river into the gulf which is not being utilized at all. The utilization of this water for beneficial purposes, even though there is some evaporation loss, as there is in all reservoirs, is fully justified.

Mr. SAYLOR. That is your explanation that you want to give to the committee?

Mr. DEXHEIMER. I think the value of those things has been fully demonstrated since the construction and filling of the Hoover Dam and Lake Mead. It started filling in 1934. The evaporation rates there are a little higher and the losses about the same as they would be at Glen Canyon. Yet I do not think anyone can question the advisability of having built those works some 20 years ago and the utilization of the water that was made possible by that construction.

Dr. MILLER. Will the gentleman yield?

Mr. SAYLOR. Yes.

Dr. MILLER. Is not that also true on the other dams that have been built—Bonneville and Coulee and others—that there is big evaporation, but the benefits that arise from them far overshadow the loss by evaporation?

Mr. DEXHEIMER. That is correct, and that is why we are so concerned about minimizing the losses by evaporation to be able to save as much as possible of that water, realizing its value to the country.

Dr. MILLER. Is there anything you can do to stop the evaporation? That is in the hands of the Lord, is it not?

Mr. DEXHEIMER. The only thing we can do is select sites at reasonably good elevations, not spread out at water surface. The reservoirs built to take the long holdover storage should be in higher altitudes, cooler climates, and have a minimum of surface area.

Dr. MILLER. Thank you for yielding.

Mr. SAYLOR. If you do not build Glen Canyon Reservoir or Echo Park Reservoir or any other storage reservoir, how much water can be put to beneficial use in the upper basin?

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Mr. LARSON. About 4 million acre-feet.

Mr. SAYLOR. In other words, if you did not build Glen Canyon Reservoir or any other storage reservoir, but merely built participating projects, you could put to beneficial consumptive use 4 million acre-feet of water?

Mr. LARSON. No.

Mr. DEXHEIMER. That would require quite a few storage reservoirs in the tributaries upstream before that could be possible. But without the Glen Canyon and Echo Park—

Mr. SAYLOR. Mr. Secretary and Mr. Commissioner, yesterday you made a statement or submitted a statement in which we are told that you can put 58 percent—I think that is correct—of the water in the river to beneficial consumptive use without any storage projects.

Mr. DEXHEIMER. Without storage projects?

Mr. SAYLOR. Yes.

Mr. DEXHEIMER. No, sir.

Mr. SAYLOR. Mr. Larson?

Mr. LARSON. That is without the holdover reservoirs of the storage units, but not without reservoirs that are attached to the participating projects.

Mr. SAYLOR. All right. That is the important thing. In other words, you can build participating projects in the upper basin States and put to beneficial consumptive use 58 percent of the water that is allocated to the upper basin. Is that correct?

Mr. LARSON. If you build reservoirs with the participating projects and suffer severe shortages in dry cycles and in dry years.

Mr. SAYLOR. In other words, you can put to beneficial consumptive use 58 percent of the water by erecting the 11 participating projects and other projects which you have on the planning boards without building one storage project on this river. Is that correct?

Mr. LARSON. That is correct, but then you would have trouble ever filling them if you did that.

Mr. SAYLOR. Now, you would have trouble filling those dams. Will you tell this committee why you would have trouble filling those dams?

Mr. LARSON. For the reason that water must go down to the lower basin. As the upper basin develops on up to the 4 million acre-feet, the higher they go in their apportioned water, the less leeway exists to fill these large holdover reservoirs like Glen Canyon with 26 million acre-feet. There are questions raised about filling them even if they were constructed now, but we know they can be filled if constructed now.

Mr. SAYLOR. Do you mean to say that competent engineers question whether or not you could fill these reservoirs even though they were built?

Mr. LARSON. No, I said questions had been raised. I think we have the answers.

Mr. SAYLOR. Questions have been raised. I am very much interested in that. What questions have been raised? Who has raised these questions?

Mr. LARSON. Various people wondered how we would fill the reservoirs.

Mr. SAYLOR. Let's name them now. Let's name the people that have raised these questions.

Mr. LARSON. I would say some people, maybe in the lower basin, are concerned with the development of firm energy at Hoover Dam and so on.

Mr. SAYLOR. Will you name for the members of this committee those who have raised questions whether or not you could fill these dams?

Mr. DEXHEIMER. Yes, sir. Governor Johnson of Colorado made quite a point of it before the Senate committee last week and was——

Mr. SAYLOR. Who is Governor Johnson?

Mr. DEXHEIMER. Former Senator of the United States Senate and Governor of Colorado.

Mr. SAYLOR. A gentleman who served for 18 years in the United States Senate; is that correct?

Mr. DEXHEIMER. That is correct.

Mr. SAYLOR. And he is now Governor of the great State of Colorado; is that correct?

Mr. DEXHEIMER. That is correct.

Mr. ASPINALL. If the gentlemen please, let us not go over those things. When the witness is asked a question please let him answer it, because we want to keep this as orderly as possible.

Mr. SAYLOR. I am trying to keep this as orderly as possible. The gentleman has said people have questioned whether or not these reservoirs can be filled. I think, since there is a question raised, and the witnesses have already indicated that if they build these participating projects there is a question of whether or not they can be filled, this committee should be entitled to know whether these projects if built can be filled.

Mr. DEXHEIMER. You understand, of course, he was raising the legal issues under interpretations of the Colorado River compact. We have no hesitancy on saying that they can be filled from an engineering and a water supply basis.

Mr. SAYLOR. Has anyone raised a question as to whether or not these can actually be filled if built?

Mr. DEXHEIMER. As I pointed out, that question was raised from a legal standpoint by Governor Johnson in his interpretation of certain articles of the Colorado River compact. I do not know——

Mr. SAYLOR. Has anybody raised the question, Mr. Commissioner, as to whether or not in fact these can be filled?

Mr. DEXHEIMER. I have not had anything formally come to my notice to that effect; no, sir.

Mr. SAYLOR. I will ask Mr. Larson if he, being out there in that area, knows of anyone who has raised the question as to whether or not these dams can be filled, if built.

Mr. LARSON. No, I do not recall that anyone has questioned, from a physical standpoint, whether they could be filled.

Mr. SAYLOR. All right. If you build first Glen Canyon, which I think was specified yesterday you intended to build, what is the next unit you expect to build in the river?

Mr. DEXHEIMER. Echo Park.

Mr. SAYLOR. Echo Park. And where is Echo Park Dam located?

Mr. DEXHEIMER. Three miles inside the Colorado State line on the Green River near the Utah border.

Mr. SAYLOR. And that is within the limits of the Dinosaur National Monument?

Mr. DEXHEIMER. Yes, sir.

Mr. SAYLOR. What will be the capacity of that dam?

Mr. DEXHEIMER. Approximately 6½ million acre-feet.

Mr. SAYLOR. That is about 25 percent as large as Glen Canyon; is that correct?

Mr. DEXHEIMER. Yes, sir.

Mr. SAYLOR. It will produce about 25 percent as much power as Glen Canyon; is that correct?

Mr. DEXHEIMER. That is right.

Mr. SAYLOR. Can you tell this committee if, in the 35 years the Bureau of Reclamation has been in existence, heretofore they have ever invaded a national park or monument for the erection of a dam?

Mr. DEXHEIMER. Not to my knowledge.

Mr. SAYLOR. So that if this committee authorizes you to proceed and build a dam at Echo Park, this will be the first time that the Bureau of Reclamation has ever gone into a national park or monument?

Mr. DEXHEIMER. We have built works in national parks of various kinds, not necessarily a reservoir of this type in national parks. The Colorado-Big Thompson project, for example, is built in a Forest Service area and in the Rocky Mountain National Park area to some extent.

Mr. SAYLOR. That is, you have a tunnel—am I correct—that goes through Rocky Mountain National Park?

Mr. DEXHEIMER. That is correct.

Mr. SAYLOR. And you also have some of your powerlines that imstead of going overground go through one of those tunnels?

Mr. DEXHEIMER. Correct.

Mr. SAYLOR. But you have never built a dam in a national park?

Mr. DEXHEIMER. Not to my knowledge.

Mr. SAYLOR. That is the testimony that was given last year by you and by Mr. Larson and by the representatives of the Department. During the past year you have not invaded any national park.

Now last year the principal reason Mr. Tudor gave for building Echo Park was that there was a tremendous difference in evaporation losses which occurred at that site as compared with any alternate site. Is that correct?

Mr. DEXHEIMER. Correct.

Mr. SAYLOR. Am I correct that you sent to this committee two letters last year which stated that the figures given in the testimony by Mr. Tudor were incorrect, and that when you finally checked your evaporation figures there was an error of 600 percent in the figures?

Mr. DEXHEIMER. I think the letters signed by Under Secretary Tudor were entirely concerned with the proposed alternate of increasing the height of the Glen Canyon Dam and reservoir. There was no discrepancy in the figures that the Bureau of Reclamation had used, are still using, on what we consider, and did at that time, possible alternate sites. As we have pointed out many times, a raising of the Glen Canyon Dam and Reservoir cannot and should not be considered a feasible or in any sense an alternate to any of the other works that we might build. There was no discrepancy on any of the other figures, any of the figures that we had an opportunity to calculate, any of the figures that are in our reports. It was just inadvertently brought into the testimony last year, and Mr. Tudor testified on the possibility of raising the Glen Canyon Reservoir as a possible alternate. It can-

not be, and should never have been, considered as a possible alternate to Echo Park.

Mr. SAYLOR. Now Gray Canyon Reservoir site has been proposed. Why is that not a suitable substitute for Echo Park?

Mr. DEXHEIMER. Which one, sir?

Mr. SAYLOR. Gray Canyon.

Mr. DEXHEIMER. That would be considered one of the storage projects to build the whole thing, not as an alternate, but one of the storage units in connection with the full development.

Mr. SAYLOR. Has your staff or your committee considered other alternate sites?

Mr. DEXHEIMER. A great many of them; yes, sir.

Mr. SAYLOR. Now is it your considered opinion that if Echo Park Reservoir is not built the Colorado River storage project and participating projects are infeasible?

Mr. DEXHEIMER. No, sir.

Mr. SAYLOR. Then Echo Park is not, as described by Under Secretary Tudor last year, the engine necessary to run this whole upper Colorado River storage project and participating projects?

Mr. DEXHEIMER. It is essential in the upper reaches of the area, and without it we would be unable to make the full development anticipated and would probably have to leave out even some of the participating projects which are recommended at the present time, or some of the units in participating projects, and it would greatly decrease the financial feasibility of the overall plan.

Mr. SAYLOR. Now, Mr. Commissioner, which one of the 11 participating projects, if any, which you have specified would have to be removed from this proposal which you have given to this committee if Echo Park Dam is not built?

Mr. DEXHEIMER. The actual participating projects that might have to be eliminated? I think we would have to go into some study, but the financial feasibility of some of them in the criteria under which we have to work, repayment within a certain period of years, might mean that some of them would have to be delayed.

Mr. SAYLOR. Now, which ones? This is getting to be a very important thing, because you have just given this committee a completely new picture that I am satisfied neither the Senate or this House has ever developed before; because up until 2 or 3 minutes ago every committee of Congress has been told that unless Echo Park was built the entire project was infeasible. Now you say that the only effect will be that some of the 11 participating projects which you have suggested will have to have a longer payout period. In other words, you feel that it is not such a vital part of this whole project that any of the participating projects have to be deleted; that the only thing that you would have to do would be to restudy your payout period. Is that correct?

Mr. DEXHEIMER. No, sir. I do not believe that can be answered that simply. There are very good reasons why Echo Park needs to be in for the development of the upper basin. Perhaps Mr. Larson can read from his statement again the reasons why Echo Park should be in. That might be helpful.

Mr. SAYLOR. Let's have Mr. Larson answer that.

Mr. LARSON. Here are the principal advantages of including Echo Park Dam and Reservoir in the Colorado storage project plan:

1. With respect to storage capacity and power generation, Echo Park would be second in size to Glen Canyon in the reservoir system planned for the upper basin.

2. Evaporation losses per acre-foot of water stored in Echo Park would be less than any other major storage site in the upper basin.

3. Construction of Echo Park Reservoir in place of Dewey Reservoir, the best alternative outside of a national monument, would save an estimated 120,000 acre-feet of evaporation losses annually, a significant quantity of water in the arid West.

4. Echo Park Reservoir, located just below the junction of the Green and the Yampa Rivers, would be integrated with the upstream Flaming Gorge and Cross Mountain Reservoirs in regulating the flows of the rivers, that is, when they are constructed. In addition, it would contribute materially to the feasibility of reservoirs at Split Mountain and Grey Canyon sites downstream on the Green River. This is why Under Secretary Tudor mentioned that Echo Park was the wheelhorse in the upper basin.

5. The use of the Echo Park site is the key to the economical development of the upper end of the upper Colorado River Basin. The site is strategically located with respect to upstream power markets of the proposed system of dams and powerplants and the basin's many resources awaiting development, such as phosphate rock for fertilizer, chemicals, oil shale, coal, natural sodium carbonate, and many other important minerals.

There is one other point: We concluded that we needed as much power revenue from Echo Park and Glen Canyon—Echo Park, the next best, would contribute materially—in financing the participating projects after the power allocation is paid out.

Another thing that is important is the construction of these dams at an early date while there are large quantities of water running down the river. That allows lower cost power and a more feasible return from power revenues while there is still that great leeway in unused water in the upper basin. We were, therefore, planning to pay the two large powerplants out as quickly as possible to result in net revenues at as early a date as possible.

Echo Park therefore dose not have a very material effect on the economy of the whole upper basin plan.

Mr. SAYLOR. Now, Mr. Larson, let us look at it. You said, first, storage capacity. What is the storage capacity of this compared to Dewey?

Mr. LARSON. The storage capacity is similar. It is quite similar.

Mr. SAYLOR. Then the first argument that was given, there is not much foundation to. Storage capacity in Dewey and in——

Mr. LARSON. And cost of power.

Mr. SAYLOR. (continuing). Echo Park are about the same.

Mr. LARSON. Yes, except the evaporation is materially different.

Mr. SAYLOR. Wait. We will take them as we come down. The second thing you said is evaporation losses. What is the estimated evaporation loss at Echo Park?

Mr. LARSON. An average of 87,000 acre-feet annually.

Mr. SAYLOR. And what is the estimated evaporation loss at Dewey?

Mr. LARSON. 215,000, 120,000 acre-feet more than at Echo. I should make one comment here: that difference should include Split Mountain

because the two go together, Echo Park and Split Mountain. We have considered Split Mountain just another powerwheel, you might say, added to Echo Park, and evaporation—

Mr. SAYLOR. Split Mountain Reservoir would also be within the Dinosaur National Monument?

Mr. LARSON. Yes, that is within the monument. So the evaporation for both Echo Park and Split Mountain is 95,000 acre-feet as an average, of which 8,000 acre-feet annually is at Split Mountain.

Mr. SAYLOR. Now the third reason you gave was that it would save at Dewey—or as compared with Dewey there is quite a saving. What is that? Is that the evaporation loss?

Mr. LARSON. The saving in evaporation loss of 120,000 acre-feet annually.

Mr. SAYLOR. Is it not a saving of 100,000 acre-feet?

Mr. LARSON. The evaporation at Dewey is about 215,00 acre-feet annually, I believe; the 195,000 refers to the new Moab site. It is 215,000 for the Dewey site. That is correct.

Mr. SAYLOR. What studies have you made on evaporation losses?

Mr. LARSON. I would like to refer that question to the hydraulic engineer, Mr. Jacobson, who has charge of all of those evaporation studies, if that is satisfactory to you.

Mr. SAYLOR. I will be glad to have Mr. Jacobson answer the question.

Mr. JACOBSON. From an analysis of the available evaporation pan data in the region surrounding these reservoirs we have been able to make approximate studies which indicate the evaporation from the water surface of the various reservoirs throughout the area. It is true we do not have evaporation pans at each one of these reservoirs, but applying that data consistently from one site to another, we not only gain an approximate value within engineering reason or judgment of the evaporation at the exact site, but also we derive a very good comparative value bewteen sites.

Mr. SAYLOR. Mr. Jacobson, have you had any pan-evaporation tests at elevation of 500 feet above the bed of the creek at Echo Park Dam site?

Mr. JACOBSON. Yes, we have, within the region. We have had an evaporation pan at Myton, Utah, at approximately that elevation.

Mr. SAYLOR. That is not what I asked you. I asked you when you have had an evaporation pan test at an elevation of 500 feet above the floor of the river at the Echo Park Reservoir site.

Mr. JACOBSON. Not right at the site, but we have records at that approximate elevation.

Mr. SAYLOR. In other words, you have not had an evaporation pan test at Echo Park Reservoir site at the elevation which you intend to build the dam?

Mr. JACOBSON. That is correct. We also have other meteorological data available from which we can check one method against another through various types of formula which have been derived in the laboratories of the Colorado A. and M. College and various other institutions throughout the country.

Mr. SAYLOR. Do you know whether or not Colorado A. and M. College or any other institution, firm, individual, corporation, or anybody else has made a pan-evaporation test at the height at which you expect to build the dam at Echo Park?

Mr. JACOBSON. Not at the particular site, but at that elevation and in that general surrounding area, yes.

Mr. SAYLOR. Has your Bureau made at the elevation of 500 feet at which you intend to build this any survey or study over a period of years of the wind velocity?

Mr. JACOBSON. No, but our engineers have been in the reservoir area and observed that. We have not set up any exact instruments. We know the general direction of the winds. I think we have a fair knowledge of that.

Mr. SAYLOR. One of the big elements in determining evaporation loss at any site is wind velocity; is that correct?

Mr. JACOBSON. No, sir; that is one of the elements, but not one of the most important elements.

Mr. SAYLOR. One of the elements. One of the big elements in determining evaporation loss.

Mr. JACOBSON. I would say it is one of the elements but not necessarily one of the big elements.

Mr. SAYLOR. Will you tell us what in your considered opinion are the main elements in determining evaporation losses?

Mr. JACOBSON. One of the greatest elements is the temperature of the air with respect to the temperature of the water.

Mr. SAYLOR. The temperature of the air with respect to the temperature of the water?

Mr. JACOBSON. Right.

Mr. SAYLOR. Now what studies have you made that would tell you what the temperature of the water is going to be in a nonexistent dam?

Mr. JACOBSON. We have very exact water temperatures at various dams and reservoirs throughout the West. We have no——

Mr. SAYLOR. I do not care what studies you have made on other reservoirs; I am asking you what studies you have made on a nonexistent dam.

Mr. DAWSON. Will the gentleman yield to me?

Mr. SAYLOR. No.

Mr. JACOBSON. That would have to be computed, and it can be computed under scientific methods by correlations between one study and another.

Dr. MILLER. Will the gentleman yield to me?

Mr. SAYLOR. Let me get these questions and answers, and then I will.

In other words, Mr. Jacobson, all you are telling this committee is that these figures of evaporation losses are based upon data which you have not been able to determine with a fine degree of exactness for several reasons: First, the dam is not in existence——

Mr. DAWSON. Mr. Chairman, I——

Mr. SAYLOR. Mr. Chairman, I have the floor and I refuse to yield.

Mr. DAWSON. I am not asking him to yield. I am raising a point of order that the gentleman is not asking questions, he is testifying, and I think the questions should be questions rather than testimony.

Mr. ASPINALL. The gentleman has an observation and not a point of order. The gentleman from Pennsylvania has the time and he shall proceed, but I do not wish him to——

Mr. PILLION. Mr. Chairman?

Mr. ASPINALL (continuing). Haggle with the witness. I just wish him to make his questions direct and then not argue with the witness.

Dr. MILLER. Will the gentleman yield for a parliamentary inquiry?

Mr. SAYLOR. Yes.

Dr. MILLER. I wonder if the rest of us are going to have an opportunity to ask questions. Mr. Saylor is doing a good job of questioning. I do not always agree with him. I think he has been badgering and arguing with the witness, and is not really a proper procedure as far as the committee goes. But I think that the other thirty-odd members of this committee would like to have a chance to ask some questions. I am going to suggest, Mr. Chairman, and the chairman of our full committee is coming in——

Mr. SAYLOR. I yielded for a parliamentary inquiry and I did not yield for a speech.

Dr. MILLER. The parliamentary inquiry then is: Will there be an opportunity—will there be an attempt to limit the debate in this committee so we can proceed in orderly fashion and so the rest of the thirty-odd members can have a chance to ask questions?

Mr. ASPINALL. Dr. Miller, as you so well know, the time in the control of the committee. We have no general rule which limits a member of the committee in a hearing to any time. Any time the committee wishes to take cognizance of the fact that the other members of the committee are not being given an opportunity to ask questions and wish to limit the time, of course, the chairman will abide by the wishes of the committee.

Mr. SAYLOR. Might I say to the gentleman from Nebraska that the Chair was very careful yesterday to offer Dr. Miller the time, and Dr. Miller was not here yesterday afternoon at the hearings to proceed to ask questions.

Dr. MILLER. I was here the first hour and 10 minutes.

Mr. SAYLOR. If you would have been here, you outrank me and have the right——

Mr. ASPINALL. I answered the question, and the gentleman from Pennsylvania will proceed.

Dr. MILLER. Will you yield now?

Mr. SAYLOR. No, I refuse to yield further.

Mr. HALEY. Will the gentleman yield to me for an observation?

Mr. SAYLOR. Yes.

Mr. HALEY. Mr. Chairman, I think that the gentleman's questions are pretty much to the point here. They are very informative as far as I am concerned, and I hope he continues. I would like to find out as much as I can about it. The gentleman seems to know a lot about it.

Mr. PILLION. A matter of inquiry, Mr.——

Mr. ASPINALL. The time is in the control of the gentleman from Pennsylvania. If he wishes to yield, he may yield.

Mr. SAYLOR. I yield to the gentleman from New York.

Mr. ASPINALL. Does the gentleman from Pennsylvania yield to the gentleman from New York?

Mr. SAYLOR. Yes.

Mr. PILLION. I would just like to make this point: That the members of this committee are not bound by rules of evidence or court procedures, and I think each member sitting here has a right to proceed in the way he thinks best in soliciting the information that is material to this inquiry.

Mr. DAWSON. Will you yield to me?

Mr. SAYLOR. I will yield to the gentleman from Utah.

Mr. DAWSON. I agree with my friend from New York, but I still think the members of the committee are here for a purpose, and that is to elicit facts, and certainly we must follow some semblance of order in eliciting those facts. It seems to me the line of this interrogation has been one more of badgering the witness and testifying himself rather than getting the facts out of the witness. I do not think it is helpful to the rest of the committee.

Mr. HOSMER. Will the gentleman yield to me?

Mr. SAYLOR. I yield to the gentleman from California.

Mr. HOSMER. I wish to associate myself with the remarks of the gentleman from Florida and the gentleman from New York, and also to state my opinion that I feel the gentleman from Pennsylvania is conducting his inquiry in such a manner as to bring out the maximum amount of information. I wish to congratulate him on the excellent manner in which he is proceeding.

Dr. MILLER. Will the gentleman yield to me?

Mr. SAYLOR. I yield to the gentleman from Nebraska.

Dr. MILLER. I want to get back, if I may, and ask Mr. Jacobson, the examination you have made relative to the evaporation from the proposed reservoir site and the scientific approach that you have had, is it in your opinion an accurate estimate as to the evaporation losses that would occur from Echo Park and the other reservoirs? In other words, have you arrived at a rate by as nearly a scientific approach as is humanly possible?

Mr. JACOBSON. My answer to that is "Yes." After 25 years of experience in this line of work, including 2 years of which I did thesis work involving evaporation for a bachelor of science degree and master of science degree in engineering, and from observation of the studies that have been conducted by those under my direction, it is my opinion that we have used competently all of the data that are available, that we proceeded as any other competent engineers would have proceeded in solving this problem.

Mr. PILLION. Will the gentleman yield for one more question?

Mr. SAYLOR. I yield to the gentleman from New York.

Mr. PILLION. Could you tell me what the difference is in the surface area of the proposed storage project between the Echo Park storage area and the proposed Dewey storage area? What is the differential in the surface areas?

Mr. JACOBSON. The maximum water surface area at the Echo Park site is 43,400 acres. The maximum water surface area at the proposed Dewey site would be 64,000 acres.

Mr. PILLION. Now is the relative height or elevation of Dewey and Echo Park about the same? Relatively, without haggling about a couple of hundred feet?

Mr. JACOBSON. No, I would not say they are relatively. The Dewey site, the maximum water surface elevation is 4,380 feet mean sea level. At Echo Park it is 5,570 feet mean sea level.

Mr. PILLION. And is the evaporation greater at a greater height or at a lesser height of sea level? When is the evaporation greater?

Mr. JACOBSON. In the same region, the evaporation increases as the elevation decreases.

Mr. PILLION. Now the temperatures in the area are about the same, are they not?

Mr. JACOBSON. No; they are not.

Mr. PILLION. They are not too far apart, are they?

Mr. JACOBSON. In the matter of degrees, but there is considerable difference in relation to——

Mr. PILLION. I am talking about relatively. The humidity is relatively about the same, is it not, between those two sites? Relatively. I am not talking about exactness.

Mr. JACOBSON. Relatively, yes; but the Echo Park would be in the greater zone of humidity.

Mr. PILLION. And the winds are about the same, are they not?

Mr. JACOBSON. No; because the Dewey site is in a wide open basin area. The site of Echo Park is in a confined canyon.

Mr. PILLION. But is not the surface area that is exposed to evaporation the great factor, the No. 1 factor, in determining the rate of evaporation?

Mr. JACOBSON. I believe it would be the greatest, if all other things were equal.

Mr. PILLION. And in view of the fact that the surface areas are pretty nearly the same between Echo and Dewey and all these other minor matters are incidental to the surface area involved between these two projects, how do you account for the fact that the differential in evaporation rate you submit here is so greatly different from the differential in the surface areas? It just does not seem to me the other incidental matters such as temperature and height would make that much difference where the surface areas are pretty nearly the same.

Mr. JACOBSON. The surface areas, Congressman, are 150 percent apart from each other. There is another factor that is equally important as surface area. This is the shape of the particular surface. This is where your wind velocity and wind travel come into play. It is the ability of the wind to pick the water up and sweep it away allowing another discharge of wind to pick up additional water. If wind travels over a broad surface area, the ability of the wind to absorb the water, of course, is dissipated.

Mr. PILLION. I yield back, Mr. Saylor.

Mr. SAYLOR. Then wind velocity is apparently a pretty good factor in evaporation?

Mr. ASPINALL. Now, Mr. Saylor, that is the part of the questioning I object to. The witness has already answered, the answer is of record, and there is no need to argue with the witness.

Mr. SAYLOR. I am not arguing with him, Mr. Chairman. He has just gotten through answering a member of this committee and explaining the difference, and he said that the velocity of the wind and ability of the wind to pick up water is one of the big factors. Now I merely asked if then velocity of the wind is not one of the big factors in determining this.

Mr. ASPINALL. He may answer the question.

Mr. JACOBSON. The wind velocity is not the big factor. I would say wind travel certainly is an important factor.

Mr. SAYLOR. I think, Mr. Larson, in your statement you contemplate in the overall picture a storage in the upper basin of 43 million to 48 million acre-feet. Is that correct?

Mr. LARSON. Yes; the ultimate is 47 million acre-feet. We mentioned 48 million last year, with the Navaho in, and now with the Navaho out, it is about 47 million acre-feet overall.

Mr. SAYLOR. How long would it take to fill all of these projects, assuming they had been built in 1929 or 1930, 25 years ago? How long would it take to fill these projects?

Mr. LARSON. That I could not tell you exactly. It depends on what order you build them and the excess water existing in any particular year over the lower basin requirements and the upper basin uses.

Mr. SAYLOR. You have before you the figures for the last 25 years, do you not?

Mr. LARSON. Yes, but I would have to work an operation study to tell you. In our report we figured it might be 30 years before they are all built and filled.

Mr. SAYLOR. Assume that these were built 25 years ago, and that through some miracle as soon as they were all built they were full. What would the condition of those reservoirs be today as far as the amount of water that would be in them?

Mr. LARSON. If we had not used any more water than we actually have used, they would remain full.

Mr. SAYLOR. You are building these projects and expect to put water to beneficial use. Is not that what you told this committee?

Mr. LARSON. Yes, sir, and at that time, if the upper basin was depleting the upper river 7½ million acre-feet annually, then the reservoirs would be drawn down in a low cycle such as we have just gone through.

Mr. SAYLOR. And could you tell this committee how far down they would be drawn?

Mr. DEXHEIMER. It would be a very difficult question, Mr. Saylor, requiring operational studies based on assumed yearly runoffs and sequence of use of water. You would have to make so many assumptions to arrive at the answer directly as to exactly how much water would be left in the reservoirs. It is too involved to give you a firm answer.

Mr. SAYLOR. That is the converse of what you are asking this committee to do, to approve them; is it not?

Mr. DEXHEIMER. No, sir. We have made such operational studies on the plan that is before you. We have not made them on assumptions that they were built some 25 years ago, however.

Mr. SAYLOR. Has your Bureau determined or made any studies as to the effect of building Glen Canyon and implementing the power supply by construction of a thermal unit?

Mr. DEXHEIMER. No, sir. We did consider it to some extent, but we have not analyzed it on that basis.

Mr. SAYLOR. As an alternative to Echo Park and Split Mountain, you then have not considered the erection and use of a thermal unit to supply the same amount of power?

Mr. DEXHEIMER. In analyzing the economics of the hydroelectric development, we always consider the alternative means. In this case it would be a thermal plant located as strategically as possible near the load centers so as to evaluate the economics of the hydroelectric development. We could not go ahead and build a hydroelectric development without such an analysis. We must show that it is probably cheaper than any alternative method of generating the power.

Mr. SAYLOR. And in that you considered the evaporation losses of 95,000 acre-feet. Is that one of the considerations that you used in arriving at that conclusion?

Mr. DEXHEIMER. Yes, all of those factors are considered.

Mr. SAYLOR. Could you tell this committee why, since you have told us that water is so important, that a thermal unit which would save 95,000 acre-feet in that area would not be a suitable alternate?

Mr. DEXHEIMER. Our main purpose, of course, is to develop the water for beneficial use, not for the generation of power. We have primarily planned for that beneficial use, and the power then becomes an incidental thing in the planning, but a necessary thing in the financial aspects of the case, and also to meet the needs of the area for energy.

Mr. SAYLOR. There is no difference as far as the community is concerned in using 1 kilowatt produced from a thermal plant and 1 kilowatt produced from a hydroelectric plant, is there?

Mr. DEXHEIMER. Yes; there is some difference in cost. Generally the hydroelectric is cheaper, but the main thing, of course, is to develop the water resources and regulate them.

Mr. SAYLOR. I do not think we have in the record—did you tell us so far what the estimated costs of production of power at Glen Canyon Reservoir site are per kilowatt?

Mr. DEXHEIMER. As I believe the report shows, for the whole power-system study, including transmission lines and all the rest, a cost of around 7 mills per kilowatt-hour.

Mr. SAYLOR. That is not in answer to my question, sir. I would like to know what the cost of producing power is at Glen Canyon Reservoir site.

Mr. DEXHEIMER. I would have to be excused to look that up in the report. It is before you in the report.

Mr. HOSMER. Will the gentleman yield for a question?

Mr. SAYLOR. Yes.

Mr. HOSMER. Did I understand you to say that the entire system costs—and I presume by that you mean Glen Canyon and Echo Park——

Mr. DEXHEIMER. And the transmission lines and necessary features of the power——

Mr. HOSMER. Is 7 mills per kilowatt-hour?

Mr. DEXHEIMER. No; the overall cost.

Mr. HOSMER. What was that 7-mill figure you just gave? What did it refer to?

Mr. DEXHEIMER. I probably made a mistake on that question. The approximately 7 mills is the alternative costs of steam power in the area.

Mr. HOSMER. Yes.

Mr. DEXHEIMER. The cost of power in the report on page 50 is given for the 2 dams as 4.7 mills for Glen Canyon and 5.9 mills for Echo Park.

Mr. HOSMER. Then you say that the cost of thermal power in the area is 7 mills?

Mr. DEXHEIMER. 7.3 mills given for the whole system. On page 50 of our report (H. Doc. 364).

Mr. HOSMER. Does that take into consideration the fact that your thermal plant would be located at a closer point to the area of use of the power?

Mr. DEXHEIMER. Oh, yes.

Mr. HOSMER. And thus not require the transmission lines?

Mr. DEXHEIMER. Yes, they generally are, and in this case we considered they would be located near the load centers.

Mr. HOSMER. Then I would take it this is the high-cost area for the production of thermal power; is that right?

Mr. DEXHEIMER. No, I do not believe it is unusually high for the country as a whole.

Mr. SAYLOR. Mr. Commissioner, if you will recall the testimony last year when representatives of the public utilities in the area appeared and testified in this hearing, they were interested in purchasing the power provided it could be delivered by you at 6 mills in the load centers.

Mr. DEXHEIMER. No, sir, I do not believe that is correct. The power companies—and that now includes every single private utility in the upper basin, 10 of them—have in their combined statement before the Senate committee, as I recall, last week said that they were willing to buy any output that was available from these plants; they would also build the necessary transmission lines from our backbone system to get it into their system.

Mr. SAYLOR. We do not have the benefit of that testimony here before us, but I know that the testimony they gave before this committee last year was that unless it was sold to them at 6 mills at the load centers they were not interested.

Mr. Chairman, in view of the fact that these gentlemen are from Washington, I would reserve the right to ask further questions and proceed with the hearings so that several people here from out of town might be heard.

Mr. ASPINALL. The Chair appreciates that, and we will try to make arrangements to get all of the necessary information.

Mr. SAYLOR. I take it I am entitled to ask a series of questions rather than reply upon the report, questions that might be asked with regard to participating projects that are included in Mr. Larson's statement. I have not had a chance to go over them all in detail, but I read a good bit last night, and there are a number of questions I would like to ask Mr. Larson with regard to some of the participating projects.

Mr. ASPINALL. Perhaps some of those questions will be asked by other members as we go around. If the gentleman from Pennsylvania would note the other questioning, so we will not have to duplicate later on.

The Chair recognizes the gentleman from California, Mr. Engle.

Mr. ENGLE. No questions.

Mr. ASPINALL. The gentleman from South Dakota, Mr. Berry?

Mr. BERRY. No questions.

Mr. ASPINALL. The gentleman from Florida, Mr. Haley?

Mr. HALEY. Mr. Chairman, I would like to reserve my time, if I may.

Mr. ASPINALL. That is satisfactory.

The gentleman from Utah, Mr. Dawson.

Mr. DAWSON. Mr. Dexheimer, how long have you been with the Bureau of Reclamation?

Mr. DEXHEIMER. About 26 years.

Mr. DAWSON. What were you prior to the time you were named Commissioner of Reclamation?

Mr. DEXHEIMER. I was Assistant Chief Construction Engineer for the Bureau.

Mr. DAWSON. At Denver?

Mr. DEXHEIMER. At Denver.

Mr. DAWSON. And how long did you occupy that position?

Mr. DEXHEIMER. About 5 years.

Mr. DAWSON. And you were with the engineering division at Denver for the years preceding that including the time you mentioned you had been in total service for the Bureau of Reclamation?

Mr. DEXHEIMER. No. Most of my time has been spent in the field on construction of such works as Hoover Dam and Shasta and other works, and immediately before going back to Denver in 1947 I was a consulting engineer for the Chinese Government and the Export-Import Bank. Prior to that I spent about 4 years in the Army as an engineering officer.

Mr. DAWSON. So you have been an engineer practically all of your adult life?

Mr. DEXHEIMER. Yes, sir.

Mr. DAWSON. Will you tell the committee what type of work is done at the Denver office? Are all of the dams designed and plans worked up at Denver?

Mr. DEXHEIMER. All the major works are designed there. We have a few field offices that do some minor design work, but all of the dams are designed there, and not only for our own work, but we are designing dams for others—we designed the Falcon Dam for the International Boundary Commission of Mexico and the United States. We designed most of the TVA dams. We have designed dams for the Panama Canal, for many foreign governments, and to some extent have worked on designs at the request of the Army engineers and other Government agencies. Where we get money provided in advance, we do it for foreign governments. In some cases we do investigative work for the private firms where they cannot get it done otherwise.

Mr. DAWSON. Did you design the Hoover Dam and Parker Dam and Davis Dam?

Mr. DEXHEIMER. Those were all designed in Denver; yes, sir.

Mr. DAWSON. Now in the course of designing a dam, does your department take into consideration the condition of the rocks and foundations at these dams? Is that part of the design work?

Mr. DEXHEIMER. That is very definitely a part of the design work. We investigate it very thoroughly and usually have consulting boards outside of the Bureau pass their opinion on the adequacy of any of our larger structures.

Mr. DAWSON. During the long course of this experience, have you ever had a dam fail?

Mr. DEXHEIMER. No, sir.

Mr. DAWSON. And do you feel that the investigation which you have now made on Glen Canyon Dam is satisfactory, that a 700-foot dam could be constructed there safely?

Mr. DEXHEIMER. We have no question about that. We have probably done a little more investigation there than we have on similar structures in the past because of the time element, for one thing, and the fact that there were several proposed dam sites downstream that gave us some question. So we kept moving until we found this site.

We have no question but what it is entirely adequate for that height of dam.

Mr. DAWSON. Now, Mr. Commissioner, a letter was introduced in the record this morning dated October 26, 1954, signed by yourself and directed to Richard C. Bradley, Cornell University, Ithaca, N. Y., and a reading of the letter will disclose that the discussion was had in that letter in relation to the possibility of raising the dam from 700 feet up to an increased height and using that as an alternate for Echo Park. I take it that the whole contents of that letter were directed to the possibility of increasing the dam above the height of 700 feet; is that correct?

Mr. DEXHEIMER. That is correct. That has been the inquiry every since our hearings last year in which that was suggested as a possible alternate.

Mr. DAWSON. And while the figure of 700 feet was mentioned it appears obvious that the object you were discussing in the letter was the possibility of raising the Glen Canyon Dam about 700 feet. Perhaps on the second page the word "above" should have preceded the figure 700, but a full reading of the letter certainly discloses that was the intent.

Mr. DEXHEIMER. I think the letter—if I might have the committee's permission, I would like to put in the record at this point the letter which I gave you yesterday, dated February 24, 1955, which gives our present position on that particular phase of the height of Glen Canyon Dam.

Mr. DAWSON. Do you have the letter, Mr. Dexheimer?

Mr. DEXHEIMER. I have a copy here, which is our file copy. Yes, I have another copy of the letter here which I gave to the committee yesterday.

Mr. DAWSON. Mr. Chairman, I ask consent this be made a part of the record at this point.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

(The letter referred to follows:)

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
COMMISSIONER'S STAFF OFFICES,
Denver, Colo., February 24, 1955.

To: Regional Director E. O Larson, Presidential Hotel, 19th and I NW, Washington, D. C.
From: Assistant Commissioner and Chief Engineer.
Subject: Colorado River storage project.

As requested in the telephone call today by you and Mr. Bennett, I am enclosing a copy of the preliminary geological report of January 1949 on Glen Canyon Dam site.

In connection with a statement on the adequacy of the foundation rock at Glen Canyon Dam site, you are referred to my letter of July 1, 1954, to the Commissioner—subject, Colorado River storage project and possible alternative sites for Echo Park Reservoir—copy of which was sent to you in Salt Lake City. The third paragraph of this letter is quoted as follows:

"The engineering and geologic problems incident to construction of a dam at the Glen Canyon site have been discussed with regional Director E. O. Larson, and he is familiar with the conditions at this site. The views of this office, which I am sure are shared by the regional office, are that the 26 million acre-feet capacity shown in the reports on the Colorado River storage project represents the maximum justifiable size of this reservoir on the basis of preliminary studies and testing. Following authorization of the project, during the reconstruction

phase, additional detail study and testing will be carried forward for the Glen Canyon site. It is anticipated that these tests will confirm our present opinion."

Also there was the letter of November 30, 1954, from the Secretary to Mr. David R. Brower, with copy to you, the information in the third paragraph of which was furnished by my office. For your convenience the last two paragraphs of this letter are quoted as follows:

"On the basis of data available at the time of writing the 1950 report on Colorado River storage project and participating projects, a 700-foot dam (580 feet above stream level) at Glen Canyon was the maximum height which met the criteria of economy, safety of the structure, and adequate protection of the Rainbow Natural Bridge. Subsequent to writing the 1950 report on the Colorado River storage project, the Bureau conducted grouting tests in the drift tunnels driven 50 or more feet into each canyon wall of the Glen Canyon Dam site. Also, special bearing tests of 6-inch cores and large fragments of the foundation materials were made in the Bureau's Denver laboratory. The poorly cemented and relatively weak condition of the materials in comparison with the foundations common to most high dams has given the engineers who prepared the preliminary designs of the dam some concern as to the competency of the foundation to support any structure higher than 700 feet. Experiments to improve the strength of the foundation through a chemical grouting process were unsuccessful. These are the geological reasons why Commissioner W. A. Dexheimer made his statement in Denver about the limitation on the height of the proposed Glen Canyon Dam.

"Following congressional authorization, more intensive studies will be made of the foundation conditions and of the Bureau's preliminary design to secure information for the preparation of plans and specifications for construction of the Glen Canyon Dam. If such intensive studies indicate the advisability of modifying the present selected height of dam, appropriate changes will be made in the designs prior to construction."

The preliminary estimated cost for Juniper Dam with a normal water surface elevation of 6,118 is $6,282,000 and with a normal water surface elevation of 6,175 is $7,858,000. These are field costs for the dam, spillway, outlet works, and power penstock including 20 percent for contingencies. They do not include costs for a powerplant, engineering and overhead, rights-af-way, or relocations of utilities, if any.

L. N. McCLELLAN.

Mr. SAYLOR. If the gentleman will yield, it was the understanding, of course, that the Commissioner and Mr. Larson and his staff will have before this committee the information which Mr. Pillion asked for yesterday.

Mr. ASPINALL. That is correct.

Mr. DAWSON. Now, Mr. Commissioner, there has been a lot of propaganda distributed, particularly among the Members of Congress. I have an example here which states that this project is going to cost the taxpayers $4 billion, and that it would cost the American taxpayer $5,000 an acre to subsidize the proposed irrigation project. Have you seen this folder that I have here [indicating]?

Mr. DEXHEIMER. I just glanced at it this morning. It is the first time I have seen it.

Mr. DAWSON. Would you care to comment on the figures that are suggested here, $5,000 an acre for the irrigators?

Mr. DEXHEIMER. We have, of course, in our report an analysis which shows what the costs per acre are. I do not understand the methods the folder authors have used or the logic in arriving at their so-called subsidy. Nor do I understand the logic of their contention generally when they arrive at figures of that kind or that the interest should be started at the time the project is authorized on the full amount, and then compounded over a period of years, which I think is the method that they used in arriving at those figures.

Mr. DAWSON. Could you tell me what would happen if they used that same formula for flood-control projects, which are totally nonreimbursable?

Mr. DEXHEIMER. I think, without going into any computations, the figures on expenditures for flood control and other public works, if you applied interest on that basis, would be so fantastic that they would not be able to carry on any public works.

Dr. MILLER. Will the gentleman yield there?

Mr. DAWSON. Yes, I will be happy to yield.

Dr. MILLER. I have a table of Federal expenditures for water conservation and flood control projects by States up to June 1952.

It shows that in California the Corps of Engineers spent $366,981,500 for engineering. Of course, cost for flood control are not paid back, not 1 penny, in interest or principal.

California, at the same time, received $486,706,414 for the Bureau of Reclamation, and some of that was power and some was for irrigation purposes. Some of it, of course, is paid back.

Coming on down to the great State of New York, they received up to that time $296,384,400 for flood-control purposes of which not 1 penny is paid back. When you compound the interest, as Raymond Moley does in his fantastic approach to the cost of reclamation, you would find it would be almost prohibitive to begin to have flood-control projects because they pay not 1 penny of interest or principal.

Now down to the great State of Pennsylanvia. Bless their heart. They received $323,865,900 for flood control.

I wrote a letter to Mr. Moley and suggested to him that he take these figures and compound the interest, use the same formula and the same principal as used for reclamation projects and then write an article showing how much flood control costs. I think it will be rather amazing if he applies the same principles and the same formula.

We want to keep in mind that flood control—and I voted for it—does not pay back 1 penny.

The total amount spent by the United States for flood-control purposes is $7 billion—have you got $7 billion on that machine, Mr. Reporter?—$7,245,017,000. That is flood control alone, the Corps of Engineers.

The amount expended by the Bureau of Reclamation during that time is $2,158,185,988.

Mr. PILLION. Will the gentleman yield?

Mr. ENGLE. Will the gentleman yield?

Mr. ASPINALL. Just a moment, Mr. Dawson has the time.

Mr. DAWSON. I will let the gentleman finish his statement.

Dr. MILLER. Of course, that shows that flood-control features consume about three times as much as reclamation. Even then, if you wanted to add another fantastic picture to that, you could add up the money spent for the development for irrigation in foreign countries, which is a new fantastic story, that is not included in these figures here, where it shows we spent more money for flood-control and irrigation projects in thirty-odd countries in the world than we have spent in our own country.

I thank the gentleman for yielding, because I want to get that in, because Raymond Moley has written a fantastic and unbelievable story and spread this type of propaganda all over the country, that reclamation is something that is bleeding the country white. Bless

his heart, if we had not had reclamation and new land brought under irrigation, some of the people in the East and New York and other States would be starving to death because we have produced food on these projects, and when we produce food and bring in new resources, it brings in new manufacturing plants, it increases the new taxes these people pay.

In my own State of Nebraska, Scott's Bluff Valley project is a Garden of Eden because we have been able to develop irrigation projects and bring in new people, new industry, and new taxes.

It is the great strength and heart in the development of a dynamic country. So I hope as we go along that propaganda such as the gentleman from Utah has on his desk—and I have received them and have written Raymond Moley a number of times, showing, of course, where he was in error, and he will never admit that, naturally—that we will see less of that type of vicious propaganda and more of the truth, and let the light be spread and the truth be told about the cost of these projects, and compare them with flood-control costs. Then some of them who write this ought to hide their faces in shame because of the tremendous amount we are spending on flood control that pays out not 1 penny.

Mr. ENGLE. Will the gentleman yield?

Mr. DAWSON. I will yield to the chairman of the committee.

Mr. ENGLE. I am glad the gentleman from Nebraska mentioned the figures on flood control. I am glad also that he mentioned the expenditures that have been made in foreign countries for precisely the kind of projects we are talking about today.

In the past 5 years under the Marshal plan the United States Government has spent almost as much money in that time as we spent in a half a century of western reclamation, a large proportion of it for the development of irrigation and steam plants for the production of power in foreign lands, not one plugged nickel of which will be repaid to the Public Treasury.

Now it occurs to me that there has to be some kind of consistency in this business; that if it is right to spend money in foreign lands and it is good for them, and the American taxpayers do not get a cent of it back, that it ought to be good, too, for this country. If it is sound and proper to spend $7 billion on flood control, not 1 dime of which is returned, to be consistent, it is in the interest of this country to spend money, too, for the development of necessary and beneficial irrigation and power in our own country.

My comment to the gentleman with reference to that item is that those who sponsor that kind of thinking are interested not only in defeating this project, but in completely killing western reclamation.

Mr. DAWSON. I might inform the gentleman that this propaganda comes from the Colorado River Association at Los Angeles, Calif. [Laughter.]

Mr. ENGLE. Let me answer the gentleman that as a Californian I vigorously disapprove of it.

I thank the gentleman for yielding.

Mr. DAWSON. Now I will yield to my friend from Pennsylvania.

Mr. SAYLOR. I want to say to my good friend from Nebraska, if the time comes he ever wants to retire from the Halls of Congress, I would recommend him to the Commissioner of Reclamation as his

successor and put him on the lecture platform, because he does an excellent job.

Mr. DAWSON. I might say to the gentleman that is exactly the comment I made with regard to the gentleman from Pennsylvania's questioning, that it was purely a lecture.

Mr. THOMSON. Will the gentleman yield?

Mr. DAWSON. I yield to the gentleman from Wyoming.

Mr. THOMSON. I think this is an appropriate place to comment that Mr. Moley overlooked the fact that we put our oil royalties into the reclamation fund. Wyoming, I know, put over $101 million in since 1925. Probably our total reclamation projects do not equal that. I wish he would compute for us the compound interest on that and the Federal Government would give it back to us, and instead of having Hoover Dam, I am very sure we could build this and other projects we have necessity for.

Mr. DAWSON. Now this has tended to derail us from our questioning, Mr. Dexheimer. But yesterday the gentleman from California, Mr. Hosmer, requested that Mr. Larson present some sample of an analysis of a cost-benefit investigation. It was not my intention to deprive the gentleman of that. I only objected to him picking out one particular project which was out of your jurisdiction as one to use as an example.

Now, Mr. Larson, do you have an example that you might present of how you arrive at your cost-benefit ratio?

Mr. LARSON. Yes, sir. As I explained in my statement yesterday, we worked out—besides the repayment analysis as usual in the Bureau—a benefit-cost ratio. We do have an example worked out on the proposed Seedskadee project in Wyoming. It is a new-land project and would have about an 8-year construction period, and to get all the land under cultivation would require about a 10-year development period before the last block of land would be irrigated. The proposed Smith Fork, a supplemental project in Colorado, was worked out as another example to show the amount of interest compounded during the construction and payout period. The cost of the project on an annual equivalent basis was then offset by the annual benefits.

Mr. DAWSON. Do you have a copy of that analysis?

Mr. LARSON. We have sufficient copies for this committee.

Mr. DAWSON. Is this the one you want, Mr. Hosmer?

Mr. HOSMER. I do not know. I have not seen it yet.

Mr. DAWSON. Give him one.

(A copy of the document was handed Mr. Hosmer.)

Mr. DAWSON. I would like to ask, Mr. Chairman, this analysis be admitted at this point in the record.

Mr. ASPINALL. Is there any objection?

Dr. MILLER. I would like to look at it.

Mr. SAYLOR. Reserving the right to object until we see what we have.

Mr. ASPINALL. The gentleman from Pennsylvania reserves the right to object.

Dr. MILLER. I remove my objection because I understand it is material requested from the Commissioner, and he has prepared it and is ready to submit it for the record.

Mr. LARSON. May I correct the record, Mr. Chairman?

Mr. ASPINALL. The gentleman from Utah has the time.

Mr. DAWSON. Do you have something to ask, Mr. Larson?

Mr. LARSON. May I correct my statement? I said Seedskadee and Smith Fork. It is the Seedskadee and Silt projects.

Mr. SAYLOR. Might I ask, Mr. Larson, you did not prepare this since you were here yesterday, did you?

Mr. LARSON. No. This was prepared in my office before we came back here.

Mr. SAYLOR. Right. And you have available not just this one project, but you have cost analyses available for each and every one of the projects; is that correct?

Mr. LARSON. Not in this form, but we have made benefit-cost analyses on each project, as I reported last year giving the benefit-cost ratio. They are the same in my testimony submitted yesterday.

Mr. DAWSON. I take it, Mr.——

Mr. ASPINALL. Just a moment. The gentleman from Pennsylvania has the time. You yielded to him.

Mr. SAYLOR. I read over last night your report with regard to the participating projects, and I think almost every one had a cost-benefit ratio.

Mr. LARSON. That is correct.

Mr. SAYLOR. So that you do have, maybe not this exact form, but you do have some analysis for each one of your projects?

Mr. LARSON. Yes, sir.

Mr. SAYLOR. Then, Mr. Chairman, I will object unless they will submit not just this but all of the cost analyses.

Mr. DAWSON. I have no desire, Mr. Chairman, to pursue this. I am merely offering it for the benefit of the gentleman from California who requested it. So if you do not want the information in the record, I will withdraw my request to put it in.

Mr. ASPINALL. Will the gentleman from Pennsylvania yield to me?

Mr. SAYLOR. I yield to the chairman.

Mr. ASPINALL. Mr. Larson, is not this just the usual procedure that you follow in figuring the benefit-cost ratio on these proposed projects?

Mr. LARSON. Yes, sir. We simply wrote this up in language that we thought could be readily understood. It may be a little different than the agricultural economists use and repayment experts use in their analyses leading up to the summary statements that I submitted for each project.

Mr. ASPINALL. It shows the steps that you take in making your determination?

Mr. LARSON. Yes.

Mr. ASPINALL. I would suggest to the gentleman from Pennsylvania that it be introduced with that idea in mind.

Mr. SAYLOR. Mr. Chairman, I withdraw my objection and will ask this be admitted, or offer no objection to Mr. Dawson's admitting it. In fact, I ask unanimous consent that the Bureau submit in addition the same analysis they have for all the other projects.

Mr. DAWSON. This is not an analysis, Mr. Chairman, this is an illustration.

Mr. ASPINALL. The gentleman from Pennsylvania has withdrawn his objection to the introduction of this paper.

Is there any objection?

Hearing none, it is so ordered.

(The document referred to follows:)

ILLUSTRATION OF BENEFIT-COST ANALYSES, COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

The Seedskadee project in Wyoming, which would receive a full water supply, and the Silt project in Colorado, which would receive primarily a supplemental water supply, are discussed in this paper to illustrate the method of analyzing benefits and costs. The other participating projects of the Colorado River storage project have been analyzed on a comparable basis. The benefits are based on estimates of the difference between future conditions with and without the project. Consideration has been given to all project effects, beneficial or adverse. Project effects comprising increases or decreases in available goods and services are converted to monetary terms, so far as possible, by the use of market prices expected to prevail at the time when costs are incurred and benefits received. Both benefits and costs are computed over a 100-year period with the former adjusted for development period and the latter converted to an annual basis at 2.5 percent interest.

The Bureau of Reclamation identifies four classes of benefits from reclamation and these benefits are:

(1) Direct benefits which are benefits derived from increased production of farm products; increased production of electric power; reduction of damages from floods, salinity, pollution, and sedimentation; improvement of navigation, recreation, and conservation of fish and wildlife; provision of domestic, municipal, and industrial water; and other directly beneficial effects.

(2) Indirect benefits resulting from the direct benefits or from the project.

(3) Public benefits.

(4) Intangible benefits.

Direct irrigation benefits comprise the increases in family living, which include value of crops, livestock, and livestock products from the farm consumed by the farm family; value of other perquisites, such as rent of farm dwelling and cash allowance for family living expenditures; cash income after the preceding items and production expenses are deducted; and allowance for accumulation of equity in the farm investment. All of these items are derived from detailed farm budgets which are prepared for irrigation repayment analysis.

Indirect irrigation benefits comprise the increase in profits of all business enterprises handling, processing, and marketing products from the project and profits of all enterprises supplying goods and services to the project farmers. Indirect benefits are largely derived from the application of calculated factors to increases or decreases in the value of individual commodities listed in farm budget summaries.

Public irrigation benefits comprise the increase or improvement in settlement and investment opportunities, community facilities, and services and stabilization of the local and regional economy.

The annual tangible benefits from the Seedskadee and Silt projects are summarized as follows:

Class of benefits	Seedskadee project	Silt project
Irrigation benefits:		
Direct	$614,500	$108,900
Indirect	638,500	72,900
Public	313,100	16,000
Total	1,566,100	197,800
Fish and wildlife benefits	0	2,000
Total project benefits	1,566,100	199,800

Interest cost for the period of construction is added to the construction cost estimate for the benefit-cost analysis. No salvage value has been recognized in these projects because it would be of minor significance. An appropriate share of the storage costs of the Colorado River storage units is included in the economic costs of the participating projects because of their relation to replace-

ment storage. Construction cost plus interest during construction represents the net project investment cost at the beginning of the period of analysis. This figure is converted to an average annual equivalent cost. Operation, maintenance, and replacement costs calculated on an annual basis are added to the construction cost to obtain all costs for comparison with the benefits in the benefit-cost ratio. Costs of these projects are summarized as follows:

Item of cost	Seedskadee project	Silt project
Federal investment:		
Construction cost	$23,272,000	$3,314,000
Interest during construction	581,800	127,000
Total	23,853,800	3,441,000
Average annual equivalent costs:		
Federal investment amortized over 100 years at 2.5 percent	651,200	94,000
Average operation, maintenance, and replacement costs	136,600	8,400
Assigned costs of Colorado River storage project	276,000	14,500
Total	1,063,800	116,900

Benefit-cost ratios:

Seedskadee project ..... 1.46 to 1
Silt project ..... 1.71 to 1

In most situations the benefit-cost analysis should be considered along with other factors in determining whether or not a particular project is justifiable. This is due primarily to the difficulty of measuring some values which can only be treated as intangibles. Employment oportunities in the vicinity of Rock Springs, Wyo., near the Seedskadee project, or stabilization of the economy in the Silt project area resulting from a firmer water supply which in these projects were not included as public benefits are illustrative of intangible values not included in the benefit-cost analyses of these projects but which have some bearing on the overall appraisal.

Some misunderstanding, in a few instances, has developed with regard to interest costs or charges in the benefit-cost analysis. All interest costs on the total project construction cost, both during and after construction, are fully recognized and appraised in the benefit-cost analysis, even though as provided under reclamation law the irrigation investment is reimbursable on an interest-free basis.

While the benefit-cost ratio expresses in concise terms a comparison of benefits and costs, the attached table has been prepared to illustrate comparative benefits and costs on an annual basis. As shown in this table, interest costs during the construction and development periods are added on a compound-interest basis until such a time as the annual benefits equal or exceed the annual costs. Thereafter annual benefits are applied against the annual costs with any benefits in excess of costs being applied to reduce any cost accumulation. Beginning in about the 20th year of project operation, annual benefits exceed annual costs, including compound interest to that year, with a surplus of benefits as shown in column 15. Over a period of 100 years benefits would exceed all costs (interest and capital costs, as well as operation, maintenance, and replacement costs) and with a surplus equal to about 2½ times the original investment.

Mr. ASPINALL. Now does the gentleman still desire as far as possible the Bureau furnish additional information on the other projects?

Mr. SAYLOR. I desire additional information on the other projects.

Mr. LARSON. The summary of our benefit-cost analysis on all of the 11 participating projects and most of the others was contained in the individual statements submitted by me yesterday.

Mr. ASPINALL. I would suggest to the gentleman from Pennsylvania that he get in touch with the Commissioner during the intermission and see just what he needs. Would that be all right?

Mr. SAYLOR. Yes.

Mr. ASPINALL. With that in mind, the request is withdrawn at this time, and the gentleman from Utah will proceed.

Mr. DAWSON. Now, Mr. Larson, a question was asked concerning the amount of the water that we could use in the upper basin States without the construction of the storage reservoirs, and I think you stated that 58 percent of it could be used under certain conditions. Would it be possible for us to use 58 percent of our 7½ million acre-feet in the upper basin States without the construction of main storage reservoirs?

Mr. LARSON. Yes, you could build the participating projects with reservoirs wherever they were needed, and then you would have larger shortages during dry cycles. You would proceed much the same as the development in the past.

Mr. DAWSON. That is the point I am making: If you had a dry cycle similar to the type we had between the period 1931 to 1940, would it be possible for us to use that water and keep our commitments to the lower basin?

Mr. LARSON. Not a full supply. You would have suffered very severe shortages, as indicated by the fact that the historical flow at Lee Ferry in 1934 was only slightly over 4 million acre-feet.

Mr. DAWSON. So then, as a practical matter, it would not be feasible to even attempt participating projects without these storage reservoirs?

Mr. LARSON. It would not be the feasible thing to do because, if you proceeded along that line, then it would be difficult and maybe impossible to fill your large reservoirs if you tried to build them later.

Mr. DAWSON. How much could you have used in the year 1934?

Mr. LARSON. You could have used a small amount, but it would not have been very much. You would have suffered a very severe shortage.

Mr. DAWSON. Was it not in 1934 the Colorado River reached probably one of its lowest ebbs, down in the neighborhood of 5 million acre-feet?

Mr. LARSON. Yes, a little over 4 million.

Mr. DAWSON. So, as a practical matter, there would not be any water available to the upper basin States during that period of time; is that right?

Mr. LARSON. Well, under the provisions of the compact, they may have been able to divert water in some places, but there would have been a very severe shortage, maybe 50 or higher percent shortage for most of the projects that would have been undertaken.

Mr. DEXHEIMER. May I expand on that a little bit?

Mr. DAWSON. Yes.

Mr. DEXHEIMER. We do not think it is a proper or a practical thing to do it, nor would we attempt to develop an irrigation project which would be extremely short in years of short water supply or runoff. Therefore, we would not recommend any such developments without storage because you would have crop failures or complete or partial loss in those years, and certainly it would not be a feasible thing to do from a farming standpoint, nor from the standpoint of repayment ability.

Mr. DAWSON. Mr. Larson, in regard to the portion of the costs which the irrigators are bearing in the participating projects, do you take into consideration the industrial and domestic uses as well as the use by the irrigators?

Mr. LARSON. Yes, sir.

Mr. DAWSON. And if that is taken into consideration, would that affect the cost per acre of the land to be irrigated?

Mr. LARSON. It would not affect the cost per acre allocated to irrigation, but it would change the figure entirely of the percent that the project is repayable if it had power and industrial water.

Mr. DAWSON. In other words, assuming we take the Central Utah project, for instance, if we took into consideration the amount that the domestic and industrial users are using, and also if we applied the power revenues from the Central Utah on the cost of that participating project, and it all went into the one project, approximately how much of the total cost of the Central Utah would that participating project be bearing?

Mr. LARSON. 61.6 percent of the Central Utah project's initial phase would be repayable if the power revenues are retained on that project from its own powerplants until the last irrigation block is paid out and if you take into consideration the portion of water allocated for municipal and industrial use and all revenues were retained on the project.

Mr. DAWSON. And if you took the 61 percent figure and applied that to the cost per acre, if you followed a theory similar to Mr. Moley's, could you come up with a figure of what it might cost per acre on that land? That is, if you took all of those revenues and applied them in there?

Mr. LARSON. I do not know that I get your question.

Mr. DAWSON. Perhaps I have not made it clear. I call attention to the fact there has been some rather fantastic figuring done here in arriving at a cost per acre. My point is this: If you took all of that revenue in the participating projects and then applied it to the total acreage——

Mr. LARSON. Oh, yes, then you get a large figure, of course, which to me is not representative and does not mean much. In other words, you take the total cost of the project and divide into that total the number of acres, and you get a fantastic figure because that does not take into consideration the portion of the project costs allocated to power and paid out by its own powerplants, and the cost allocated to industrial and municipal water, which bears interest like power and which is paid out by those municipal and industrial users.

Mr. DAWSON. Mr. Larson, I want to ask you the same questions I did Mr. Dexheimer. How long have you been with the Bureau of Reclamation?

Mr. LARSON. About 32 years.

Mr. DAWSON. During the course of that time have you had general supervision over construction of various dams within your region?

Mr. LARSON. Yes, sir, construction and all planning activities, and also supervision of the operation and maintenance which now includes some 20 reclamation projects in region IV.

Mr. DAWSON. Have you ever had a dam fail in your region?

Mr. LARSON. No, sir.

Mr. DAWSON. That is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. I just have one or two questions, Mr. Commissioner. What is the present status of the planning and the report on the Navaho project?

Mr. DEXHEIMER. We have the Commissioner of Indian Affairs, Mr. Emmons, here, who is available to testify regarding that project. It is well along.

Mr. UDALL. It is well along. I am speaking, of course, from the engineering standpoint.

Mr. DEXHEIMER. Yes, the report is here.

Mr. UDALL. And if the project were authorized, there would not be any substantial delay you can foresee as far as that project?

Mr. DEXHEIMER. The only delay would be a question of when funds are available to go ahead.

Mr. UDALL. That is all I have, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Washington, Mr. Westland.

Mr. WESTLAND. Mr. Commissioner, I am particularly interested in the method of repayment on these projects, and particularly in the apparently new theory which is included in the bill which the chairman of this subcommittee has introduced, where, as I understand it, he would make concurrent repayment, that is, both irrigation and power repayments concurrently, and that thereby those repayments might extend over a period of a hundred years.

The first question I would like to ask is, under that plan would there be less or more of a subsidy to agriculture or to irrigation?

Mr. DEXHEIMER. There would be somewhat less of so-called subsidy to irrigation because of the concurrent pay-out features.

Mr. WESTLAND. On irrigation features?

Mr. DEXHEIMER. Yes.

Mr. WESTLAND. Has the Department ever considered this?—the Federal Government is in the position of loaning a certain amount of money, you might say in the position of a lender, in the construction of this project, and for the large portion of it they are going to be repaid with interest, and for another portion of it, approximately 30 percent, they are going to be repaid without interest.

Now, from the standpoint of a lender, certainly you would like to get the money back first which is out not carrying any interest. Has the Department considered the feasibility of repaying that portion that is allocated to irrigation first, or in repaying that part that is allocated to irrigation while at the same time paying, let us say, the interest and whatever other funds might be available on the power projects?

It would seem to me that if that sort of a thing were done one of the big objections to this project, which is subsidy, would largely be eliminated. I wonder if any consideration has been given to that sort of thinking?

Mr. DEXHEIMER. We have considered it under, of course, the terms of Mr. Aspinall's bill, which provides for the concurrent pay-out. I do not know if we have an analysis for this particular project of paying all of the irrigation out first.

Mr. DAWSON. Will the gentleman yield to me?

Mr. WESTLAND. Yes.

Mr. DAWSON. Is there any difference in this project as far as the subsidy feature is concerned than any other reclamation project we have had in the past?

Mr. DEXHEIMER. None whatever, except this pays out a little quicker than many of them.

Mr. WESTLAND. I understand that. I voted for this bill a year ago. But one of the objections to it has been the subsidy, and it is a constant objection to any irrigation program, the subsidy, the interest on the amount of money that is spent for irrigation. Now in this case, as I understand it, you would build first Glen Canyon and then you would build Echo Park, so that you would have your two power-producing facilities built first. Is that correct?

Mr. DEXHEIMER. That is correct.

Mr. WESTLAND. And then the participating projects with their irrigation features would come along later?

Mr. DEXHEIMER. Yes.

Mr. WESTLAND. So that the income from the power facilities would be in operation at the time the irrigation facilities were built. Is that not correct?

Mr. DEXHEIMER. Generally speaking, yes, they would be.

Mr. WESTLAND. Then what is wrong with taking the income from the power-producing facilities and applying that to the irrigation costs which are noninterest bearing and return that money to the Federal Government first?

Mr. LARSON. With 11 participating projects paid out concurrently, you could do that and pay off power in less than 100 years. But the one disadvantage of that plan is that you cannot take on more than the 11 projects without raising the power rate, if additional projects are developed while the power is taking 100 years to pay out, the higher you have to raise the power rates. The higher power rate is the one trouble we get into, depending on how many projects you add.

Mr. WESTLAND. I am no financial expert, but it seems to me you still have the same number of dollars to repay—$930 million estimated total cost of this project. And whether you pay the irrigation costs or the power costs first, I cannot see it would make any difference in the number of dollars or in the number of years.

Mr. DEXHEIMER. The only difference, of course, is the interest on the interest-bearing parts of it, which limits the overall financial aspects of it. You have to bear that interest cost, of course, for a long period of time. Therefore, it limits the number of other things you can do.

Mr. WESTLAND. I would like to explore this further at a later time, Mr. Chairman.

Mr. ASPINALL. Will the gentleman yield to me?

Mr. WESTLAND. I was sort of hoping you would ask me to.

Mr. ASPINALL. I would like to talk to the gentleman at his convenience. I have a chart which I think will explain and which maybe later on we will want to discuss in the committee.

Mr. WESTLAND. Fine. That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from Oklahoma, if he desires any time.

Mr. EDMONDSON. No questions.

Mr. ASPINALL. The Chair recognizes the gentleman from New York, Mr. Pillion.

Mr. PILLION. Mr. Commisisoner, do you have any idea or any estimate of the possible devaluation of the dollar over the course of the next hundred years?

Mr. DEXHEIMER. We have the predictions made by economists that we look at. We have not made any ourselves.

Mr. PILLION. Is one of your economic theories that we are inflating at an approximate rate of 2 percent per year? Is that about a normal prediction for inflationary tendencies and for devaluation of the purchasing power of the dollar?

Mr. DEXHEIMER. Personally, I have no convictions on that. We have seen in the past 20 years such wide fluctuations that I think any predictions are just a matter of judgment.

Mr. PILLION. If we were to assume that 2 percent is a normal rate of inflation or normal rate of devaluation of the purchase price of the dollar, and we could compound that over a period of 50 years or even 40 years, at the end of that time—let's not take 100 years because that would be strictly fantastic—but over the period of 40 or 50 years the money that would be received back by the Government would be practically zero in comparison to the value of the dollar when it is given out as of today or tomorrow.

Mr. DEXHEIMER. I think a very good illustration of that probably was the reverse. Where people bought Government bonds in the early 1949's, cashed them in 10 years later, they were able to purchase much less with the money they received even though they had interest on it.

Mr. PILLION. So when we are figuring out the return to the Government or the return to the taxpayers of the United States of the reimbursable costs here, we have not taken into consideration that tendency of inflation or for inflation we are in at the present time and in the foreseeable time. Is that correct, Mr. Commissioner?

Mr. DEXHEIMER. We do not recognize those things at all in our work. We work on present-day prices and costs.

Mr. WESTLAND. Will the gentleman yield there?

Mr. DEXHEIMER. We feel, of course, that the value of those projects will go up the same way as the value of real estate or any other sound investment.

Mr. PILLION. That value, of course, Mr. Commissioner, would inure to the beneficiaries directly of that project rather than to the taxpayers of the United States as a whole who would receive back dollar for dollar even though the dollar may be of less value. Is that right?

Mr. DEXHEIMER. Well, it largely would accrue to the benefit of the beneficiaries of that particular project. We might take an example of Hoover Dam, where the contracts were negotiated in 1936 for a rate for power. Although they have been renegotiated, certainly they are getting a great advantage of the cost of developing that project as against what it would cost to do it today.

Mr. PILLION. I yield to the gentleman from Washington.

Mr. WESTLAND. The Commissioner has largely said just what I was going to say—that the theory which you have put out is an excellent one as far as buying, perhaps, a fixed income bearing security such as happened in the case of buying the Government bonds, which most of us bought during the war period, and perhaps some of us still are continuing to buy. But where you buy tangibles, then that tangible will increase in value during the period of that inflation, and in spite of the fact that the taxpayer may get a depreciated dollar back, this project is owned by the Federal Government and that increase in value would at the same time benefit the entire Nation or the taxpayers of the country.

Mr. DAWSON. Will the gentleman yield to me?

Mr. WESTLAND. In fact, it is a better thing to put those dollars into tangibles if you are going to have inflation rather than let them sit.

Mr. PILLION. I yield to the gentleman from Utah.

Mr. DAWSON. Do you have something, Mr. Dexheimer?

Mr. DEXHEIMER. Might I add to that, those inflated values, of course, are controlled by the Federal Government to get their proportion back through the method of Federal income taxes. The taxes that we paid in the 1930's, of course, have no relation to the taxes that are paid today. I would say on an average that every one of the reclamation projects, each farm thereon contributes an average of a little over $1,200 a year in Federal income taxes alone, which would not have been contributed at all had that development not been made.

Mr. PILLION. Is the gentleman from Utah through?

Mr. DAWSON. I just want to pursue that further. As I understand it, the costs to build Hoover Dam, for instance, are just about double today what they were at the time Hoover Dam was constructed.

Mr. DEXHEIMER. About 2 4/10.

Mr. DAWSON. 2 4/10?

Mr. DEXHEIMER. Yes.

Mr. DAWSON. 2 4/10 times?

Mr. DEXHEIMER. Yes.

Mr. DAWSON. So that is the very argument that we are making now. Now is the time to build these dams. If we are going into an inflatory cycle, we had better build them now, that is, if we are going up 2½ percent each year. [Laughter.]

Mr. PILLION. That is just the point I was making.

Mr. DAWSON. I am through.

Mr. PILLION. Mr. Commissioner, I think you have answered this question before, but the relative construction schedules of Echo Park and Glen Canyon is what? Which construction would have priority?

Mr. DEXHEIMER. Essentially under the plans submitted we would build them almost concurrently. If we had a choice, we would probably start with Glen Canyon. If we had to make that choice.

Mr. PILLION. You could build Glen Canyon and complete it before you started Echo Park?

Mr. DEXHEIMER. Yes, it would be possible if our appropriations or authorizations were such.

Mr. PILLION. I would like to refer you to Mr. Larson's statement, the end of his statement, table 1, which is about page 19. It is not numbered, but there are 17 pages included in the statement, and then the first map, and then the table.

The first storage project there is the Echo Park unit, which has a generating capacity of 200,000 kilowatts at a total cost of $176 million. Figuring out the cost as against the capacity, you have a cost of about $880 per kilowatt-hour capacity for Echo Park; is that about right?

Mr. DEXHEIMER. No, sir. A large part of the costs are for conservation storage rather than directly chargeable to the power features.

Mr. PILLION. I see. Suppose you take the figure then of the power feature itself, which is $128 million. That is broken down between the power and the irrigation. Then that would give you a figure of approximately $600 per kilowatt capacity; is that correct?

Mr. DEXHEIMER. Yes, sir.

Mr. PILLION. Now the next project is that of Glen Canyon, which has a rated generating capacity of 800,000 kilowatt-hours, and the total cost of the power phase of that is $370 million, which gives you an approximate cost per kilowatt capacity of $450; is that correct?

Mr. DEXHEIMER. Yes, sir.

Mr. PILLION. Now if Glen Canyon could be built without Echo Park at $450 per kilowatt capacity as against $600 per kilowatt capacity for Echo Park, why should the two be built at one time and thus increase the cost of the electricity for the consumers and the users in that area?

Mr. DEXHEIMER. Actually the two reservoirs would be operated in conjunction.

Mr. PILLION. I understand.

Mr. DEXHEIMER. Not only for conservation storage and to meet the commitments under the compact, but for power generation, and these costs that you are mentioning include the necessary transformers, substations, transmission lines to tie them together. The figure, of course, if you built one of these alone, would be somewhat different because you would have to go through the——

Mr. PILLION. I understand, but substantially they are correct. Substantially they could be built separately; could they not?

Mr. DEXHEIMER. Yes.

Mr. PILLION. The addition of Echo Park then to this whole project, instead of increasing the financial feasibility, actually decreases the financial feasibility of the project?

Mr. DEXHEIMER. No, sir. You are talking about power features alone when you make this analysis on power.

Mr. PILLION. Yes.

Mr. DEXHEIMER. The necessary conservation of water and the exchange aspects of the water are the ones that make these reservoirs necessary, the two together, and particularly Echo Park. The further development of the whole Basin to utilize the water is the essential part.

Mr. PILLION. Is there any reason why Glen Canyon could not be built alone and have that operate, and out of the income or the profits of that operation, why, some of the other reclamation or irrigation projects could not be financed at a later date rather than putting them all in at one time? Why would it not be feasible to build just the one and see how it works out?

In other words, we have two projects. One would cost $450 per kilowatt and the other $600. As an ordinary business proposition, you would not want to build them both, but the one you could build for the cheapest price possible.

Mr. DEXHEIMER. Our particular function is not to go out and build power projects at the cheapest price possible. We have a plan here for the development of the water resources and to put them to beneficial use. If you were a power company going to develop purely power, you probably still would not develop Glen Canyon alone but as we have suggested it here because this is tied in with the compact commitments to the lower basin.

Mr. PILLION. Yes, I understand that you tried to make maximum use of the water. However, from an economic point of view, from the standpoint of return of the dollars and the greatest economic good at the least cost to all the people of the country, is it not the dollars

that make the difference as to whether a project is economically feasible rather than the mere use of water, even though it becomes an uneconomic use?

Mr. DEXHEIMER. I think you lose sight of the overall desirable economic development of the Nation, which includes the use of its water resources in areas where the water is short, to the maximum benefit, and I think the benefits of those things outweigh the necessity for developing purely the cheapest possible means of developing power.

Mr. PILLION. I might just say, in answer to your statement, Mr. Commissioner, that I do not think I have lost sight of the economic development of the whole country, excepting that perhaps we differ in this respect: that I believe the economy of the country should be built and developed by its citizens rather than by the Government or, you might say, its bureaus. I believe that we can get the best and most economic development through private capital and private industry wherever possible.

Mr. DEXHEIMER. I think that is true to the extent——

Mr. PILLION. I would like to make that distinction.

Mr. DEXHEIMER. To the extent that the people locally could carry on their projects. But ever since this Government was established, it has been apparently necessary, and certainly a policy, to do those things which the people apparently could not do for themselves, such as flood control, navigation, some of the irrigation projects, harbors, building roads, mapping the country, and so many things that the Federal Government has been doing. This is just one very small aspect of the overall picture.

Mr. PILLION. I might say also, Mr. Commissioner, that I believe that perhaps the governmental units at a level other than the Federal Government could possibly manage to develop some of these areas. I am thinking now of States themselves. Has there been any thought given to permitting States to develop some of these projects?

Mr. DEXHEIMER. I would say that of the 26 million acres under irrigation in the West only about 7 million have been developed by the Bureau of Reclamation, the others either by private, State, or local groups. That is continuing. That is being encouraged. To the largest extent possible we expect local people to take over their responsibility. But so many of these things seem to be beyond their capacity, and, even in your own State of New York, I do not believe you have a water code under which a local person could develop their own irrigation or water supply for something of this kind. Some States have been quite backward in carrying their part of these burdens.

Mr. PILLION. Mr. Commissioner, I suppose that the irrigation projects here will improve the lands and increase the values of the lands to be irrigated?

Mr. DEXHEIMER. They will very much improve the land and change probably in many areas the cropping pattern, but more importantly, they will provide a few very small areas in a vast region of grazing, cattle raising, and other dryland farming and make more stable the economy of the overall picture.

Mr. PILLION. And the results, of course, I suppose will be reflected eventually in the increased value of the lands to be irrigated.

Mr. DEXHEIMER. That is correct.

Mr. PILLION. I would like you to refer to the Hammond project, which is the last of the 11 participating projects. That is on the same table, table 1.

Mr. ASPINALL. If the gentleman will yield to the chairman, it is 12 o'clock and the House is in session. The chairman of the full committee has secured permission for us to meet this afternoon for 2 hours between 1:30 and 3:30.

The Commissioner of the Bureau of Indian Affairs and his staff will have the first time at 1:30. Then we will resume our questioning of the Commissioner of the Bureau of Reclamation and his staff. That will be the order unless there is some objection.

Hearing no objection, it is so ordered. The committee stands in recess.

(Whereupon, at 12 noon the subcommittee recessed to reconvene at 1:30 p. m. of this same day.)

AFTERNOON SESSION

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for the further consideration of the bills having to do with the authorization of the upper Colorado River program.

At this time I would like to make an announcement to the effect that when today's session ends we shall discharge the Bureau witnesses for the time being. We will proceed with the program as it has been set up for the next 6 days, beginning tomorrow morning, with the proponents having the first 3 days and as much time as we can get in the afternoon, and with the opponents then having the days allotted to them with as much time as it is possible to get. We are not always sure when we begin an afternoon session just how long we may be able to continue. This afternoon we have permission, but a rollcall would, of course, cause an adjournment of the session.

I would suggest to those who wish to testify tomorrow that they leave with the staff member, Mr. McFarland, a copy of the statement which they expect to use tomorrow, that they leave them tonight before adjournment, so that any member of this committee who wishes to have those statements before the beginning of tomorrow's session will be able to have them. I intend to stay just as nearly within the time limits as have been determined as we can possibly do because we only have a very limited amount of time.

To the representatives of the Bureau of Reclamation, it will be necessary, I expect, to have you appear before at least a part of this committee later on, but you will have a week or 10 days' notice so that you can bring your people in from out of town.

At this time I will ask Commissioner Emmons of the Bureau of Indian Affairs, with his staff, to present themselves before the witness stand.

Mr. Commissioner, we are glad to have you here, and as I understand it, you have a statement to which you wish to refer in your presentation. Is that right?

Mr. EMMONS. Yes, sir.

Mr. ASPINALL. As you begin your testimony, Mr. Emmons, it is my understanding that you will testify as to claimed Indian rights and possible Indian rights to the waters of the Colorado River, that you

or members of your staff may refer to the proposed Navaho project, and that it is your understanding that the Navaho project report has not yet been circulated among the various States interested and is not before the committee at this time for any final or any degree of consideration on engineering feasibility. Is that correct?

Mr. EMMONS. That is right, sir.

Mr. ASPINALL. You may proceed.

STATEMENT OF GLENN EMMONS, COMMISSIONER OF INDIAN AFFAIRS, ACCOMPANIED BY G. B. KEESEE, IRRIGATION ENGINEER, NAVAHO RESERVATION; AND W. L. MILLER, CHIEF IRRIGATION ENGINEER, BUREAU OF INDIAN AFFAIRS

Mr. EMMONS. Mr. Chairman and members of the committee, my purpose in coming before you here today is to give you my views, both as Commissioner of Indian Affairs and as a longtime friend of the Navaho people, concerning the proposed Navaho Dam and irrigation project which is included as part of the program embodied in several bills which you now have under consideration.

Although I have known the Navaho people and their problems rather intimately since 1919, the proposal to develop a large irrigable area south of the San Juan River predates me by quite a bit. In fact, it goes back to the early years of the present century. During this whole period the people of northwestern New Mexico, both Indian and non-Indian, have been waiting sometimes patiently and sometimes eagerly, for this great project to become a reality.

A feasibility report on the Navaho project, which consists of the Shiprock and San Juan divisions, has been prepared by the Bureau of Indian Affairs and is now under review by the Department of the Interior. It has not yet been submitted, as required by law, to the other interested agencies of Government and to the governors of the States concerned.

Other witnesses who are present here are far better qualified than I am to testify on the economic and engineering aspects of this proposal. My primary aim will be to bring out some of the nontechnical considerations which I believe are fundamentally important. More specifically, I want to emphasize how tremendously desirable I think this project would be in terms of the future welfare of the Navaho Indian people.

First, I would like to put the Navaho project in the framework of the total program to help the Navaho people in solving their more urgent problems. The distressing poverty which prevails among the Navaho people today is primarily a result of the lack of balance between the rapidly increasing population (which now numbers around 75,000) and the resources upon which they depend for support. As the population has expanded—it has grown 600 percent since 1868 when the Navahos were released from Fort Sumner—the basic standard of living has declined. This central problem was recognized by the departmental report of March 1948, which led to the enactment of the Navaho-Hopi Rehabilitation Act of 1950. In that act there is a strong implication that construction of the Navaho project is an indispensable

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element in any sound approach to a solution of the total Navaho problem. The departmental report of 1948 lay great stress on the project as a feature of Navaho economic rehabilitation. The act of 1950 provided an authorization of $9 million for reservation irrigation projects and for study of the Shiprock (or, as it is now called, the Navaho) project.

At this point, however, I want to emphasize that in dealing with the complex and many-sided problem of the Navaho people, we are not relying on any one line of approach. It is abundantly clear that only by a comprehensive and concerted program can we hope to make real progress. As you all know, we recognize the fundamental importance of education and, through our Navaho emergency education program, we have provided schooling this year for more than 8,000 additional Navaho children who had never previously seen the inside of a classroom. We are emphasizing adult training and helping in the relocation of those who want to move off the reservation in search of better job opportunities. We are, in every possible way, encouraging the development of industry and business and thus opening the way to increased Navaho employment in the immediate area. And there are the emphases that are being given to preventive medicine and to resource use and conservation.

But frankly, I do not see how, basically and in the long run, we can hope to solve the Navaho problem, without the Navaho project. In placing 1,110 Navaho families on the proposed project, we foresee several primary and secondary results. Another 2,220 families will find employment in service and other activities. This means that a total of approximately 18,000 Navaho men, women, and children, in addition to 2,000 non-Indians, would be direct beneficiaries of the project. The indirect benefits would be even more far-reaching. Present pressure of overuse of the Navaho Reservation range would be substantially relieved. Schools for this population (farmers and nonfarmers alike) could be built on a day-school basis instead of the expensive boarding-school basis on which we are now forced to operate. Every social service, to which the Navahos located on or near the project are entitled could be more efficiently and economically administered. I foresee that the Navaho project would have profound, far-reaching, permanent, and expanding influence in helping the tribe find economic stability.

The Navaho Tribe, as you know, is the biggest one in the country. Its problems, as a whole, represent the biggest single complex of Indian problems, with which the Congress and the Bureau have to deal. We have all been acutely aware of this fact since the great blizzard of a few years ago which swept the Navahos onto the front pages of the national press. National interest in the Navaho has remained constant, as I can well attest since I came to Washington. If, with the assured support of the Navaho people themselves, we can set this fine group of people on the road to economic self-sufficiency, we will be meeting the expressed wishes of the American people. In this task, as I have said, the construction of the Navaho project is an indispensable feature, because it represents the largest and most feasible economic potential in that entire distressed area.

I urge you to consider the factor of cost in a broad framework. I don't know how many millions of dollars have been spent over the years, not only in meeting the basic human needs of the recurring

crises in Navaholand, but in carrying the essential services of welfare and administration. As I said earlier, I have lived intimately close to this situation for years. I know that the total cost expended by the Federal Government must have run to a gigantic figure.

The question I would raise is whether it may not be better to make the kind of investment which is here proposed rather than to go on as we have in the past?

There is more involved here than cost, that is, the human need of the Navaho people. The Navahos have lands aggregating 16 million acres; yet the astounding fact is that out of all the vast territory, only 21,500 acres can be hazardously dry-farmed. Apart from the Navaho (Shiprock) project, there is only a total irrigable acreage of 58,900 acres, of which 36,600 acres are actually irrigated on some 73 projects ranging in size from 20 to 6,500 acres. Of these projects only 9 have an assured water supply either from storage or perennial flowing streams or springs. The remainder receive their supply by diverting the intermittent flows resulting from normal rainfall.

From every point of view, I believe it is far better to invest in Navaho economic rehabilitation than in Navaho relief, in permanent stability than in the present ever-worsening instability and frustration. The Navaho project offers us the best and largest opportunity of striking out in that direction.

One important question that needs to be faced, of course, is whether the Navaho people can and will farm the land productively once it is developed? For an answer, we have two things to go on—our past experience and the training plans we have in mind for the Navaho before they go onto this project—it is constructed.

Let me mention first our past experience.

As you fly into Farmington, N. Mex., after passing over the dry eroded area to the south, you see a ribbon of green all along the San Juan River. This, in other words, is a prosperous valley. It was a prosperous valley even before the recent coming of gas and oil development, uranium mining and processing, and helium production in the area. Some Navaho Indians have had real experience with irrigation on the Fruitland and Hogback projects and are contributing substantially to the agricultural production of the valley.

It can be said that the two Navaho irrigation projects on the San Juan—Fruitland and Hogback—are producing annually more than $300,000 worth of crops from a total of 7,669 acres. Both projects are seriously handicapped because of the small acreage allotted to the Navaho families—11 acres on the Fruitland and 7½ acres on the Hogback. The reason we have such farm acreage is because of decisions made years ago to crowd as many Navaho families onto the land as possible on a subsistence basis. This scheme has not worked, because the Navaho irrigationists have had to leave their farms to seek transient labor off the reservation. Nevertheless, on the Fruitland project 93½ percent of the land was in use last year and only 6½ percent idle. This compares with the usual experience of 10 percent idle land on Bureau of Reclamation projects. On the Hogback project, the idle acreage was larger—a little over 20 percent—due directly, I believe, to the almost impossible small 7½-acre farm units. With the construction of the new Navaho project it will be possible for us to enlarge the farm units on these two projects. Our experience, however, in spite of the heavy handicap which I have indicated, proves

that the Navaho Indian can and will become an irrigation farmer, as he is now doing with more success than we could reasonably expect under the circumstances, raising alfalfa, corn, beans, small grains, fruit, and garden vegetables. The Navaho has a strong feeling for the land and its use, and I am wholly convinced that, given the opportunity and the training, he will be successful on this great project.

It is clear, however, that we must have Navaho operators prepared to use the land properly when this great project is completed. Navahos will be eagerly waiting for the opportunity to move onto this land; but more important, they must know how to operate and manage an irrigated farm unit. It is of utmost importance, therefore, that we anticipate this need and provide as a corollary to this project a well-planned educational training program to give Navahos the know-how to use the land when it is ready.

Anticipating this need for trained operators, we have prepared the blueprints of an education-training program that will be geared both directly and indirectly to this project. The training program objectives are threefold:

1. Eradicate illiteracy and raise the general educational level of the Navaho people.
2. Carry out a well-planned adult-training program in the practices and techniques of irrigated farming for Navaho adults interested in locating on irrigated land.
3. Prepare future operators through high-school programs of vocational agriculture.

A goodly number of the first occupants of this land will be Navaho adults who will receive assignments. These adults for the most part will have had no previous experience in this type of farming. We have planned an intensive adult-education program for these future farmers—a program which we hope to carry out by using Indian land on the Fruitland and Hogback projects and school farms as laboratories for the demonstration and practice of effective farming techniques. We plan to seek the cooperation of State and local agencies, agricultural colleges, extension agents, and soil scientists in carrying out such a program. We are already doing this type of cooperative education in a limited way at our Stewart agency in Nevada.

Finally, I would like to mention the possibilities for future economic development which I can visualize in the entire San Juan Valley area above Shiprock. It promises to become one of the really balanced economic areas—industrially and agriculturally—in the whole Southwest.

I have mentioned the past, though modest, success of irrigation farming based on the use of the waters of the San Juan. In recent years, we have seen the vast and important development of gas deposits. We have seen the area intimately linked with the extraction of uranium on the Navaho Reservation. We have seen the construction of a uranimum processing mill and testing plant and the reactivation of the helium processing plant at Shiprock. We know that private industry is working towards the development of the great coal deposits near the area. Construction of homes has kept abreast of the growing population. The Navaho Tribe built a modern motel at Shiprock; it is full every night and will have to be enlarged. We have seen the town of Farmington grow from 3,600 to 12,000 in the past 5 years.

The area is richly endowed. It is coming into its own. It has natural energy in its coal and gas resources. It has manpower in its Navaho people. It has water in the San Juan River.

The Navaho Dam and irrigation project, if built, will give vast and growing impetus to the whole economic life of northwestern New Mexico.

For centuries, the Navahos have lived along the San Juan River. To them, it is "our river," yet they have been most reasonable and practical in recognizing the needs of the Rio Grande Valley, and they have shown a willingness to work cooperatively with the State of New Mexico in developing a broad plan for the use of the unused waters of the San Juan.

The decision is in hands of the Congress. In these remarks, I have emphasized the indispensable place which the Navaho project has in the solution of the Navaho Problem, a broad perspective on the matter of construction costs, the past experience of Navahos in irrigation farming in the San Juan Valley, our planning for training and preparing Navahos for resettlement, and the developing economy of the San Juan Valley, which needs the project and can benefit most effectively from its construction. I earnestly hope that all these matters will have your most thoughtful consideration.

Thank you.

Mr. ASPINALL. Thank you, Mr. Commissioner. We are very appreciative of having you here at this time to speak on this part of the program.

Mr. EMMONS. Thank you.

Mr. ASPINALL. We are very fortunate indeed to have someone who has made his home in that area for the years which you have and know it so well.

I think I shall take notice of the fact that we have with us at this time another visiting colleague, Congressman Dempsey of New Mexico, and we are very glad to have you this afternoon, Mr. Dempsey, and you will be permitted to take part, if you wish, in the questioning from time to time.

Mr. Udall, do you have any questions you wish to ask the Commissioner?

Mr. UDALL. Yes, I do.

I, too, would like to commend Commissioner Emmons for this statement here. I guess all of you are well aware of the fact he is not just speaking as a normal administrator but as one who has lived in that area most of his life, and as one who is thoroughly familiar firsthand with these problems. Politicians tell me not to make a statement like this, but there is no one I know of in the administration who is doing a finer job than he is, and I want to take notice of that here today.

Mr. EMMONS. Thank, you.

Mr. UDALL. As I gather, then, from your testimony, Mr. Emmons, the Navaho irrigation project is really the keystone in your long-range program?

Mr. EMMONS. Yes, sir.

Mr. UDALL. Would that be a good statement of it?

Mr. EMMONS. Yes, sir.

Mr. UDALL. And it is one of the big hopes for providing the Navaho people with an economic base which will enable them to become self-sufficient?

Mr. EMMONS. That is right, sir.

Mr. UDALL. That is one of the chief aims, if not the chief aim, of the Indian Bureau?

Mr. EMMONS. That is right.

Mr. UDALL. Is it not also true that many of these lands that the Indian will be put back on if this project goes through are lands that they used to occupy, to farm, prior to the time we white men came out in that area?

Mr. EMMONS. I think that is right, sir.

Mr. UDALL. I think there is a particular element of justice we do not see too often, Mr. Chairman, in that these Indians farmed those areas in 1863 when I understand Kit Carson took the Navaho Indians out of Fort Sumner in New Mexico. At that time many of these Indians were farming these lands and here we are putting them back on the land which their ancestors occupied, we do not know how far back before them, and I happen to think there is a great deal of justice in that.

I would like to inquire, too—maybe you cannot furnish me with exact figures, but in approximate figures—what amount of money will your budget be either for this fiscal year or next fiscal year for the Navaho people, just to give us some conception of that?

Mr. EMMONS. The present year is $27 million and 1956, $24 million plus.

Mr. UDALL. Is that the Navaho-Hopi rehabilitation or is that the total?

Mr. EMMONS. That is the total.

Mr. UDALL. So that over a period of not too many years you are spending now on normal services and other rehabilitation activities a total that would well exceed the total cost of this project, which has many reimbursable features?

Mr. EMMONS. That is right.

Mr. UDAL. How many Navahos are there actually farming today up on the San Juan River? Do you have any approximate figures on that?

Mr. EMMONS. Yes, sir. On the Hogback there is 4,419 acres, approximately 600 farm families; on the Fruitland project, 3,250 acres, with an average-size farm of 11 acres, about 300 farm families.

Mr. UDALL. And you have already had experience with those people as far as educating them in farming techniques and farming procedures. I mean, you have an Extension Service and you have done that type of work with the Navaho people?

Mr. EMMONS. Those people up there, I believe, have just picked this up. There is an area of white farmers. I do not think they had any special training for that. As I say, in spite of the limitation of acreage, as I mentioned in my statement, they have about $300,000 income from produce.

Mr. UDALL. Have any of your people there working with them concluded that the Navaho as a people are not adaptable to farming, that they will not make good farmers, or anything of that sort?

Mr. EMMONS. They are adaptable. The Navahos are very fond of the land, and the reason that you do not find so many of them farm-

ing at this time is simply because they just do not have water. But they utilize every space of land that they can possibly use where there is any chance of having a crop.

Mr. UDALL. It is true even farther west in the arid areas of the reservation where there are washes where they can plant a little corn or do any farming, they do so and have done so for a long time in the past.

Mr. EMMONS. That is right, yes, sir.

Mr. UDALL. And have you people determined yet if this project were to go through—I notice you are stating that 10- and 12-acre farms are not sufficiently large, of course—how large a farm, how many acres, would be given to each individual Indian farmer?

Mr. EMMONS. About 97 acres, we would consider to be one of the new farm units.

Mr. UDALL. 97?

Mr. EMMONS. Yes, sir.

Mr. HOSMER. What was that figure, may I ask?

Mr. EMMONS. 97.

Mr. HOSMER. 97 acres?

Mr. EMMONS. Yes, sir.

Mr. UDALL. I am curious about this. It may not be of any particular significance. But just take a moment to answer this. What is in the mind of your people now as to how the particular persons who will go in there and be assigned farms, how that will be carried out? Have you thought that far ahead?

Mr. EMMONS. Yes, our people are working on it in the blue print. Could I ask Mr. Keesee, our Navaho irrigation engineer?

Mr. UDALL. Certainly.

Mr. KEESEE. That would be done through the district land board of the Navaho Tribe themselves.

Mr. UDALL. The Tribal Council?

Mr. KEESEE. That is correct.

Mr. UDALL. I take it then, Mr. Emmons, it is your hope, if this project were to be passed and brought into being, that ultimately this amount annually expended to take care of the Navaho people to rehabilitate them and help them get them on their feet, that that annual expenditure would decline gradually as this project came into being and these people were able to establish themselves on their farms and build up their income.

Mr. EMMONS. Yes, sir. I think we all certainly realize, I think all Indians of America realize, that some day the Federal Government is going to terminate its trustee responsibilities toward Indian people. The fact is, I think, that was indicated by the House and Senate approval last Congress of House Concurrent Resolution 108. It is certainly our job, the Government's job, to try to work out a program so that these people will be economically ready when that time does come.

Since that is the ultimate objective, I feel that we are somewhat in the position of, say, a military commander over a certain sector, who has received orders to take a certain objective. Certainly in order to do that there has to be ammunition to make that possible. In our case, of course, the ammunition happens to be in the form of appropriated dollars to make these programs possible.

But unless we begin to hit this thing hard, as I have said since long before I became Commissioner—unless we hit these things hard and fast, the problem in some areas is going to be out of our hands. It is going to cost the Government untold millions in the future to get some of these Indians prepared, because they do have an ever-increasing population, and the best reservation will simply not support the population.

On the Navaho—as I say, I would rather not get into the technical aspects because Mr. Keesee is here for that purpose, but we anticipate there will be 1,100 farm families, approximately, and with the other allied activities there will be approximately 18,000 of our Navaho people located in this area.

Mr. UDALL. That would be about one-fourth of the whole population?

Mr. EMMONS. Just about one-fourth, yes, sir.

Mr. UDALL. And is it not also true that the general economic condition of the Navaho people is such that if they are not the poorest, they are one of the poorer tribes economically speaking?

Mr. EMMONS. Yes, sir.

Mr. UDALL. Do you have the data on the average cash income, annual cash income per person of those people?

Mr. EMMONS. I do not have the late figures on that.

Mr. UDALL. I have a figure of $150.

Mr. EMMONS. It is something less than $500, I am sure.

Mr. UDALL. I want to commend the Commissioner again for his forthright presentation today and for the excellent work he is doing. That is all I have.

Mr. RHODES. Will the gentleman yield to me?

Mr. UDALL. I would be happy to.

Mr. RHODES. I want to associate myself with the remarks of my colleague from Arizona and thank the Commissioner not only for the presentation he has made today, but also for the very hard and effective work which he has conducted among the Navaho people for so many years. I was particularly impressed, Mr. Commissioner, with the program which your Department undertook for the education of the Navaho children. As you know, for many years that problem has been attacked and we have been more or less spinning our wheels. Because of the high birth rate it seemed as fast as we built schools, the schools became overcrowded and outmoded. The ideas which have sprung from your administration of the Indian Service to educate these children, not only in mobile schools, but in schools in the white communities surrounding the reservation, I think will very shortly, if not now, result in practically all Navaho children being in school and getting an education. Is that not the situation?

Mr. EMMONS. We will have all of them in school, we hope, by this fall.

Mr. RHODES. I think that your department is to be commended in this project, and your sponsorship of it represents, of course, another step in the long-range development and rehabilitation of the fine Navaho people.

I thank you gentlemen for yielding to me.

Mr. UDALL. That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Commissioner, could the Navaho project be erected in and of itself? In other words, could it be operated by building a Navaho Reservoir and letting the water flow by gravity down through these fields, as has been indicated, by which it will be used?

Mr. EMMONS. I would rather not attempt to answer that technical question, sir, and I would rather refer it to Mr. Keesee.

Mr. KEESEE. The answer is "Yes."

Mr. SAYLOR. The reason I ask is this: It is my understanding that this Navaho Reservoir could be built and that the water could flow by gravity, with a tunnel or two, down to the lands on which it is to be used.

Mr. KEESEE. Yes, sir.

Mr. SAYLOR. I think you have indicated, since practically all of the land that will be brought into irrigation by this project would lie within the Indian Reservation, it occupies an entirely different position than some of the other projects. In other words, the beneficiaries, or practically all of the beneficiaries, are wards of our Government to whom we owe the duty which you have so well expressed in your statement. Therefore, I was wondering if you had any reason to know why each and every one of these bills that has been introduced require that the Navaho project must be brought back to Congress before construction could proceed. I noticed that in every bill that has been prepared, by Mr. Dawson, Mr. Rogers, Mr. Aspinall, and Mr. Fernandez, they require that this Navaho project, even if approved, would have to be brought back to Congress. I would like to know if you, as Commissioner of Indian Affairs, know why this special treatment is given to this project.

Mr. EMMONS. I will ask Mr. Keesee to make a report on that.

Mr. KEESEE. The feasibility report is in the process of being distributed in conformity with the 1944 Flood Control Act, and it has not yet completely cleared the Department. We just recently finished.

Mr. ASPINALL. Will the gentleman yield to me?

Mr. SAYLOR. Yes.

Mr. ASPINALL. Because both of my bills have a provision which states:

> As to Indian lands within, under or served by any participating project, payment of construction costs within the capability of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564).

Now that reference, of course, is what we commonly call the Levitt Act, and in the preparation of the report on the Navaho project there is approximately one-fourth of the land which comes under the project which is outside of Indian control. Is that not correct?

Mr. KEESEE. Twenty percent.

Mr. ASPINALL. About 20 percent?

Mr. KEESEE. That is right.

Mr. ASPINALL. And in order to firm up this project as a part of the whole project, giving to the Indians benefits which are desired for them, as well as the non-Indians, it was made a part of this overall upper Colorado River program in order to make use of the water to which the State of New Mexico is entitled under the upper Colorado River compact. Is that not correct?

Mr. KEESEE. That is correct.

Mr. ASPINALL. I do not know whether that answers the gentleman.

Mr. SAYLOR. I think that answers most of this because, as the Commissioner so adequately pointed out, the beneficiaries of practically all of this water occupy an entirely different position than most of the beneficiaries of the other projects. That is the reason I wondered why it should be brought back here for special approval.

Mr. ASPINALL. If the gentleman will yield further. Perhaps the Commissioner and his staff do not wish to make answer to this question at this time, and, if so, you may do as you desire. But, under the Levitt Act the payment of charges against the lands is deferred as long as they are within Indian ownership. Is that not correct?

Mr. Bennett will agree with that.

Mr. BENNETT. Yes, sir.

Mr. ASPINALL. Now if 80 percent of this project is to benefit Indian lands, is it possible that the charges against 80 percent of the project should be borne by the Nation generally rather than as charges against the net revenues from the power projects proposed in the upper Colorado River program? If the Commissioner does not wish to take any position, that is perfectly all right.

Mr. EMMONS. I believe I would rather not on that at this time, Mr. Chairman.

Mr. UDALL. Will the chairman yield to me on that point?

Mr. ASPINALL. Certainly.

Mr. UDALL. There is one matter I wanted to clarify under the Levitt Act. Maybe Mr. Bennett can be of help on that. That is, these lands outside the regular reservation area which, under the plan, are to be owned by Indians. I assume they would have the benefit of the Levitt Act, as I read the act. I have it here.

Mr. BENNETT. Yes; it is my understanding that the Levitt Act is not restricted in its application to lands within Indian reservations. The test is whether it is held by Indians.

Mr. UDALL. That is the way I read it, and I wanted to be sure you read it the same way.

That is all I have. Thank you.

Mr. ASPINALL. The gentleman from Pennsylvania.

Mr. SAYLOR. One further question. Mr. Commissioner, are there any of the lands within the San Juan Chama project in the confines of the Navaho Reservation or any other Indian reservation?

Mr. EMMONS. You mean the San Juan division of this?

Mr. SAYLOR. Yes.

Mr. KEESEE. I think Mr. Mutz can best answer that question, Mr. Saylor. He has prepared that report with the Bureau of Reclamation.

Mr. ASPINALL. Who is testifying?

Mr. KEESEE. I say possibly Mr. Mutz, from Albuquerque, can best answer that question.

Mr. ASPINALL. That question can be deferred if he is with the Reclamation group, if the gentleman is willing.

Mr. SAYLOR. Yes. I just wanted to know whether any of the lands in the San Juan Chama project were within the confines of any Indian reservation, so that the reason you gave, Mr. Commissioner, with regard to the Navaho project might apply to that portion of the lands within that reservation.

Mr. MUTZ. If I might answer that question. My name is John L. Mutz——

Mr. ASPINALL. Just a minute. You are with the Bureau of Reclamation, are you not?

Mr. MUTZ. Not any longer, sir.

Mr. ASPINALL. You are with the Bureau of Indian Affairs?

Mr. MUTZ. I am now employed by the Public Works Committee of the Senate. I was responsible for the preparation of the San Juan Chama project.

Mr. ASPINALL. All right, go ahead.

Mr. MUTZ. The San Juan Chama project does provide a supplemental water supply for Indian lands lying within the Rio Grande Basin. There are 30,000 acres of Indian-owned lands within that area.

Mr. SAYLOR. Am I correct, Mr. Mutz, that of the 225,000 acres which would receive a supplemental supply of water and the San Juan Chama project, approximately 30,000 acres are within an Indian reservation?

Mr. MUTZ. They are within the so-called Pueblo-owned lands in the Rio Grande Basin.

Mr. SAYLOR. That is right. In other words, it is not the Navaho Reservation, it is the Pueblo Reservation?

Mr. MUTZ. It is within the Pueblo Indian lands within the Rio Grande Basin, but not within the Navaho Reservation.

Mr. SAYLOR. That is all the questions I have, Mr. Chairman. Thank you.

Mr. ASPINALL. The gentleman from New Mexico, Mr. Dempsey. Do you have any questions?

Mr. DEMPSEY. I have no questions, but I want to compliment the Commissioner for his presentation here. While the Commissioner has been Commissioner only for a couple of years, he has practically lived on the Navaho Reservation for a great many years. I think that the Commissioner is very well qualified to express the situation of the Navaho Reservation.

I think he, like I, knows that without water you are going to have to find someplace else for the Navahos other than what is supposed to be the Navaho Reservation.

Mr. EMMONS. Yes.

Mr. DEMPSEY. They have a terrific amount of acreage over there, a little grass. I think it takes about 79 or 80 acres per cow, and without water they just cannot subsist on that reservation. That is all I have to say.

(Committee note: Mr. Dempsey subsequently offered the following statement:)

STATEMENT BY HON. JOHN J. DEMPSEY, A REPRESENTATIVE FROM NEW MEXICO

Mr. Chairman, members of the committee, due to the great volume of evidence and testimony that has been offered before your committee during the hearings on the upper Colorado River storage project it is inevitable that some phases of the beneficial effects of this program may not have been given proper emphasis. I therefore seek the indulgence of this committee in giving full consideration to the economic soundness of the upper Colorado River storage project with particular regard to the proposed Navaho participating project.

In the hearings some question has been raised in this regard by those who apparently were not in possession of the facts. In presenting this brief summary of the economics of the proposed Navaho participating project I seek to give your committee those facts which are fully documented by the records of the Bureau of Indian Affairs.

The project is designed to irrigate 109,000 acres within the Navaho Indian Reservation and 28,250 acres under the south San Juan unit lying immediately east of the reservation line. The latter unit is primarily privately owned, but it also contains approximately 1,660 acres of irrigable lands under Navaho Indian public-domain allotments.

It is proposed to assign the irrigable lands on the basis of approximately 90 acres per family which, it is estimated, will support a family on a reasonable standard of living. On the above basis there would be 1,110 Indian families settled on irrigated farms within the reservation and 20 families on Indian allotments within the south San Juan unit of the project or a total of 1,130 Indian families. It is estimated that the establishment of the project would create employment for an additional 2,260 Indian families in allied occupations or a total of approximately 18,300 Navaho people. The cost of the project allocable to 110,660 acres of Indian lands would be approximately $9,310 per person. The settlement of Indian families within the project area would vacate rangelands that could be utilized to increase the acreage of present range holdings of Indian families to economic range units. At the present time some 8,800 families are attempting to make a living on a range base that, it is estimated, will support only 2,400 families.

The portion of the project cost charged against the lands would be $225 per acre. The balance, approximately $1,315 per acre, would be repaid to the Federal Government from credits of the upper Colorado River Basin fund.

The Navaho project would create a means of employment for the Navaho people and eventually would make it possible to reduce welfare, old-age, and similar expenditures by the State and Federal Government of some $2,100,000 annually. The concentration of the large number of families within the project area would simplify and reduce the cost of administering health, education, and other community services.

The fundamental importance of the project to the Navaho people cannot be accurately measured in dollars and cents. The construction of the project would provide a measure of balanced resource development in a vital area that will benefit the entire reservation.

Aside from the purely economic necessity for this Navaho participating project it is my belief that we should give due consideration to the fact that this is the first bright chapter that can be written in the long, shameful story of our dealings with the Navahos. It is an opportunity to right in some degree the wrongs that have been done these people by our Government during the last century. For years they have been held in what we must confess closely approaches bondage. They have suffered privation and hardship that would fully subdue the spirit of less courageous people. We now have the opportunity to restore them to the status of self-respecting, self-sustaining American citizens. They have been economic outcasts in this greatest of all nations far too long. In the long run construction of the Navaho participating project will pay off not only financially but morally for the American people.

It is not my intention to be critical of the Congress because its desire to be of assistance to the Navaho people was shown through enactment of the Navaho Rehabilitation Act in April 1950, which authorized $88.5 million for a 10-year program. The intent of the Congress in passing that legislation was expressed in that bill in which $9 million was authorized for investigation and surveys of irrigation and reclamation potentialities. Particular stress was laid on the project which the Colorado River bill proposes as far back as the 1948 report of the Bureau of Indian Affairs contained in the Department of the Interior report to the Congress.

Under that legislation $42.6 million has been appropriated by the Congress up to and including fiscal year 1955, but that expenditure has not accomplished the desired results in making the Navaho people self-sustaining. That end can be accomplished only by such legislation as you are now considering, legislation which will make a large segment of these Navaho people self-supporting in accordance with the intent of the Congress as expressed in Public Law 474 of the 81st Congress.

It is my hope that your committee will make it possible for the House to concur in the approval given by the United States Senate in its overwhelming vote for the upper Colorado River development measure.

Mr. ASPINALL. The gentleman from Utah, Mr. Dawson.

Mr. DAWSON. I just have one other observation. I think the gentleman from New Mexico might also add, that if some of these other

participating projects do not go through, there might be a lot of other wards of the Government along with the Indians. [Laughter.]

Mr. DEMPSEY. I am sure of that.

Mr. DAWSON. That is all.

Mr. ASPINALL. The gentleman from Colorado, Mr. Rogers.

Mr. ROGERS of Colorado. I have no questions.

Mr. ASPINALL. The gentleman from Washington, Mr. Westland.

Mr. WESTLAND. No questions.

Mr. ASPINALL. The gentleman from California, Mr. Sisk.

Mr. SISK. No questions.

Mr. ASPINALL. The gentleman from New York, Mr. Pillion.

Mr. PILLION. Mr. Commissioner, do you have an estimated cost of the Navaho project?

Mr. EMMONS. Our Navaho irrigation engineer does, yes, sir.

Mr. PILLION. May I have the estimated cost?

Mr. KEESEE. The estimated cost of the project is $212 million.

Mr. PILLION. How much?

Mr. KEESEE. $212 million.

Mr. PILLION. $212 million?

Mr. KEESEE. Yes. $211,845,000.

Mr. PILLION. I am speechless. That would take care of 1,100 families at an estimated cost of $200,000 per family.

Mr. KEESEE. It will take care of 18,000 people.

Mr. PILLION. Directly on the farms you would place 1,100 families at a cost of $200,000 per family for irrigating this land.

Mr. KEESEE. That is right.

Mr. PILLION. As the Navaho project.

By the way, if you were to estimate the same amount of help and assistance to every family in the United States, the total cost would probably run way into trillions of dollars. I suppose maybe even beyond that.

Is the Navaho project dependent upon the Echo Park storage project?

Mr. KEESEE. No, sir.

Mr. PILLION. Is it dependent upon the Glen Canyon storage project?

Mr. KEESEE. No, sir. Only insofar as——

Mr. PILLION. In other words, it could stand by itself in a bill all by itself, could it not?

Mr. KEESEE. Yes, sir.

Mr. PILLION. No further questions.

Mr. ASPINALL. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. I would like to ask you, you say the present cash income of these Navaho Indians is less than $500 a year?

Mr. EMMONS. Yes, sir.

Mr. HOSMER. Approximately what is it, do you know?

Mr. EMMONS. The Navaho basic economy is based on sheep raising. The reservation at this time requires approximately 22 acres for 1 sheep unit, and I think you can readily see that by the use of 250 sheep units that it is certainly not a living economy for any group of people.

Mr. HOSMER. What I asked was, What is their income today, Mr. Commissioner?

Mr. EMMONS. You mean the source of their income?

Mr. HOSMER. No, I want to know what it is. You said that the present cash income of the Indians of the Navaho Tribe is less than $500. I am asking you what it is.

Mr. EMMONS. For the Indian who actually lives on the Navaho Reservation, who derives his income solely from the reservation, I do not have the exact figures here, but it would be something, I am sure, under $500 annually.

Mr. UDALL. Will the gentleman yield to me on that?

Mr. HOSMER. I will be glad to.

Mr. UDALL. I have figures submitted to me by the present chairman of the Navaho Tribal Council that their average cash income per year per person is $150 as against a national average in excess of $1,500.

Mr. HOSMER. I thank the gentleman for his information.

Mr. Commissioner, you plan to train 1,100—you have 1,100 farms and you have 900 farm families now, so that will make an additional 200 farm families on the reservation; is that right?

Mr. EMMONS. No, sir.

Mr. HOSMER. You said you had 600 in 1 place and 300 in another place.

Mr. EMMONS. The 109,000 acres that will be utilized by this project we estimate will take care of about 1,100 farm families.

Mr. HOSMER. Yes, and you have 900 farm families now. Is that right?

Mr. EMMONS. This is in addition to that, sir. The other 2 ar 2 projects that are currently being used by the Navaho Indians—the Hogback and the Fruitland.

Mr. HOSMER. You have a total of 900 farm families there?

Mr. EMMONS. Yes, sir.

Mr. HOSMER. So you are going to have 2,000 farm families in all?

Mr. EMMONS. Yes, sir.

Mr. HOSMER. That is what I am getting at. You stated these people are not farmers today, but you intend to train them to be farmers, and that as a consequence their economic situation will be much better. What will be the income of these farm families, according to your calculations, if they have this water?

Mr. EMMONS. We estimate that the average return per acre will be approximately $70, and it will run up to about $5,000 when this project is utilized.

Mr. HOSMER. $5,000 per family or per acre?

Mr. EMMONS. Per family.

Mr. HOSMER. Their income will be $5,000?

Mr. EMMONS. Yes, sir; that is the gross income, however.

Mr. HOSMER. Do you realize that if you put this $200,000 out that you are going to spend on each farm at 5 percent interest, they would have $10,000 a year income instead of $5,000.

Mr. EMMONS. I realize that, sir, but, as I mentioned in my remarks, we have to get right down to the human facts. The Navahos up to 1924 were wards of the Government. They have been treated as wards of the Government, but in 1924 they became citizens. However, we still had the trustee responsibilities over their lands, over their properties. We have raised these Indians up to the point where they are in their present low economy. I say it is only human, it is the only fair thing for the United States Government, that we do everything we

can to build these people up so that the United States Government can step out.

Mr. HOSMER. That is exactly my point, sir. Exactly my point. You spoke a little while ago of appropriations being your ammunition toward this purpose, and my questions are directed toward whether or not you are shooting this ammunition off over the hill or onto the target.

There is only so much in appropriations that you are going to get, and there is only so much money out of the Treasury that can be spent for these Indians; and your responsibility is to spend it in a manner that will most quickly and economically put the Indians in a self-sufficient status. Is that not right?

Mr. EMMONS. There are so many elements we have to consider, Mr. Congressman. Certainly if we are just looking at this one way, you might say we could pay off the Indians and turn them loose, which I do not think would be feasible either. The thing is the Indians have this land. We are holding it in trust. There are 75,000 of them today and in another 20 years you are going to have over 100,000. The United States Government could not get out of the picture. The States of New Mexico and Arizona can never assume that responsibility because you would have in the case of Arizona approximately 10 percent of the population, in the case of New Mexico at least 8 percent of the population that would be on direct relief, and I do not believe that the States could stand that.

Mr. HOSMER. That is my point. I wish to congratulate your Bureau on the fine job it is doing in connection with resettlement of Indians into various other parts of the country and integrating them into the general population rather than keeping them isolated on a reservation.

The point of my questioning is this: You want to make farmers out of them, according to the recommendations you have given to this committee today. Possibly you might better spend the money making electronic technicians out of them. You have got just so much money and you are bound and determined to use it to make farmers out of them. Have you actually thought about these other alternatives and other things that the Indians might do and taking the $212 million and putting it into some other places instead of this? You could train a lot of electronic technicians for that, or whatever else you wanted to.

Mr. EMMONS. That is one of the features of the overall program. We have a relocation program.

And on the matter of saving money to the United States Government, we even have five outstanding Americans who are serving without pay, not costing the Government 1 penny, to make economic surveys on the various Indian areas. That is not costing the Government anything. We even hope——

Mr. HOSMER. My objection has not been to the cost on this thing. My statement goes to the practical matter, which is that whatever you spend there is a certain limit on what you can spend in this country for Indians, and is it wise to pour it all down the farm line or should it be spent for something better or more efficient or that will better operate to place the Indians on a paying basis in a shorter time.

Mr. EMMONS. Mr. Congressman, if we get this Navaho project completed, based on the population today it will take care of about one-fourth.

Mr. HOSMER. Take care of some 8,000 people if your farm families average 4 per family.

Mr. EMMONS. We anticipate that this would probably take care of maybe one-fourth of the population. This is going to be affecting not just the 8,000, but it is also going to affect the whole 75,000 because the Navaho Reservation proper will only take care of so many economic sheep units. As I mentioned just awhile ago, there are 250, now limited to that.

With the other programs that we have, industrialization on the perimeter of the reservation, we hope that we can reduce the reservation load so that the other Indians can raise their number of sheep units up to possibly 400 to 450. That would give a living economy to those people.

I think if we got 75,000 of those Navahos rehabilitated by these programs, the United States Government could eventually get out of the business. I do not know how many years it is going to take us to build the Navaho up to the point that he receives the required education, but it will probably take another 20 or 25 years. But it is certainly going to take a hundred years if we do not strike at every angle so they can be prepared as quickly as possible.

Mr. HOSMER. I quite agree with you that that must be done, but I am not too certain that the way you want to do it is the best way of doing it.

There are two other things I want to ask you about. As I understand it, you have lived in this area a long time, and I heard that the real reason behind this Navaho project is to get municipal water down to the city of Albuquerque. Do you know anything about that?

Mr. EMMONS. No, sir. That is not in my province, sir. I do not know anything about it.

Mr. HOSMER. My next and last question is: You realize that others than the Navahos—and I am sure you do. You are more or less the trustee for all the Indians in the country?

Mr. EMMONS. Yes.

Mr. HOSMER. By virtue of being the Commissioner of Indian Affairs. I am sure you realize that there are numerous tribes whose rights to waters in the Colorado River totaling some 2 million acre-feet a year are involved in this project as well as the particular interest of the Navahos.

Mr. EMMONS. That is right.

Mr. HOSMER. Do you feel if this project goes through that the interest of the other Indians will be taken care of?

Mr. EMMONS. I think they will be taken care of.

Mr. HOSMER. In what way?

Mr. EMMONS. My personal opinion—as I say, I am not giving any expert testimony at this time—but I believe there will be plenty of water. I think you are speaking of the lower Colorado tribes. I think they will be adequately taken care of.

Mr. HOSMER. I will say, not in argument with you, that there are a number of respectable engineers who quite disagree with your conclusion.

Mr. PILLION. Will the gentleman yield?

Mr. HOSMER. I yield to the gentleman from New York.

Mr. PILLION. Mr. Commissioner, I appreciate the fine work that you have been doing on behalf of these Indians along with all other

Indians in the country. But I notice that in this statement of yours you have dwelled upon the responsibility of your Bureau for the Navaho Indians. In fact, you showed a great deal of concern for their welfare. However, I am struck by the fact that nowhere in this statement do you appear to show any concern for the country as a whole.

Now the Indian Bureau itself, I suppose, has its obligation to the country as a whole rather than to the Indians first, and I just wondered if that was your approach to this problem or whether we are to think of the welfare of the Navaho Indians exclusively and primarily rather than the welfare of the country as a whole.

Mr. EMMONS. Mr. Congressman, may I answer that by saying that I am not a professional welfare worker. I happen to be a businessman. The only reason that I accepted this job as Commissioner of Indian Affairs was to do a constructive job for the Indian people and for the United States Government. Unless we build up constructive programs to enable these people to get out from under the Government as quickly as possible, I just do not think that it is good business.

Mr. PILLION. I am sure we all agree with you on that objective, Mr. Commissioner.

Mr. UDALL. Will the gentleman yield?

Mr. PILLION. Surely.

Mr. UDALL. I would like to ask a few questions to clarify this.

I think we have forgotton one fact that should have been brought out here. Maybe it was and I was not listening. That is that Mr. Emmons, before he became Commissioner, was a banker in my State. So he is speaking from that background.

Commissioner, in your opinion then, knowing the Navaho people as you do and knowing their overall problem, it is your judgment that the Navaho project does hold out the best hope for a long-range solution?

Mr. EMMONS. Yes, sir, I think that is most basic.

Mr. UDALL. And you are also attempting at the same time that you are working in that direction to work with a relocation program which you are expanding. Is that not true?

Mr. EMMONS. That is right.

Mr. UDALL. And you are sending some of those Indians out to work in Mr. Hosmer's aircraft factories?

Mr. EMMONS. That is right.

Mr. UDALL. I think that is all.

Mr. PILLION. No further questions. Thank you.

Mr. ASPINALL. Is the gentleman from California through?

Mr. HOSMER. Yes.

Mr. ASPINALL. The Chair recognizes the gentleman from Arizona.

Mr. RHODES. Mr. Commissioner, do you have a breakdown of the $212 million cost of this project so we might know how much is for the reservoir and how much is for canals and so forth?

Mr. EMMONS. Mr. Keesee has a complete feasibility report here.

Mr. ASPINALL. Mr. Rhodes, I am not going to raise any objection to general information, but as far as getting into the technical engineering feasibility part of it, I suggest that we had perhaps better not take that up until later on when the final authorization of this project might come before this committee. That is all I have in mind.

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Mr. RHODES. We have the feasibility engineer who, presumably, has these figures. If the Chair knows of a better time to bring it out, I will be glad to yield.

Mr. ASPINALL. The question of final authorization of this project is not before this committee.

Mr. RHODES. As I read the bill, it is before the committee except insofar as the contingency concerning the approval of the various States.

Mr. ASPINALL. No. If the gentleman will read the bill, it is suggested that the legislation provides it must be returned to Congress for authorization.

Mr. RHODES. Of course, on page 2 of the Rogers bill—is the chairman's bill different than the Rogers bill?

Mr. ASPINALL. I would ask staff counsel, do you have an answer to that? I do not want to take up more time than what the gentleman would take trying to get the answer.

Mr. RHODES. The chairman will realize I just now started asking questions and have not taken up any great amount of time.

I notice on the chairman's bill it is not authorized. However, on the Rogers bill, which is also before this committee, on line 14, page 2, it is authorized.

Mr. ASPINALL. I am informed that the Rogers bill does have it.

Mr. KEESEE. The dam and reservoir is $36 million. I will just quote the millions.

Mr. RHODES. Right; 36 million for the dam and reservoir?

Mr. KEESEE. Yes.

Mr. RHODES. Is this that portion of the cost of the dam and reservoir which is charged to this particular division or the total cost?

Mr. KEESEE. This includes both divisions.

Mr. RHODES. The total cost of the dam and reservoir known as the Navaho Dam and Reservoir?

Mr. KEESEE. That is right. About 60 percent of that is chargeable to the Ship Rock division.

Mr. RHODES. To what project is the rest chargeable?

Mr. KEESEE. It charges $800,000 of it to the San Juan Chama, a little over a million dollars is charged to flood control and recreation. The total that has been allocated to irrigation is $209 million out of the $121 million.

Mr. RHODES. We have the $36 million charged for the dam and reservoir. What would be the component parts of the rest of the $121 million in general terms?

Mr. KEESEE. That is rather a hard question to answer because part of it is on an 80–20 basis and part is on a 40–60 basis, depending on how the land is served.

Mr. RHODES. I might ask if you will submit what figures you have for the record at this point. May I have unanimous consent, Mr. Chairman, to have the witness submit the figures as the breakdown of the cost of this project for the record at this point?

Mr. ASPINALL. You have heard the request. Is there any objection? Hearing none, it is so ordered.

Mr. KEESEE. We will be glad to do it.

(The information referred to follows:)

Official estimate, Navaho project, December 1954

[Prepared by U. S. Bureau of Reclamation and Bureau of Indian Affairs]

Uniform cost classification (1)	Description (2)	Quantity (3)	Unit cost (4)	Total estimate [1] (5)	Construction contracts (6)	Materials and supplies (7)	Labor (8)	Construction facilities (9)	Other costs [2] (10)	Previous official estimate (11)
	Navaho project, total cost: [3]									
01.01	Navaho Dam and Reservoir	1,450,000 acre-feet		$36,400,000	$31,065,000			$950,000	$4,385,000	
03.01	Kutz Canyon pumping plant	770 cubic feet per second		10,700,000	8,475,000			200,000	2,025,000	
.02	West side pumping plants	90 cubic feet per second		261,500	218,000			2,000	41,500	
	Cubic feet per second									
05.01	Main gravity canal 2,630	28.7 miles		63,000,000	54,760,000			1,344,000	6,896,000	
.02	Bisti canal 370	51.0 miles		5,800,000	4,650,000			100,000	1,050,000	
.03	Gallegos canal 400	49.6 miles		9,500,000	8,100,000			140,000	1,260,000	
.04	Shiprock main gravity canal 1,690	118.5 miles		58,709,100	53,439,000			1,000,000	4,270,100	
.05	Bisti and Gallegos canal extensions 270	16.0 miles		418,000	344,000			5,000	69,000	
	Laterals:									
06.01	South San Juan division	28,250 acre-feet		4,600,000	3,531,250			100,000	968,750	
.02	Shiprock division	109,000 acre-feet		12,724,700	10,720,700			220,000	1,784,000	
	Drainage:									
07.01	South San Juan division	28,250 acre-feet		2,000,000	1,524,000			66,000	410,000	
.02	Shiprock division	109,000 acre-feet		7,732,000	6,700,000			180,000	852,000	
	Total			211,845,300	183,526,950			4,307,000	24,011,350	

[1] Total costs do not include interest during construction.
[2] 954,000. Prior investigation costs prorated to items in col. (10).
[3] U. S. Bureau of Reclamation classification and identification system used for ease of description.

Mr. ASPINALL. I wish to advise the gentleman from Arizona that this does carry conditional authorization. Even the Rogers bill states it has to come back to Congress for authorization.

The House has a call for the yeas and the nays. We will recess this committee until 3:05.

(A recess was taken at 2:45 p. m. and the subcommittee reconvened at 3:20 p. m.)

Mr. ASPINALL. The committee will be in order.

Mr. Rhodes of Arizona has the time.

Mr. RHODES. I yield back the balance of my time.

Mr. ASPINALL. The Chair recognizes Mr. Utt.

Mr. UTT. No questions.

Mr. ASPINALL. Mr. Thomson of Wyoming.

Mr. THOMSON. No questions.

Mr. ASPINALL. The Chair has one question to ask the commissioner or his staff.

If I understand correctly, the answer was given that the storage program as contemplated by the legislation now before us was not necessary to the feasibility of the Navaho project?

Mr. KEESEE. Do you mind? I do not quite get your question.

Mr. ASPINALL. Did the Chair understand the statement from either the commissioner or yourself to be that the storage program as contemplated by the legislation now before us was not necessary to the feasibility of the Navaho project?

Mr. KEESEE. It is necessary if they participate in the power revenues as a part of the payout. It is also necessary to the storage project in that the water that would be return flow would be caught in the Glen Canyon Reservoir.

Mr. ASPINALL. And it is also necessary, is it not, in relation to the principle of the exchange of water?

Mr. KEESEE. That is correct.

Mr. ASPINALL. And it is also necessary, is it not, in that approximately one-fifth of the land, as I now understand it, is in non-Indian ownership and the other four-fifths are in Indian ownership, and there would be no possible way to have the combined acreage under a project unless it came into some such sort of project as is now contemplated? Is that not correct?

Mr. KEESEE. That is correct.

Mr. ASPINALL. That is what I thought.

Are there any other questions?

If not, Mr. Commissioner and your staff, we appreciate having you before us and thank you for your testimony.

Mr. EMMONS. Thank you.

Mr. ASPINALL. The Commissioner of the Bureau of Reclamation and his staff will take the witness stand, and the gentleman from New York, Mr. Pillion, has charge of the time.

STATEMENT OF W. A. DEXHEIMER, COMMISSIONER, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY E. O. LARSEN, REGIONAL DIRECTOR, REGION 4, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR—Resumed

Mr. PILLION. Mr. Commissioner, I believe at the conclusion of our last discussion here we were referring to the Hammond participating project, which is the last of the 11 participating projects on table 1. That project indicates lands to be irrigated would be 3,600 acres at a cost of $2,302,000, or roughly a cost of about $650 per acre. Is that about correct?

Mr. LARSON. Yes, $627 per acre.

Mr. PILLION. $627 per acre?

Mr. LARSON. Yes.

Mr. PILLION. Is there any irrigated acreage in that area or in that surrounding area of the Hammond project?

Mr. LARSON. Yes. Across the river near Farmington there is. In fact, this very area was irrigated or partially irrigated at one time.

Mr. PILLION. I see. Now the irrigated lands adjacent or near the Hammond project are selling today for what market price?

Mr. LARSON. The best lands in the vicinity of Farmington——

Mr. PILLION. Let's take the average land comparable to the Hammond land.

Mr. LARSON. I would say the average land of the same class of land as the Hammond project is selling from $250 up to $500 an acre.

Mr. PILLION. What is the present value of the Hammond area lands?

Mr. LARSON. That I do not know. It would be quite low because it is in sagebrush and is entirely unirrigated. You might say just poor grazing land.

Mr. PILLION. Would a hundred dollars an acre be a fair estimate?

Mr. LARSON. I think it would be much less than that.

Mr. PILLION. At any rate, after spending $600 per acre the irrigated lands themselves would only be worth somewhere between $250 and $500. Is that a fair statement?

Mr. LARSON. That is not quite right. In making our economical analysis of this project we used the value of about $300 an acre when it is in full production. That analysis was based on what we call a price index of 215, which is lower than the price index that would apply.

Mr. PILLION. Suppose we take the value of the land at $50 per acre, the present value, add the $600 to it spent by the taxpayers of the United States, or a total of $650. Then we arrive at a value afterward of $300 per acre. Does that sound like good business to you?

Mr. LARSON. Yes, but the setup is not quite like you say.

Mr. PILLION. I appreciate there are small differentials.

Mr. LARSON. First of all, to me the land is practically valueless now.

Mr. PILLION. Glen Canyon Dam itself would be how wide at the site presently selected?

Mr. LARSON. I would have to see the report for the information. I do not recall.

Mr. PILLION. The width of the dam.

Mr. LARSON. The crest length, the top of the dam, would be 1,400 feet.

Mr. PILLION. And how thick is it at the bottom and how deep is it at the top?

Mr. LARSON. I do not believe we have that information without looking into the detailed designs.

Mr. DEXHEIMER. Approximately 400 feet at the base on bedrock up and downstream. What was the other part of your question, sir?

Mr. PILLION. On the crest.

Mr. DEXHEIMER. I cannot tell. It is not dimensioned on the drawing before me. It would be approximately 30 feet, the roadway across the top.

Mr. PILLION. And how is the dam anchored—how deep do you go, first of all, in the bedrock?

Mr. DEXHEIMER. We go essentially 120 feet below the normal bed of the river. That includes whatever gravel or rock that might be there, and then down into the rock sufficiently to be sure that you have firm fresh rock for a foundation for the dam.

Mr. PILLION. How deep is that below the bed of the river?

Mr. DEXHEIMER. Approximately 120 feet.

Mr. PILLION. What core drillings have you done at the site of this dam and how deep have your core drillings been?

Mr. DEXHEIMER. We have done a good deal of drilling in that site. Essentially, we have drilled approximately 400 feet below the top of the bedrock down into the rock, and on the sides, essentially the same distance, also with some additional small tunnels, drifts were driven for checking the rock more minutely.

Mr. PILLION. What type rock do you find at what levels in your core drillings going down at the side of the dam?

Mr. DEXHEIMER. It is all the massive unbroken Navaho sandstone, the entire site.

Mr. PILLION. All the way down?

Mr. DEXHEIMER. Yes, sir.

Mr. PILLION. You have reached no firm bedrock in any of your cores?

Mr. DEXHEIMER. It is all firm bedrock.

Mr. PILLION. Do you call Navaho sandstone a firm bedrock?

Mr. DEXHEIMER. Yes, sir.

Mr. DAWSON. Will the gentleman yield to me?

Mr. PILLION. Yes.

Mr. DAWSON. We construct many of our buildings out there of sandstone.

Mr. PILLION. What engineering safety factor do you use with respect to the pressures on the dam?

Mr. DEXHEIMER. It varies, of course, with the various parts of the dam, but as an overall safety factor, after all other things are considered in a dam of this type, it usually runs between 3 and 4.

Mr. PILLION. How deep do you go below your river bottom to find the Navaho sandstone?

Mr. DEXHEIMER. As soon as you strike the bottom of the river fill and it is exposed on the sides of the canyon.

Mr. PILLION. Are the sides of the canyon also Navaho sandstone?

Mr. DEXHEIMER. Yes, the whole area is. For a good many miles both up and down the river and to the sides it is the same type of formation.

Mr. PILLION. What is the hardness? Have you taken any hardness tests of the sandstone?

Mr. DEXHEIMER. I am not aware of what that is, if we have.

Mr. PILLION. Mr. Larson, could you tell us?

Mr. LARSON. No, I do not know. The particles themselves, of course, the hardness is very high. What the scratching would be and the rate of hardness, I do not know whether it would be 6, 7 or what it would be.

Mr. PILLION. How about the porosity?

Mr. LARSON. The porosity is known by the tests in Denver, but I do not recall what they are.

Mr. PILLION. So the water is to be impounded at a depth of approximately 700 feet. Is that about right?

Mr. DEXHEIMER. 700 feet above the bed rock.

Mr. PILLION. Yes.

Mr. DEXHEIMER. Approximately.

Mr. PILLION. What would be the pressure per square inch against that dam, roughly?

Mr. DEXHEIMER. At what point?

Mr. PILLION. Well, take it at the bottom.

Mr. ASPINALL. Will the gentleman yield to me for just a question here to help out?

Mr. PILLION. Yes.

Mr. ASPINALL. I think the general question can be answered this way: The anchorage at the proposed site of the Glen Canyon Dam is comparable as far as its values are concerned to that at the Hoover Dam, is it not?

Mr. DEXHEIMER. So far as the anchorage, the safety factor, the relative pressures would be comparable. The other factors are somewhat different, of course, the rock and the methods of treating the foundation and so on varying.

Mr. PILLION. No further questions.

Mr. ASPINALL. The Chair recognizes the gentleman from California who has been sitting very patiently for some time, Mr. Hosmer.

Mr. HOSMER. Thank you, Mr. Chairman.

First, let me say in connection with that newspaper article I made reference to yesterday which I had read to me over the telephone, I found out that Mr. Jacobson made the statement and the statement was very firm that the dam could be built at the 700-foot level. So there will be no necessity to answer my part of the question with respect to that.

In respect to the last question asked by Mr. Pillion, I wonder if you can answer that—what the water pressure per square inch would be at the base of the dam at river level.

Mr. DEXHEIMER. It is approximately the weight of water, 63 pounds per cubic foot——

Mr. HOSMER. I know it would be that.

Mr. DEXHEIMER. And 700 feet. But there are a lot of other factors, of course. We use various other methods rather than that to deter-

mine the stresses which are more important actually than the water pressure itself.

Mr. HOSMER. I still have no answer to my question, Mr. Dexheimer.

Mr. DEXHEIMER. You want a figure?

Mr. HOSMER. If you have one.

Mr. DEXHEIMER. I do not have it with me. We can get you one.

Mr. HOSMER. Does Mr. Larson?

Mr. LARSON. No.

Mr. HOSMER. Do you have any in the Denver office?

Mr. DEXHEIMER. I am sure we would have, yes.

Mr. HOSMER. I presume that has all been calculated; has it not?

Mr. DEXHEIMER. Oh, yes.

Mr. HOSMER. Now this massive unbroken Navaho sandstone that you have got to put this dam on, as I understand, sandstone is compacted sand. It that correct? Or what?

Mr. DEXHEIMER. That is not quite the geological——

Mr. HOSMER. Explain what it is.

Mr. DEXHEIMER. Essentially it is formed that way; yes, sir.

Mr. HOSMER. I wish for the record that you might either yourself or Mr. Larson explain the geology of massive unbroken Navaho sandstone.

Mr. LARSON. I am not a geologist, but I know that the formation through there, the Navaho sandstone, is very, very massive and extends at great depths from the top of the canyon walls down, and it dips generally, has a slight dip upstream, so that the different formations of rock miles south downstream in Marble Canyon, limestone, for example, and the other formations, go underneath the Navaho sandstone at great depths by the time they reach Glen Canyon.

Mr. HOSMER. It is a sedimentary rock, is it not?

Mr. LARSON. Yes, I know that the rock is generally, you might say, quartzite crystals cemented together, but maybe somewhat more porous than other sandstones, but still, as Mr. Dexheimer said, dense enough to support a dam.

Mr. HOSMER. This is a relatively porous type of sandstone then?

Mr. LARSON. I think the percolation through it in feet per year is not great.

Mr HOSMER. That does not answer my question. I asked, as compared to other sandstones, is it a relatively porous sandstone?

Mr. DEXHEIMER. No, I would say it is relatively dense sandstone as compared with a great many we find in the Southwest.

Mr. HOSMER. Have you made any tests on the amount of percolation through it, the rate?

Mr. DEXHEIMER. Yes, our Denver laboratory has been conducting those tests for some time. We have also made tests in the drill holes to see how much water loss there would be under pressure. We have tried to inject grout into the area, a very thin mixture, perhaps 1 part of cement to 15, even 20 parts of water, under 1,000 pounds pressure per square inch, which would be much greater than any pressure it would be subjected to, without success, without being able to penetrate the sandstone very far.

Mr. HOSMER. After it had been grouted?

Mr. DEXHEIMER. No, in the grouting process. We are just not able to force under 1,000 pounds pressure per square inch that very thin grout into the sandstone appreciably.

Mr. HOSMER. Now at the proposed location of the dam is the formation entirely homogeneous from the 125 feet below the river to the 800-foot elevation from it?

Mr. DEXHEIMER. Our drillings and explorations indicate that it is massive, it is not fractured as might be found in some other areas.

Mr. HOSMER. As I understand, some of the alternative locations to this dam that you have checked up and down the river have faulting in the Navaho formation. Is that right?

Mr. DEXHEIMER. That is correct. Some 10 or 15 miles downstream there are fissures and slight cracks that we do not find at this site.

Mr. HOSMER. Now you related that you made these grouting tests. How many of those were made?

Mr. DEXHEIMER. I do not have the record of that here.

Mr. HOSMER. Does Mr. Larson know?

Mr. LARSON. No. There were more than one test, but sufficient to satisfy themselves that——

Mr. HOSMER. Who satisfied themselves?

Mr. LARSON. The Denver office. Sufficient to satisfy themselves that the chemical grouting would not work.

Mr. HOSMER. You are in charge of the Denver office, are you not?

Mr. LARSON. What is it?

Mr. HOSMER. You are at Salt Lake City?

Mr. LARSON. Yes; I am from Salt Lake City.

Mr. HOSMER. Mr. Jacobsen is from Denver?

Mr. LARSON. He is from Salt Lake also.

Mr. HOSMER. You are talking about engineering studies. Is there any representative from Denver here?

Mr. DEXHEIMER. No, not here right now.

Mr. HOSMER. In other words, we have nobody that can testify directly with respect to this geology.

Mr. DEXHEIMER. Before I took this position, I spent some 6 years in Denver and was, and am, quite familiar with what they had been doing there.

Mr. HOSMER. At any rate, we know there was more than one of these grouting tests made.

Mr. DEXHEIMER. We did that over quite a period of time.

Mr. HOSMER. Which would make it at least two; is that right?

Mr. DEXHEIMER. Well, I am sure there were a great many more than that.

Mr. HOSMER. Were these taken at the proposed locations?

Mr. DEXHEIMER. They were done in the drill holes and in the tunnels that we used for our exploratory work to determine the adequacy of the foundation. That is one of the tests that we made.

Mr. HOSMER. Now, as I understood, these cores were taken at various proposed sites?

Mr. DEXHEIMER. No, I think that most of our drillings, the ones that I am talking about, were done at this site.

Mr. HOSMER. Were there no drillings elsewhere?

Mr. DEXHEIMER. I do not know that we did any. The Southern California Edison Co. drilled some of the sites in that area downstream.

Mr. HOSMER. Do you have the benefit of their findings?

Mr. DEXHEIMER. Oh, yes.

Mr. HOSMER. Where did they do their work?

Mr. DEXHEIMER. What we call mile 4 above Lee Ferry, which would be about 11 miles downstream from this site.

Mr. HOSMER. Was there core work that you did also downstream?

Mr. DEXHEIMER. No.

Mr. HOSMER. Where else was it?

Mr. DEXHEIMER. Our work has been done on this particular site.

Mr. HOSMER. I mean downstream from this site, have you done any?

Mr. DEXHEIMER. Not that I am aware of, no.

Mr. HOSMER. Have you done any work upstream from this site?

Mr. DEXHEIMER. Nothing but geological exploration, of course, sir.

Mr. HOSMER. What is that—surface exploration?

Mr. DEXHEIMER. Largely.

Mr. HOSMER. And how far back up the stream from the proposed dam site would the reservoir extend?

Mr. LARSON. 186 miles up the Colorado and 71 miles up the San Juan. I mentioned it in my statement.

Mr. HOSMER. Then you have taken visual surface geology in those extensive areas only?

Mr. DEXHEIMER. Yes. I am sure that our geologists have covered that reservoir area.

Mr. HOSMER. Well, surface geology?

Mr. DEXHEIMER. Yes.

Mr. HOSMER. You were in the office 6 years. Do you know of any of the results of that work?

Mr. DEXHEIMER. It has been some time since I went over the geologist's reports, and I am not familiar enough now to say that I remember just what they were. But those reports, of course, were fundamental to the selection of this site and the reservoir area.

Mr. HOSMER. You cannot tell us what is in them at the present time?

Mr. DEXHEIMER. No, I cannot.

Mr. HOSMER. I believe you testified that this formation in relation to the horizontal is at any angle downstream.

Mr. DEXHEIMER. The general dip, I think, is upstream, I believe, rather than downstream. In other words, with the river at this level [indicating] the dip would be to the upstream going down.

Mr. HOSMER. Then with respect to the formations at locations above the proposed dam site, the core drillings at the dam site would indicate the nature of the rock at increasing depth?

Mr. DEXHEIMER. Yes, I think that is essentially true if the formation followed through on the same general dip and strike.

Mr. HOSMER. So that the layer at the bottom of the dam will be deeper and deeper and deeper as you go further upstream?

Mr. DEXHEIMER. Generally speaking, yes.

Mr. HOSMER. For that 186 miles up the river, do your surface geology reports indicate that it is likewise massive Navaho sandstone?

Mr. DEXHEIMER. I have in the House Document 364, 83d Congress, 2d Session, starting on page 119, a brief description of the geology of the Glen Canyon site which might be helpful to you.

Mr. HOSMER. If you want to read it in answer to my question, go ahead. That is the point where it asserts the Glen Canyon site is geologically favorable for a high concrete dam?

Mr. DEXHEIMER. Yes.

Mr. HOSMER. What I am asking you about now, Mr. Dexheimer, is not the dam site but the geology upstream from the dam site. And

I asked you if you know or if your records showed from the visual surface geology explorations made in this 186-mile area whether or not it is all Navaho massive sandstone.

Mr. DEXHEIMER. I could not say that it was entirely that, but I think I would be safe in saying I think so, but without reference to those reports made some years ago I would not want to make that an unqualified "Yes."

Mr. HOSMER. Do you know whether those reports contain any information as to whether the formation is broken or unbroken?

Mr. DEXHEIMER. I am sure they would contain that information.

Mr. HOSMER. But you do not know what it is?

Mr. DEXHEIMER. No. It has been so long since I have seen that that I do not recall.

Mr. HOSMER. As I understand it, this process of grouting is one which is common in construction of dams in this country, is it not?

Mr. DEXHEIMER. The cement grouting, yes, it is.

Mr. HOSMER. And what is the purpose of grouting?

Mr. DEXHEIMER. It is to solidify any areas in the foundation or abutments into which you can force a mixture of cement and water. This grout, which later sets up, seals against possible leakage or percolation and fills cracks that you might find in the rock, and in some cases strengthens the foundation where you might find little open seams, as at Shasta Dam where we found great big seams filled with clay. In some areas we excavated the clay and later refilled it with cement. But as a precaution we also thoroughly grouted the foundation by curtain and by blanket grouting, as we call it, deep into the rock to satisfy ourselves that anything that was not seen on the surface and we did not know about was adequately sealed against possible percolation.

Mr. HOSMER. How much grouting do you plan to do in the construction of Glen Canyon Dam?

Mr. DEXHEIMER. That would depend, of course, upon the nature of the foundation and the experience we had after starting the excavation. But as a minimum, I would say we would grout the entire foundation to 40 or 50 feet in depth, probably on 20-foot centers both ways. Then we would have a curtain of grout holes drilled up to 150 or more feet in depth near the extreme edge, and might even have 2 or 3 such curtains, 1 right behind the other. It depends a great deal on the experience after you start that grouting procedure and how much it takes and what we find in the process.

Mr. HOSMER. I have difficulty reconciling that with your statement a moment ago that in these test groutings that you did with a 10 percent solution you were unable to make any penetration into the sandstone.

Mr. DEXHEIMER. That was a little different type of test, Mr. Hosmer. We were trying there to see if we could force water or a thin mixture of cement grout into the pores of the rock, not to make it a more dense rock. It was so dense we found that we were unable to do that.

We also tried chemicals of various kinds trying to force those into the body of the rock, into the pores of the rock, if you will, for a different purpose, to try to make the rock, as we say, a little more dense.

Mr. HOSMER. I still do not understand it. You were trying to get a liquid into this rock and you could not get it in in your tests. Yet you say you can force a liquid in in your actual grouting locations.

Mr. DEXHEIMER. We forced that grout, as I have pointed out, in the case of Shasta, Hoover, and all the rest of them. The only place——

Mr. HOSMER. I am not talking about all the rest of them, Mr. Dexheimer, I am talking about the proposed grouting you just related you were going to do at Glen Canyon.

Mr. DEXHEIMER. Yes. We would do that as a safety precaution in case there were any cracks, any fissures, in the rock, any holes that might have been in the formation of the rock in its formative stages to be sure that those are sealed.

Mr. HOSMER. But you just described an elaborate process of grouting on the bottom and the sides. Now you say you are going to do it if you find any holes in the place. Have you found holes that need grouting that you base your prior statement on?

Mr. DEXHEIMER. No, sir.

Mr. HOSMER. Or as an alternative to that, will you answer my question of how you are going to get it in when you do the actual grouting when you could not get it in when you did the test grouting?

Mr. DEXHEIMER. We do not expect we will get any grout in any appreciable amount into this foundation by our process of grouting. We would, however, carry out a grouting procedure by, as I pointed out, going down 40 to 50 feet in a blanket process in the bottom, just to be sure that if there were any cracks there we had them adequately filled. The same thing would be true of the curtain grouting along near the upstream face of the dam. We would go down at 10- or 20-foot centers with grout holes, put grout in under high pressure, so that if there were any chance or any possible seams or openings they would be adequately filled. It is a precautionary measure.

Mr. HOSMER. Has your extensive core drilling disclosed whether or not that is going to be necessary?

Mr. DEXHEIMER. We think we will not get much grout in, but we could not begin to drill holes close enough all through this foundation to say definitely that there were not minute cracks in the foundation at all until we get actually to building the works.

Mr. HOSMER. In other words you do not expect it is going to be needed, but you are going to do it anyhow.

Mr. DEXHEIMER. We would do that as a precautionary measure to be sure that we had the foundation adequately sealed.

Mr. PILLION. Will the gentleman yield?

Mr. HOSMER. I will yield to the gentleman from New York.

Mr. PILLION. If you had a satisfactory rock, you would not need to do any grouting. Is that correct?

Mr. DEXHEIMER. Mr. Pillion, I do not believe there is that satisfactory a foundation for a high dam in the world. One of the best that we ever had was the Hoover Dam on the Colorado River just below this. We did a great deal. We carried out exactly the same program I have explained here. Yet years later we found a hot spring. We went back in to do additional grouting because of the developed small leak. It is one of the things that is standard procedure and has been so far as my memory serves.

Mr. PILLION. Would you say the Navaho sandstone is one of the least preferable rocks to build on?

Mr. DEXHEIMER. No, sir.

Mr. PILLION. For a foundation?

Mr. DEXHEIMER. No, sir. We have a great many foundations that are much less desirable and require a great deal more care to build on. We still go ahead and have no hesitation because we know how to take care of these foundation problems when we get into the foundation and find out what they are.

Mr. PILLION. If you had a bed of rock underneath, you would remove the standstone and use a bedrock. Is that not right? But, of course, you do not have it here, and that is why you use the grouting process. Is that correct?

Mr. DEXHEIMER. No, sir. We do use the grouting process in all of our dams. We do it, I think, regardless of the type of rock or the formation as an assurance that we would not have water getting into these fine cracks, causing uplift and possible percolation through the foundation.

Mr. PILLION. Thank you.

Mr. HOSMER Has a dam of this size ever been built on this kind of formation?

Mr. DEXHEIMER. There are lots of dams built on poorer foundations of this size. Not quite this height, I might say, because this is almost the height of the Hoover Dam, which is at present the highest in the world. But there are a great many that have been built on sandstone foundations that are giving satisfactory service. Chief among those, I might say, are the TVA dams, where under many areas there were 2 to 3 feet or more of gravel between the layers of standstone. We adequately took care of that foundation. You go 50 feet through the sandstone and find 2 or 3 feet of gravel with water in it. We were still able to take care of that condition and build the TVA dams, which I think are giving adequate service.

Mr. HOSMER. Mr. Jacobson's newspaper statement to which I referred earlier did indicate that he was doubtful that a dam of a height of 735 feet, that is, 35 feet higher than the proposed 700-foot dam could be built.

Mr. DAWSON. Mr. Chairman, a parliamentary inquiry.

Mr. ASPINALL. If the gentleman has a parliamentary inquiry, all right.

Mr. DAWSON. It is an inquiry, at least.

Mr. ASPINALL. Does the gentleman from California yield for a parliamentary inquiry?

Mr. HOSMER. I will yield for a parliamentary inquiry, not for a speech or anything else.

Mr. DAWSON. I simply want to say this: The gentleman keeps referring to a newspaper article. If we have the article, I think that is the best evidence. Let's get the article before us and then we can see what we are talking about.

Mr. HOSMER. I will make the point of order that the gentleman's parliamentary inquiry is not a parliamentary inquiry.

Mr. DAWSON. Then I raise the point of order.

Mr. HOSMER. I will withdraw the question and state it this way.

Mr. ASPINALL. Mr. Hosmer, let the Chair answer the gentleman from Utah. The introduction of a newspaper article is not in order, and the gentleman from Utah knows it, and we are not going into that. As far as a parliamentary inquiry, I doubt very much if it was meant that way. So the Californian will proceed.

Mr. HOSMER. Do you want to answer that question?

Mr. LARSON. It has been so long, could I have it again?

Mr. DEXHEIMER. I think the question was adequately answered, Mr. Hosmer, by the introduction of the letter I asked to be made a part of the record this morning.

Mr. HOSMER. Explain in your own words, if you will, please.

Mr. DEXHEIMER. At this time, based on our studies up to date, we do not feel that it would be entirely wise to build a dam at the Glen Canyon site higher than 700 feet.

Mr. HOSMER. I recognize that fact, and my question was why.

Mr. DEXHEIMER. The geology of the upper parts above that is somewhat questionable, and the loading of the foundation with the additional 35 feet of dam at this particular site is also somewhat questionable from a safety and geological standpoint.

Mr. HOSMER. In other words, your 700 feet is the maximum that you feel it is safe to go?

Mr. DEXHEIMER. No, sir. Based on the information we have at the present time, we feel we would not be justified in going higher. However, if it should develop when we get into the foundation that our fears are on the too conservative side, it might be possible to raise it some.

Mr. HOSMER. What would happen if, when you went into that foundation, your fears were not conservative enough?

Mr. DEXHEIMER. If we found that our geological examinations on other things indicated that the 700 foot high dam would not be entirely safe and economical, we would not build it to that height.

Mr. HOSMER. There is then the possibility at least that geological facts unknown at the present time will make this dam engineeringly unfeasible?

Mr. DEXHEIMER. No, sir, I do not believe so.

Mr. ASPINALL. The Chair calls attention to the fact that the hour of four has arrived. The committee was good enough to permit us to sit this long and many members wish to get to their offices.

Before we adjourn the meeting, would it be possible for us to meet at 9:30 in the morning and adjourn the committee at 12:30 so we will not have to work tomorrow afternoon? Is there any objection?

Mr. HOSMER. Are we going to hear the proponents tomorrow?

Mr. ASPINALL. Tomorrow we shall hear the witnesses from the State of Colorado.

Mr. HOSMER. As I understand, these gentlemen will be subject to later call and continuation?

Mr. ASPINALL. They will be subject to later call and that call cannot come before the last of April.

Mr. HOSMER. The last part of April?

Mr. ASPINALL. Yes.

Mr. RHODES. It is my understanding that we will not sit Saturday. Is that right?

Mr. ASPINALL. We will not sit Saturday.

Is there any objection to the request of the chairman that we meet at 9:30 in the morning?

Hearing no objection, the meeting is adjourned. We will meet again at 9:30 tomorrow.

(Whereupon, at 4 p. m. the committe was recessed, to reconvene at 9:30 a. m., Friday, March 11, 1955.)

COLORADO RIVER STORAGE PROJECT

MONDAY, APRIL 18, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:07 a. m. in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will now be in session for the further consideration of those bills having to do with the authorization of the upper Colorado River storage and development project.

At our last session supposedly we finished the presentation and introduction of statements and arguments in opposition to the project. However, since that meeting the Chair has received several additional requests to have included within the hearings matter in opposition.

One is a letter from Thomas Dawes Eliot, of Northwestern University. Another is a letter, together with a short statement, signed by Alex Radin, manager of the American Public Power Association, stating particularly his opposition to the use of the Collbran formula.

Another is a letter of transmittal from W. S. Chamberlin, member of the National Committee for Glen Canyon National Park, together with a statement in opposition to the construction of Glen Canyon Dam.

Another is a statement by the National Parks Association president, Sigurd F. Olson, opposing the Echo Park inclusion.

Another is a statement by Charles Eggert, of Barrytown, N. Y., in support of the Dinosaur National Monument, or in opposition to the construction of the Echo Park unit of the project.

Unless there is an objection, these statements and letters will be made a part of the record of the hearings, to follow immediately in the record following the last session of this subcommittee on this particular project. Is there any objection?

Hearing none, it is so ordered.

(The documents referred to will be found on p. 1138, pt. 2.)

Mr. HOSMER. Mr. Chairman, I also have a statement that pertains to the matter on March 19, when I claimed a point of personal privilege with respect to Mr. Udall's statement that California had been dragging its feet and so forth in the Arizona versus California suit. I would ask unanimous consent to include at that point in the record. namely, page 1285 of the proceedings for Saturday, March 19, my own statement purely with relation to the progress of that Arizona versus

California case, material which I did not have and could not reasonably have anticipated to need on that day.

Mr. ASPINALL. Without objection, it is so ordered.

Hearing none, it is so ordered.

Mr. HOSMER. It is understood to be at that point in the record.

Mr. ASPINALL. That is right.

(See p. 1025, pt 2.)

Mr. ASPINALL. We have with the committee this morning Mr. Dexheimer, our Commissioner of the Bureau of Reclamation, Mr. Larson of the Salt Lake City office, Mr. Elmer Bennett of the Washington office, Mr. J. Neil Murdock, regional geologist, and Kenneth B. Keener, chief designing engineer. The Chair would desire that the three statements be made first, from the geologist, from the chief designing engineer, and from Mr. Bennett, then that we proceed with the questioning of the Washington representatives of the Bureau, and the regional representatives of the Bureau, with the understanding that we shall proceed as rapidly as possible, with the statement from the Chair at this time that we shall finish the questioning of the Bureau this week. We shall work this into the week's program as fully as possible. We can meet this afternoon without any question. When we recess at 5 minutes of 12:00 we will recess until 1:30 this afternoon. Then if it is feasible we will carry over even until Saturday morning and finish our questioning at that session.

Mr. SAYLOR. Mr. Chairman.

Mr. ASPINALL. It will be necessary for some of the members of the committee to reserve the right to further questioning on particular matters because they have not had a chance to see some of the material that has been handed in according to agreement by the Bureau representative, and members will have the right to such a reservation.

The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. It is perfectly all right to proceed with rapidity to get this business disposed of, and if the committee decides that is the course, there is not much that some of us can do about it. However, many of the questions and information which we asked to have supplied to us did not appear on the Hill until Friday. I have not even had a chance to see, until this point, the questions with regard to the geology, let alone have the men who have discussed it with me examine the reports which the Bureau has made over a period of years. If it is going to be the attitude of this committee to proceed in the fashion that competent engineers outside of the Bureau are not going to be given a chance even to look at this, then I want to inform the chairman and the other members of the committee, as far as responsibility for any mistakes or errors which might have been developed, they will be forewarned.

I did not ask this committee to duplicate and have the Bureau answer for us the series of questions which Mr. Ely submitted to the Senate back in March. As near as I know those questions have not been answered, and they go to the very heart of this entire issue. In fact, on the 17th day of March 1955, Mr. S. W. Crosthwait, Acting Commissioner, addressed a letter to Hon. Clinton P. Anderson, chairman of the Subcommittee on Irrigation and Reclamation of the United States Senate, stating that he had received those questions from Mr. Lineweaver and that they would proceed to answer the questions as rapidly as possible, but that those answers went to the

very heart of this entire project and that it would be at least 60 days before the answers would be available. The answers are not available to the Senate; they are not available to this committee. I, for one, want to go on record as protesting the attitude of the chairman in saying that we will complete the hearings this week, when the information which the members of this committee are entitled to have before them has not been presented.

I might call attention of the Chair to the fact that last year when we had these hearings I requested the Bureau of Reclamation to furnish me certain information in answer to certain questions—furnish them to the committee. I asked for them the 31st day of March 1954. The 7th day of April 1954, the Assistant Secretary, Mr. Aandahl, said they would be presented, and to date, the 18th day of April 1955, the answers are not yet furnished.

Now, in view of the fact I have just received from the Department certain matters with regard to the suit entered in the United States Supreme Court between the State of Texas and the State of New Mexico, affecting a large portion of this project, which is recognized even in the Bureau's report, I feel that the statement by the Chair, "We will finish these hearings this week," indicates that there is not a serious attempt, for those who are interested in the developing of this entire project and bringing out the answers and having them presented by the Bureau, to give a fair opportunity for all parties to be heard.

Mr. ASPINALL. May the Chair say that the hearings have nothing to do with the particular matter that the gentleman from Pennsylvania brings up. We are not going to write up this bill yet for 35 to 40 days. I am hopeful that we can get that material so that the gentleman will have it, and when we get to writing up the bill there is a great deal of the matter referred to by this committee in the hearings which should be studied then rather than in open hearings, when the answers, we hope, will be available to the gentleman.

Mr. SAYLOR. With that I heartily agree, but when we get this information from the Department in 35 or 40 days, I certainly feel this committee should then have an opportunity to ask the people who prepared——

Mr. ASPINALL. Let the Chair make this statement: That he will confer with the gentleman from Pennsylvania before we go to writing up the bill, and I think the gentleman is entitled to that consideration. On the other hand, we have already taken 10 or 12 minutes now about matters, perhaps, which we could discuss among ourselves rather than taking the time in open hearing.

Mr. HOSMER. Mr. Chairman.

Mr. ASPINALL. Mr. Hosmer.

Mr. HOSMER. I just want to be on record briefly with respect to this time problem. I have two matters, one concerning the law and the other concerning the geology, which heretofore have not been explored, and I would certainly want time sufficient to place whatever materials are needed in the record.

Mr. ASPINALL. The gentleman has already spoken to his chairman about that and the chairman has told the gentleman he is going to do his best to cooperate. The chairman will keep that promise. We will go along here and see what we have. There is no endeavor to run this

legislation over anybody, and there is no endeavor, also, on the part of the chairman, to permit any delay in the matter, because we have too many projects before this committee to delay all of them because of the Colorado project. And the Chair makes the positive statement at this time that these matters will be considered in executive session in priority to the time they have been studied, unless there is agreement on the part of the committee to do otherwise.

At this time the Chair calls to the witness table Mr. J. Neil Murdock, regional geologist, region 4, for presentation of his statement. Unless there is objection, the statement will be presented and then Mr. Murdock will take his place in the audience and wait for the other statements to be presented before the questioning.

We are glad to have you here this morning, Mr. Murdock. We understand that one of your distinguished relatives, perhaps a little bit distant, but one of your distinguished relatives, nevertheless, served in the Congress of the United States, and we are glad to have you representing that family.

STATEMENT OF J. NEIL MURDOCK, REGIONAL GEOLOGIST, BUREAU OF RECLAMATION, SALT LAKE CITY, UTAH

Mr. MURDOCK. Thank you.

I am J. Neil Murdock, regional geologist, region 4. I am a graduate geologist with both bachelor's and master's degrees in geology. I have been employed by the Bureau of Reclamation since October 1, 1935. For the past 20 years I have been engaged in engineering geology, exploration, and materials testing on dams and tunnels. I have had both construction and investigation experience in the Western and Southwestern States. Since region 4 was organized in 1945, I have supervised the geological studies and exploration of all dam sites under investigation in this region, totaling over 100 dam sites. Most of these have been diamond-core drilled, and I have prepared reconnaissance or preliminary geology reports on all of these sites for use in determining the adequacy for dam construction. I am particularly familiar with the geology of the dam sites in the Colorado River storage project, including the Glen Canyon dam site.

I participated in planning the exploration program at Glen Canyon dam site prior to the drilling and made periodic inspections of the work. I first visited the site in 1942 while engaged in geological studies of the Bridge Canyon and Marble Canyon dam sites.

Geology at Glen Canyon dam site is relatively simple. Navaho sandstone of Jurassic age forms the abutments and foundation and is the only formation involved in the dam. Older formations are found at the upper end of the reservoir basin. Navaho sandstone is exposed over wide areas in Arizona and Utah and occurs as a high vertical cliff. Zion Canyon in Utah and Glen Canyon in Utah and Arizona are carved from this massive sandstone.

Technically, the rock is a buff to red, medium-to-fine-grained, moderately hard, slightly friable sandstone. Most of the sand grains are quartz but minor amounts of feldspar and biotite occur. Cementing material is principally calcite. The rock stands in massive, highly cross-bedded cliffs which at the dam site are remarkably free from joints, fractures, or structural weaknesses. It is well adapted to the construction of a high dam in all respects except that the sandstone

is not too well cemented. This lack of complete cementing between the sand grains was recognized prior to our exploration program, and we planned our work to secure the special information which would supply the designer the data he would need to make a safe, economic design. The special tests included load bearing tests, strength and elastic property tests, and chemical grouting tests. These were in addition to the standard diamond-core drilling and percolation tests which are made in all our investigations of a dam site.

Personnel from the engineering laboratory of the chief engineer at Denver, Colo., conducted the special tests. The results of these special tests are incorporated in the design studies of the dam. The bearing tests and the strength and elasticity tests supplied invaluable information on the character and limitations of the rock. The chemical grouting tests were made to determine if it would be possible to recement the sand grains immediately under the structure to increase the rock's unit strength. This has been demonstrated in the laboratory, but so far as I know has never been successfully used in the foundation of a dam. It was abandoned at Glen Canyon when after several attempts it was found to be impossible to pump the solutions into the small pores between the sand grains. While voids do exist between the particles of the sandstone, the spaces are too small to permit the penetration of any type of solutions including water.

During the drilling operations percolation tests were made in each of the 25 holes at 10-foot intervals under pressure of 150 pounds per square inch. Invariably the tests showed the sandstone to be of low permeability. Only near the surface where an occasional narrow contraction joint was penetrated was any water lost into the sandstone. This is unusual since most sites require extensive portland cement grouting during construction to prevent seepage through the bedrock around the structure. The Navaho sandstone will absorb water but it will not allow appreciable passage since the tiny voids are capillary in size.

In determining the suitability of a dam site the engineering geologist pays particular attention to the behavior of the bedrock under natural conditions. If it successfully resists erosion and supports itself in vertical cliffs 1,000 feet or higher, as does the Navaho sandstone in Glen Canyon, it indicates that the rock is competent to support the dam. This, accompanied by favorable test data, gives assurance of the suitability of a dam site. I consider the geology of the Glen Canyon dam site entirely favorable and competent to support safely the proposed 700-foot dam.

Geologic conditions in the reservoir are equally favorable. Groundwater drainage, as far as is known, is into the basin and the formations involved are relatively impervious. Some mathematical studies were made assuming the most unfavorable conditions, and these studies indicate reservoir losses will be negligible.

At least six Bureau geologists and one private consulting geologist have examined the dam site and concur in the conclusions outlined in the preliminary geology report which states the site is suitable.

Mr. ASPINALL. Thank you very much, Mr. Murdock.

The Chair calls to the witness table Mr. Kenneth B. Keener, chief designing engineer of the United States Bureau of Reclamation with headquarters in Denver.

We are glad to have your statement.

STATEMENT OF KENNETH B. KEENER, CHIEF DESIGNING ENGINEER, BUREAU OF RECLAMATION

Mr. KEENER. I am Kenneth B. Keener, chief designing engineer of the United States Bureau of Reclamation, with headquarters in the commissioner's office in Denver, Colo. I have degrees of bachelor of science and bachelor of science in civil engineering from accredited universities. I have been a registered professional engineer in Idaho since 1920. I am a member of the American Society of Civil Engineers and other professional organizations.

I had over 10 years of field experience on investigation, location, design, and construction of various features of Government irrigation projects in Idaho. During the period I was field engineer for 2 years on the construction of a concrete gravity dam 183 feet high and 1,320 feet long and for 1 year I was resident engineer on the construction of an 8,000-kilowatt hydroelectric powerplant.

I was transferred to the Denver office of the Bureau on September 1, 1926, where for 4 years I was engaged on the preparation of specifications and the design of dams. During this period I prepared the construction specifications for Hoover Dam. From October 1930 until May 1936, I was principal assistant to the engineer in charge of the Dams Division, when the construction drawings for Hoover, Marshall Ford, and Grand Coulee Dams were prepared. From May 1936 to October 1952, I was Chief of the Dams Division, supervising the designing of such major structures as Friant, Shasta, Canyon Ferry, and Hungry Horse Dams among numerous others of lesser height. I have been chief designing engineer since October 8, 1952.

I understand I have been asked to be present at these hearings of your committee in the event I may be of help should any questions arise as to the suitability of the Glen Canyon Dam site for the construction of a high dam. On the basis of reading some of the past history of the upper Colorado River storage project, in anticipation of some of the discussions which may occur, I have prepared a brief statement expressing my present views on inquiries which may arise.

I believe it is recognized by laymen and engineers that the Bureau of Reclamation has proceeded with caution on the design of its major structures. In the design of a storage dam, in which failure would always mean the loss of life and property, the safety is of unusual importance.

The type of dam depends in large measure on the geological conditions, including the surface and subsurface configuration and upon the economy or cost of construction. However, economy is of secondary importance to the assurance that the completed structure is safe from failure.

Designers of dams have placed great reliance on the opinions and interpretations of geologists. I believe this committee would be interested in the comments of one of the most eminent geologists of our time, Dr. Charles P. Berkey, dean of the Department of Geology at Columbia University for many years whose services have been used extensively in consulting capacities on Bureau of Reclamation dams. The comments to which I refer were made after an inspection of Glen Canyon by him in June 1947. Two excerpts from his report are quoted as follows:

With this formation it would be possible to build even a higher structure than is proposed, even higher than 600 feet, if for other reasons such design proves to be desirable.

* * * * * * *

The walls are almost vertical and the sandstone formation at this location is sound and virtually free from regional jointing. The only noticeable primary structures are bedding and cross bedding, and the only secondary effects are those due to spalling and weather. Such fractures as there are seem to be due to spalling induced by removal of side support as the river excavated to deeper and deeper levels. There is unusual uniformity in the quality of rock from top to bottom of bare cliffs which must be more than 700 feet high to the first backward slope.

There is no apparent objectionable feature for a dam on this site.

The above opinions by a noted and experienced geologist after observing the surface only of the formation, for no drilling had been done at the time, were highly significant. Almost invariably due to exposure to the weather the surface presents the worst defects; that is, the quality improves with depth. Yet Dr. Berkey found no objectionable characteristics which would preclude the construction of a high dam. As a result, it was decided to thoroughly explore the foundation and abutments by 25 cored deep drill holes and two drifts. Had Dr. Berkey found serious defects in the quality of the formation at the surface, it is doubtful that the expensive foundation explorations would have been undertaken. I believe that the committee has been apprised by others that the results of the foundation explorations were satisfactory and that there was an improvement in quality of the formation with depth.

As a consequence of the subsurface explorations and a certain amount of testing of drill core samples of the Navaho formation, the Bureau has satisfied itself that a high concrete dam may be designed and constructed at the Glen Canyon site. The design of this dam would include the safety factors in common use for high masonry dams. It would conform to the geologic and other conditions at the site. It would take into consideration that the supporting formation is a massive, highly cross-bedded, medium-to-fine-grained sandstone, and that although it is relatively porous compared with rock foundations of other dams, it is structurally competent to withstand the loads that may be imposed upon it.

The fact that water tests at regular intervals in all drill holes showed very little water loss indicates that the rate of permeability is not prohibitive. It was reported than in most cases there was no loss of water when a pressure of 50 pounds per square inch was used, and that when the pressure was increased to 150 pounds per square inch the losses ranged from nothing to 4 gallons per minute. It is true that in a very few cases the first 20 to 30 feet of bedrock had losses of 25 gallons per minute but the zone in which these larger losses occurred never extended more than 30 feet below the surface of the bedrock.

Unsuccessful experimental attempts in the fall of 1949 to chemically grout the formation at the site, gave further conviction that permeability was not excessive. Permeability rates represent the number of cubic feet of water passing through a 1-foot cube of rock in 1 year under a 1-foot head. These rates average 64 feet per year for 20 tests. They are highly satisfactory. Mathematical computations show that the percolation of water around the ends of the dam and returning to the river downstream from the dam would not exceed

14 feet per second under full reservoir head. This amounts to only 10,200 acre-feet per year, or four-hundredths of 1 percent of the storage capacity of 26 million acre-feet. This slow percolation of water around the dam will not damage the rock abutments as the sandstone is insoluble.

Between pages 118 and 119 of House Document No. 364, 83d Congress, 2d session, are inserted two prints of preliminary estimate drawings showing a high concrete arch dam at the Glen Canyon site, No. 557–D–1 and No. 557–D–2. Because the prints are not entirely clear the principal pertinent data are listed as follows:

Reservoir storage	acre-feet	26,000,000
Crest elevation, USGS datum	feet	3,715
Normal water surface elevation, USGS datum	do	3,700
Height of crest above stream bed	do	580
Height of crest above foundation	do	700

Stresses for a dam of similar plan and sections were analyzed by the trial-load method, one in common use for the design of arch dams. By it the dam is divided into horizontal and vertical elements, and the loads are adjusted between the two sets of elements until the deflection at each intersecting point is equal. The resultant stresses in the arch and cantilever elements of the dam and the unit pressures on the foundation and abutments were well below the maximum allowable working stresses and loads respectively.

A series of laboratory tests made in 1950 on 6-inch cores from the Navaho sandstone showed average direct stress at failure of 4,400 pounds per square inch without lateral load and 5,470 pounds per square inch with lateral load of 250 pounds per square inch. The preliminary trial-load analysis, mentioned heretofore, indicated that a high concrete dam can be designed for the Glen Canyon site with stresses at the concrete-to-rock contact surface not exceeding 750 pounds per square inch.

Although sandstones generally have a high porosity as compared with other formations, such as for instance granite, basalt, and shale, this property has not precluded the construction of storage dams on sandstone foundations. It is recognized that a low porisity is advantageous and much preferred, although this quality is not essential.

In determining the height of dam, the use of engineering judgment as well as experience in designing is very important. There should be a limit to the height to which it is proposed to construct Glen Canyon Dam. Just what this should be is determined not only by the geology of the site and the safety of the design but by other factors. One of the most important factors is the overall plan for development of the river—the economic and functional part each dam is to have in the development. On the basis of studies to date and our best engineering judgment, it is believed from the design standpoint that the maximum height of the Glen Canyon Dam for purposes of planning and authorization should be limited to 700 feet, corresponding to a storage capacity of 26 million acre-feet.

Mr. ASPINALL. Thank you very much.

Now, the Chair calls to the witness table Mr. Elmer Bennett, legislative counsel for the Bureau of Reclamation. Do you have a written statement, Mr. Bennett?

ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR

Mr. BENNETT. That is what I wanted to explain. As you know, the notice to the committee did not carry my name as a witness. It was our understanding that the entire day today would be devoted to the engineering problems connected with Glen Canyon foundation, with the result that I do not have a written statement. However, I am prepared to suggest that the statement which I made on the Senate side, which appears in the printed hearings, could be incorporated in these hearings at this point, or, on the other hand, I could come back tomorrow with a printed statement.

Mr. ASPINALL. You are ready to proceed though?

Mr. BENNETT. Yes, I am.

Mr. ASPINALL. You may proceed. The committee will determine later on whether or not we should have the statement included.

Mr. HOSMER. May I ask if Mr. Bennett has his statement before the Senate?

Mr. BENNETT. Yes, I have a copy of it. I take it you do, too, sir, is that right?

Mr. HOSMER. I have some typewritten things here that I assume are the statement you made.

Mr. BENNETT. That is right, sir.

Mr. SAYLOR. Is it printed in the copies?

Mr. BENNETT. Yes, printed in the hearings at page 269.

Mr. HOSMER. Did you bring any copies of the Senate record with you?

Mr. BENNETT. I have one, yes.

(Discussion off the record.)

Mr. ASPINALL. You may proceed, and the copies will be obtained.

Mr. BENNETT. The purpose of my appearance is to discuss with the committee two questions which have been raised by opponents of the project on the one hand and certain friends of development in the upper basin who have undertaken to express opinions on certain basic legal questions bearing upon this project.

The first of those questions stems from the interpretation of article III (e) of the compact, that is, the Colorado River compact of 1922. The language of that subsection of article III is as follows:

> The States of the upper division shall not withhold water and the States of the lower division shall not require the delivery of water which cannot be reasonably applied to domestic and agricultural use.

That language has been the basis for considerable discussion by various witnesses before this committee and also before the Senate committee. For that reason we deemed it desirable to state what our legal conclusions in those matters were.

I would like to state on behalf of the Department that so far as we are concerned there is no doubt but that the upper States under the compact clearly have the right to store water for the purpose of reasonably regulating the flow in order to meet their obligations to the lower basin under article III (d) of the compact. The very purpose of the compact, as the interpretive material in the record will show, was to provide a basis for the regulation of the flow of the Colorado River through storage of the waters of the stream wherever that storage

might be necessary or appropriate to accomplish the apportionments made by the compact.

To begin with, let me say that the provisions of the compact must to read in the light of the instrument as a whole. This is a usual legal principle in construing documents of this type, but in this particular case I would like to quote Hon. Delph Carpenter, who was commissioner for the State of Colorado in the negotiating of the compact. He said:

> First and foremost, it must be ever kept in mind that the intent of the compact is to be ascertained from a consideration of the entire instrument and that each clause must be considered in connection with other clauses.

Now in reading the compact as a whole and thus deriving a reasonable interpretation of article III (e) of the compact, we believe that first, one should turn to article I of the compact. That article contains a statement of the purposes thereof. The statement of purpose includes the following expression:

> To secure the expeditious agricultural and industrial development of the Colorado River Basin, the storage of its waters, and the protection of life and property from floods.

I call your attention specifically to the use of the words "the storage of its waters" in the statement of basic purpose of the compact which appears in article I of that compact.

The representative of the United States in the negotiation of the compact was Herbert Hoover, who later became President of the United States. In response to questions from Congressman Hayden of Arizona which were contemporaneous with consideration of the compact by the States which were made parties thereto, Mr. Hoover stated the following which will be found at page A–37 of House Document 717 of the 80th Congress, otherwise known as the Hoover Dam Documents:

> The future development of the Colorado River is dependent wholly upon the creation of storage. The lower States have certainly reached the limit of development by the direct diversion of the flow of the river.

Mr. Hoover's statement was certainly predicated upon generally recognized historical conditions in the development of the Colorado River at the time of the negotiations of this compact.

As Mr. Ely pointed out in his statement before this committee the possibilities of industrial and agricultural use of the waters of the Colorado River from direct flow had ended by the time this compact was negotiated. At that time there were years in which there were shortages of water below the site which later became the site of Hoover Dam.

The reason for Mr. Hoover's statement appears clear too, when we look at the statements which were made by the negotiators of the compact at that time.

To begin with, I would like to cite to you the statements by Commissioner Emerson of Wyoming, which appear at page A–123 of the document I referred to previously. Legal adviser Sloan of Arizona made a similar statement concerning the fact that storage was essential to the development of the river and that the compact provided a means of arriving at needed storage. His statement appears at page A–65 of the document I mentioned.

Mr. Hoover's statement appears at page A–37 of that document and a statement by Hon. Delph Carpenter of Colorado appears on page A–80.

Now looking at the situation which the negotiators had before them, we must recognize that the lower basin States were developing at a much faster rate than were the upper basin States. At that time a decision by the Supreme Court was impending, and in fact was rendered in the course of the negotiations, which involved the question whether priority of time would be determinative of rights as between appropriators situated in one State as against appropriators situated in an upper State. That decision of the Supreme Court, which is known as *Wyoming* v. *Colorado* (259 U. S. 419), held that as between States which use the appropriation doctrine of water law, the doctrine of priority of time would be applicable in adjudicating the equitable rights of States situated on the same stream.

In the case of the Colorado River, all of the States used the doctrine of appropriation or priority of time, and the result was that the upper basin States, which were developing much less rapidly, were very much concerned over the possibility that lower basin uses would continue to increase at a rapid rate, which would, by virtue of priority of time, use the entire flow of the river and thus preclude future development of the upper basin States.

Having used the direct flow up to its maximum, the lower basin States were at that time very anxious to obtain congressional authorization for a storage structure which would permit the storage of flood flows in the wet years for later use in dry years, thus permitting greater uses in the lower basin. The efforts of the lower basin to obtain authorization of such a structure were resisted bitterly by the upper basin States on the grounds that, if that structure were built and those waters were stored you would thereby encourage even more rapid growth in the lower basin, and you would preclude any future development of the upper basin States.

California, and Arizona, too, in order to achieve their goal of securing storage in the lower basin to assist in the development of the lower basin, were quite willing to sit down and negotiate a compact which would give reasonable assurances to the upper basin that they would not be forever precluded from use of an equitable share of the water of the stream. As a result, we have the Colorado River compact.

That compact, then, from the very beginning, was concerned with regulating the flood flows of the river so as to make possible development of that river. That principle was known just as well to the lower basin as it was to the upper basin.

I repeat again, that it was generally conceded by the negotiators that the possibility of development from direct flow had ended at the time that the compact was being negotiated.

Mr. SAYLOR. That applied only in the lower basin States?

Mr. BENNETT. Well, Mr. Saylor, in the light of the case of *Nebraska* v. *Wyoming*, the doctrine of priority of time applied to the entire basin. Therefore, the direct flow rights, even though the greater share of them had been proven up in the lower basin, were sufficient to block development from direct flow in the upper basin in the absence of storage to regulate the flows of the stream.

Mr. ASPINALL. Does that finish your statement?

Mr. BENNETT. No, sir; there is considerably more to it.

Mr. ASPINALL. If you will proceed, then.

Mr. BENNETT. In applying the language of article III (e) to the matters which are pending before this committee, we must then conclude that one of the basic purposes of the compact was the erection of storage to regulate the flow of this stream.

Then what is the next question? The next question is, What does the compact mean in the language of article III (e)?

I would like to repeat that language again at this point:

> The States of the upper basin shall not withhold water, and the States of the lower division shall not require the delivery of water which cannot be reasonably applied to domestic and agricultural use.

It is our conclusion, first, that that language merely precludes arbitrary and unreasonable withholding of water. In that connection we cite Mr. Herbert Hoover as our authority. In his official documents which were pending before the States at the time they were considering the compact for purposes of ratification, Mr. Hoover said:

> This paragraph applies only to an unreasonable or arbitrary withholding or demand. I do not anticipate either arbitrary action or unreasonableness on the part of any of the States concerned. The upper States can gain nothing by withholding water not needed, nor can the lower States gain by demanding water for which they have no use. The paragraph is of value as an expression of the prohibition of such action, but I doubt if it is ever called into practical effect.

That appears at page A–39 of the Hoover Dam Documents.

Secondly, I would like, in connection with interpreting article III (e), to point out that Mr. Delph Carpenter, in his official documents which were pending before the State of Colorado at the time of the ratification of the compact, said:

> Paragraph (e) or article III is reciprocal. It should be construed with paragraph (b) or article IV.

Now article IV (b) is that section which expressly states that the waters may be impounded for the generation of electricity, except that any rights to generate electricity shall be subservient to agricultural and domestic purposes.

Now it is apparent, then, that Mr. Carpenter in his official documents and statements took the view that the section dealing with withholding of water was related directly to the question of the dominance of agricultural and domestic uses. No one questions the mandate of the compact so far as the paramountcy of domestic and irrigation uses are concerned. That is not the issue here. In fact, we would like to point out from the language of IV (b) that it expressly states that the waters might be impounded for the generation of electricity.

The interpretation of the project's opponents which has been offered to this committee in that connection, is that, when the language in article III (e) is read, you should read only these words, that water may not be withheld by upper division States unless those waters reasonably may be used for agricultural and domestic uses in the upper basin, that under no other circumstances could the waters be stored in the upper division. We reject that on the clear language of article IV (b) which expressly states that the waters may be impounded for the generation of electricity, which is not even mentioned in article III (e).

Mr. HOSMER. Will you read the provisions of IV (b) to which you are referring?

Mr. BENNETT. Yes. This is the language of article IV (b):

Subject to the provisions of this compact water of the Colorado River system may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

In the light of that language, it is easy for us, at least, to see why Mr. Carpenter stated that the language of article III (e) is complementary to the language of IV (b), that the two are designed to make clear that uses of Colorado River water for generation of electricity are subservient to uses for agricultural and domestic purposes.

Now, perhaps of more importance than any other aspect of the interpretive problem involved in dealing with article III (e), is the fact that article III (a) expressly apportions 7½ million acre-feet of water to each basin. There is nothing in article III (a) which puts any limitation on that apportionment; yet it is generally conceded that other subsections and articles of that compact do in fact put limitations on those apportionments.

Mr. HOSMER. Just a moment, Mr. Bennett.

Mr. ASPINALL. Just a minute. The Chair wishes that the gentlemen will not ask questions. If there is additional materials to be put in——

Mr. HOSMER. I would like him to read the provisions of III (a) into the record at this point so it can be compared with the statement relating to that.

Mr. ASPINALL. That is all right.

Mr. BENNETT. I think that is a good idea.

Article III (a). There is hereby apportioned from the Colorado River system in perpetuity to the upper Basin and to the lower Basin respectively the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.

There is not one word in article III (a) which says that article III (a) is subject to anything else in the compact. Yet I do not believe that there is a lawyer on either side of the issues involved here who supports the proposition that III (a) is an unqualified apportionment. It is generally conceded the rest of the compact must be read in connection with III (a).

Those who argue that III (e) is completely independent of any other provision in the compact and should not be read in the light of the rest of the compact are arguing for a different principle of interpretation as to III (e) from what they accept as to III (a).

In our judgment this is not a reasonable interpretation, and we believe that this document must be read as a whole.

Furthermore, we point out in this connection that article III (d) imposes a specific obligation on the Upper Basin so far as the delivery of water over 10-year periods is concerned; that, according to the opponents of this project themselves, would preclude the use of more than, say, 4.3 to 4.5 million acre-feet of water per year in the upper basin without additional storage.

In our judgment, then, we believe that article III (a) was meant by the negotiators to attempt to apportion 7½ million acre-feet of water to the upper basin and to authorize those things which are reasonably necessary, such as holdover storage to permit the upper basin to use the water apportioned to it in article III (a).

Likewise, we believe that article III (d), which imposes the specific 10-year obligation on the upper basin, is to be read in connection

with III (e) and also III (a), so that III (e) then is not to stand in the way of storage which reasonably is necessary to permit the upper basin to use the waters apportioned to it by article III (a) and still meet the obligations of III (d).

That, I believe, concludes the major aspects of the interpretive problem as we view it. The statement before the Senate was considerably longer, as I believe the committee is aware, and for that reason you may desire to have it incorporated in this record.

Mr. ASPINALL. The gentleman from Pennsylvania would like to have you repeat that last statement so he can have it definitely in mind.

Mr. BENNETT. Well, to attempt to state it in exactly the same words——

Mr. ASPINALL. The reporter will read it.

(The record was read by the reporter.)

Mr. ASPINALL. That concludes your statement at this time?

Mr. BENNETT. Yes.

Mr. ASPINALL. Is there any objection?

Mr. HOSMER. Mr. Bennett also covered an additional topic in his Senate testimony that I would like for him to cover here this morning, inasmuch as the statement is going in, and that pertains to the argument that power might be generated in the upper basin from water which may not be used for agricultural and domestic uses in the upper basin.

Mr. BENNETT. I might say, Mr. Hosmer, that the reason I did not cover that at this point was that I understood—and I may have been mistaken—that the principal attorneys for the opposition to this bill in their House appearance conceded the right to generate electricity in the upper division. If I am mistaken, I will be happy to deal with that question.

Mr. HOSMER. I would like to have you deal with it as to what the Department's understanding is.

Mr. BENNETT. Right.

Mr. HOSMER. I would like to have you deal with it as to what the statement of Senator Johnson, the argument was offered for consideration that the right to generate electricity was restricted as to both basins, presumably, unless the water which was stored for that purpose could also be used for agricultural and domestic uses.

Mr. BENNETT. Now our response to that lies flatly in the provisions of article IV (b) which, as you will see, makes no reference to the geographical location of powerplants. It states flatly that "subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of electrical power."

That statement in article IV (b) is then qualified by saying "but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes."

Now no one is attempting to reinterpret this compact so that power uses are either equal in preference to domestic and agricultural uses or preferred. Everyone has conceded, on both sides of the questions that are pending before this committee, that power uses are subservient. That has been the rule in the lower basin, it is the rule by State law, I believe, in every State of the basin, and it was confirmed in the compact itself. So there is no question about the preference accorded to domestic and agricultural uses.

Now I might say that the relationship of article 3 (e) to this question of generation of power has been brought about in this way in the course of the discussions: The language of 3 (e) has been interpreted by the project's opponents to mean that any water that cannot be used for agricultural and domestic uses must be permitted to flow down the stream. In other words, water which cannot be used in the upper division must go on down to the lower division. But it appears quite clear on the face of the compact that such is not the case, in our judgment. The provision of article 4 (b) expressly comprehended the use of water for generation of electricity so long as there was no interference with uses for domestic and agricultural purposes.

We rest on that as a very brief thumbnail statement of our position on the generation of electricity.

Mr. HOSMER. Mr. Chairman, at this point I think probably it would be well to have in the record just preceding Mr. Bennett's explanation, the full statement by Governor Johnson, and I ask unanimous consent that it be inserted.

Mr. ASPINALL. That is the statement of Senator Johnson?

Mr. HOSMER. Which the witness was discussing.

Mr. ASPINALL. The whole statement?

Mr. HOSMER. It is almost impossible to extract that portion, I believe, is it not, Mr. Bennett, because it is a total document?

Mr. BENNETT. Yes.

Dr. MILLER. Reserving the right to object. I would like to have Senator Johnson here so that we can ask questions, because I do not agree with many of the things in his statement.

Mr. HOSMER. I think that is very true. Mr. Bennett stated he does not agree with some of the things. But I do not see how we can follow the discussion without having the statement in.

Dr. MILLER. Assuming it is made a part of the record, I would want to have him here. I have no objections otherwise.

Mr. ASPINALL. The chairman would suggest this: When Senator Johnson made the statement he did not go on record that he was wholly in agreement with everything he set forth in this statement, as the gentleman from California well knows.

Mr. HOSMER. That is right.

Mr. ASPINALL. The Chair has no objection to having it made a part of the record or a part of the file, as far as that is concerned, but the gentleman from Nebraska——

Dr. MILLER. Let us reserve the decision.

Mr. HOSMER. May I say this to the gentleman from Nebraska?—The Governor of Colorado concluded that the dams not only should be built, but that many more should be added to the project. So certainly it is not, in that sense, an attempt on my part to get something in by way of argument against his position.

Mr. ASPINALL. Would the gentleman from Nebraska permit it to be made a part of the record, for what it is worth, without placing the Governor of Colorado in the position that he has to appear?

Dr. MILLER. I am not going to object, if you want to do that. I do think there are some questions I would like to ask the Governor.

Mr. HOSMER. There are some I would like to ask him too.

Mr. ASPINALL. We will determine later on whether or not we will put it in.

Dr. MILLER. Would you hold it up for the time being?

Mr. DAWSON. I join with my colleague from Nebraska. This is a press release that the Governor made involving a good many matters. I do not think we should insert it in the record. I think if he wants the Governor of Colorado to testify on this particular matter, he should come, but it is just a press release and he asked to be corrected if he is mistaken.

Mr. DAWSON. I think he admitted that later on he was mistaken.

Mr. HOSMER. Perhaps it would be a good idea to have the Governor come here and testify before the committee, Mr. Chairman.

Mr. ASPINALL. Let the Chair say, we do have the reference to the statement and the statement is available to all of us to study, and if the gentleman from California will withhold, later on we may determine it.

Mr. HOSMER. Thank you, Mr. Chairman.

Mr. ASPINALL. Thank you very much, Mr. Bennett.

We will now proceed with the questioning. The gentleman from California, Mr. Engle, asked that he be allowed to pass this morning and reserve, if he desires, any questions he may have when he gets caught up with his work as chairman of the full committee. So the Chair recognizes the gentleman from Nebraska, Dr. Miller, for any questions he may have.

QUESTION PERIOD OF W. A. DEXHEIMER, COMMISSIONER OF RECLAMATION; J. NEIL MURDOCK, REGIONAL GEOLOGIST, BUREAU OF RECLAMATION; KENNETH B. KEENER, CHIEF DESIGNING ENGINEER, BUREAU OF RECLAMATION; ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR; E. O. LARSON, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, ACCOMPANIED BY C. B. JACOBSON

Dr. MILLER. Mr. Bennett, as I understand it, there are some phases of the legal problem before the Supreme Court which you are rather reluctant to express an opinion upon because it is before the Court. That is the matter of surplus waters and storage and so forth. But I would like to ask you this: These things written in III (e) and III (b) and III (c), I am not sure when they were written in the early 1920's whether the people who wrote them knew exactly what they meant. We are trying to put a little different interpretation in here.

I have gone back in the record and tried to search out statements that may have been made at that time to clarify the record, but they stand there in all their nakedness and subject to different interpretations. I suppose the Supreme Court in due time will make certain findings upon what was really meant by some of the language. But I want to ask you: Under the compact, I believe that the water is to be released in the amount of 75 million acre-feet over a 10-year period or 7½ million acre-feet per year average. Is that correct?

Mr. BENNETT. I would say this, Congressman: It is not comprehended, as I understand it, that 75 million acre-feet of water is the maximum amount of water that would ever be released to the lower basin. We recognize there are contingencies involved in the interpretations of the compact, the rights under the Mexican treaty, all of those things, which might, in fact, require the release of more than

7½ million acre-feet per year. But in shortage years you might also not have enough water to do that. But if you were in that situation, then the upper basin could dry up completely, if we assume no storage in the Upper Basin.

Dr. MILLER. So the 7½ million acre-feet are a minimum that has to be released?

Mr. BENNETT. There is some difference of opinion on that, but I believe it is conceded by us—I would not want to say that flatly—but it is my understanding that the Department takes the view that the 75 million is a guaranty which probably assumes priority over and above upper basin uses of water. That is the reason why we recomlished at the date of the compact have priority.

Mr. ASPINALL. With this exception—if the gentleman will yield to me.

Dr. MILLER. Yes.

Mr. ASPINALL. That the uses of the upper basin which were established at the date of the compact have some priority.

Mr. BENNETT. Oh, yes, definitely, as provided for in article 8. Article 8 of the compact specifically provides that.

Dr. MILLER. They did not show too much use at that time in the upper basin States.

Mr. BENNETT. That, I think, is true, Congressman. However, those rights, many of them, are very, very old rights, as I know Congressman Aspinall is aware.

Dr. MILLER. In other words, we might come to a situation where the lower basin States required, because of their growth, for domestic water and agricultural purposes an average of 10 million acre-feet a year. Then, is it part of the compact that that water must be released for that purpose?

Mr. BENNETT. Absolutely not, in our judgment. That depends on the interpretations of the compact as a whole. The compact certainly does not establish rights on the basis of needs as of any given period. Article 3 (a) makes an apportionment of water to the lower basin and an apportionment of water to the upper basin and, as I pointed out, it expressly cuts across, in fact, the doctrine of priority of time. It guaranteed to the upper basin that at some future time she could come in and use water under the apportionment. The apportionment was made in perpetuity according to the language of 3 (a) for that reason.

Dr. MILLER. The Secretary of the Interior must comply with all provisions of the Colorado River compact, the Boulder Canyon Project Act, and the treaty with Mexico, and so forth, as it relates to the storage and release of water.

Mr. BENNETT. Under every bill pending before the Congress, that is the case, to my knowledge.

Dr. MILLER. Do you think then you could withhold water in the upper Colorado River Basin for the creation of electrical energy if that water is needed for domestic or agricultural purposes further down the river?

Mr. BENNETT. No.

Dr. MILLER. You think that would not be possible?

Mr. BENNETT. That is correct, sir. Now there is a technical, legal——

Dr. MILLER. Even if there was a surplus of water?

Mr. BENNETT. Now, if it is surplus water, over and above all reasonable requirements, over and above article 3 (b), you are getting into questions which are definitely in litigation, and we would be most reluctant to deal at length with that.

I would like to point this out, though, Congressman: When you say the water is needed in the lower basin, then the question of reasonable requirement comes in under the language of article 3 (e). If you remember, article 3 (e) says that the waters of the river shall not be withheld by the upper basin, nor required by the lower basin unless reasonably necessary for irrigation and domestic uses.

Dr. MILLER. What is reasonably necessary for irrigation and domestic uses?

Mr. BENNETT. That, of course, is a factual question that turns from case to case; one that has been known in the law for many years.

Dr. MILLER. Who makes that decision?

Mr. BENNETT. The courts eventually under these bills which permit the litigation of issues of that kind.

Dr. MILLER. The water running down, of course, past Lee Ferry goes into Lake Mead. How much water on an average is stored at Lake Mead?

Mr. BENNETT. I would have to ask the engineers on that.

Mr. HOSMER. Will the gentleman yield for a question while he is getting that information?

Dr. MILLER. I would like to pursue this just a little further, if I might.

Mr. DEXHEIMER. Capacity of Lake Mead originally was approximately 31 million acre-feet. It has been reduced about 1½ million acre-feet by siltation. It is approximately 29½ million acre-feet at present.

Dr. MILLER. If the need for water, then, in the lower area for irrigation and domestic purposes comes into play, the water in Lake Mead, I would think, would be considered as a part of the storage system which could be used to meet the needs of the irrigators or domestic users before you would call upon the upper river basin, because you do have a surplus of water, at least, water in Lake Mead. Is that your thinking?

Mr. DEXHEIMER. That is correct, Congressman Miller. And at the present time, due to last year's shortage of runoff in the Colorado River and the anticipated shortage for this coming spring, we are withholding water in Lake Mead and curtailing the power output of that power project to save that water for the needs of the lower basin.

Dr. MILLER. And over a 10-year period of time, is there a good deal of water that gets by Lee Ferry and out of Lake Mead that is surplus to the 7½ million acre-feet that is required, plus the million and a half acre-feet that must go down to Mexico?

Mr. DEXHEIMER. There has been since Lake Mead was closed in 1934 an average of a little over 4 million acre-feet surplus over and above not only the needs but the commitments to Mexico and the lower basin that has gone to waste unused in the gulf.

Dr. MILLER. And if we had had Glen Canyon and some of the other reservoirs built, a portion of that, or all of it, could be held back for future needs?

Mr. DEXHEIMER. Certainly in an area where water is that short we should not permit the continued waste of 4 million feet on the average

per year, and these upper basin developments would make possible the saving of that and using it for beneficial uses.

Dr. MILLER. Over an average of 4 million acre-feet. It has been 21 years. Four times 21 would be 84 million acre-feet of water that could have been stored up and held back in excess of the needs of Mexico and the lower basin. Am I correct in that?

Mr. DEXHEIMER. Yes, sir. In 1952, as a matter of fact, we had a large runoff, and the waste into the gulf was about 7 million acre-feet.

Dr. MILLER. But the average has been about 4 million acre-feet?

Mr. DEXHEIMER. Yes, sir.

Dr. MILLER. So, unless we have some additional reservoirs to hold back water that comes in flood seasons, then it dissipates without being used?

Mr. RHODES. Will the gentleman yield for one question?

Dr. MILLER. Yes.

Mr. RHODES. Was this 4 million acre-feet released, Mr. Dexheimer, because of lack of storage at Lake Mead?

Mr. DEXHEIMER. It was partially to draw down that storage to make room for the anticipated floods. Of course, you realize it takes a period of months to pull that reservoir down to take care of the anticipated floods. So these releases are made through the powerplant as much as possible to generate power but are made over a period of time, and then the reservoir is refilled as the floodwater comes off.

Mr. RHODES. The release is made then as a matter of control of the river and not as a matter of producing more power at Lake Mead?

Mr. DEXHEIMER. The power was produced—every drop of water we could run through the generators, of course, at Hoover, Davis, and Parker was of benefit to the power users, largely in Los Angeles, but in some instances we have had to actually spill water when we had so much to get rid of that we could not run it all through the powerplant in the time allotted.

Mr. RHODES. The motivation for the release was not the production of power, though?

Mr. DEXHEIMER. No, it was primarily a control of the river.

Mr. HOSMER. Will the gentleman yield?

Dr. MILLER. Yes, I will yield.

Mr. HOSMER. Then that figure of 4 million total you mentioned has not been all what you would call waste, but a good deal has been released in order to prevent floods; is that right?

Mr. DEXHEIMER. The primary first purpose of releasing it, of course, has been to evacuate Lake Mead enough to take care of the anticipated floods so that we would not have a flood in the lower valley. Incidentally, of course, it is run through all of the generators, and the power users have had the benefit of that average of 4 million acre-feet additional in generating capacity through the systems of dams in the lower river for the last 20 years. This year, I think, is the first time that we have had to curtail the uses and save water.

Dr. MILLER. I would like to ask: What is the anticipated storage in the Glen Canyon and Echo Park Dams?

Mr. DEXHEIMER. Glen Canyon would have a total of 26 million acre-feet, of which about 6 million would be dead storage. Echo Park is about 6½ million. I do not have the figure for dead storage in Echo Park. (Dead storage capacity at Echo Park reservoir is 1 million acre-feet.)

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Dr. MILLER. I was just trying to do a little figuring here. If we had built Glen Canyon and Echo Park and maybe some of the other reservoirs in 1934, the 84 million acre-feet of water which has run off since that time would have filled Echo Park and Glen Canyon 2½ times.

Mr. DEXHEIMER. Yes, sir.

Dr. MILLER. If you had had them, it would have been some help in holding water back that now continues to run off unused, while at the present time there seems to be a shortage of water. But the record shows that since 1934 we have lost about 84 million acre-feet of water that has not been stored, and most of it could have been stored if we had had proper storage capacities for it.

Mr. DEXHEIMER. Not only that, Dr. Miller, but had we had those dams and powerplants in, we could have gotten a great deal more electrical energy out of that water as it went on down than we were able to produce with the downstream plants alone.

Dr. MILLER. And the water that is held in storage that is not needed for agricultural and domestic purposes can be used to produce electrical energy?

Mr. DEXHEIMER. Yes.

Mr. BENNETT. That is correct, sir.

Dr. MILLER. And the question of surplus water and so forth is now before the Supreme Court for their decision?

Mr. BENNETT. That is correct, sir. I might point out that today we have not hit upon a very pertinent fact in connection with consideration of the bills before the committee. Mr. Ely, in his statement, uses the figure 2 million acre-feet as being involved in that litigation. The largest package involved in any of the bills does not exceed uses of 4.8 million acre-feet of water in the upper basin, including all present and authorized uses.

Mr. HOSMER. May I ask——

Mr. BENNETT. That means there is a margin——

Mr. HOSMER. May I——

Mr. ASPINALL. Just a minute.

Mr. BENNETT (continuing). A margin of 2.7 million acre-feet of water, which appears many times in the Senate hearings, as the leeway between the development comprehended by the largest package which has been offered in any of the bills and the apportionment mentioned in article III (a). Now whatever that apportionment may mean. I am not trying to interpret how that apportionment is affected by the compact. I am merely pointing out the size of the cushion.

You have indicated that you were concerned as to what relationship the litigation had to this project from the point of view of the Department, Congressman Miller, and I thought we had better get that clear.

Dr. MILLER. I can see and understand the apprehension of the lower-basin States. Southern California is growing rapidly and is going to need in the years ahead probably far more than the 7½ million acre-feet of water. It does not seem they would be in very good position to get that additional water unless there was some storage up in the upper-river basin someplace to hold back part of this 84 million acre-feet that has run off in the last 21 years in order to meet the needs of their growing country and the needs of their irrigators and domestic users.

Mr. HOSMER. Will the gentleman yield?

Dr. MILLER. I am certain, looking ahead another 20 years California probably will have twice as many people in that State, someone is not taking some steps to have sufficient water available, whether it is in the upper Colorado River Basin or someplace else. We must remember that in our growing country California is about the size of Japan. Japan has about 90 million people. I do not know whether California will ever have 90 million people or not, but if they have 45 million people, they are going to need twice the water they are getting now in order to get a drink of water once in a while, and unless somebody has the wisdom and foresight to store up water someplace that presently runs off without being used, then their growth will certainly be limited by the amount of water that might be available.

That is all.

Mr. HOSMER. Will the gentleman yield?

Dr. MILLER. Yes.

Mr. HOSMER. Do I understand your contention to be that the upper Colorado storage project is wholly or at least partially for the benefit of the State of California?

Dr. MILLER. It has been said here that, if you people needed more than 7½ million acre-feet of water for domestic and agricultural purposes, you are entitled to it. I would not know where you would get it out of Lake Mead if you had double the population you have.

Mr. HOSMER. Can you explain to me how water which does not pass Lee Ferry can be used in southern California?

Dr. MILLER. It is my understanding if you need it for domestic purposes, whether it is 7 or 12 million acre-feet of water, that the water is held back in storage and would be available. I think the testimony over in the Senate by Mr. Bennett so stated. If I am wrong, I want to be corrected. Is that right, Mr. Bennett? I believe your testimony over in the Senate indicates that if it were needed downstream it would be available.

Mr. BENNETT. There are a number of different situations involved in that question, but assuming, first, that the water which was in Glen Canyon Dam was not reasonably necessary to regulate the flow of the stream so as to make the upper basin uses possible, yes, it would have to go down, it could not be held.

The only purpose of holding it under those circumstances would be for the generation of electricity, and if that water were reasonably required in the lower basin for domestic and agricultural purposes, yes, it would have to be released.

Dr. MILLER. That is the testimony which you gave over in the Senate.

I might point out to my friend from California that in the last 21 years there has been 84 million acre-feet of water run away without being used, and if Glen Canyon and Echo Park and a couple of other dams had been built, they would not have been capable of storing up all 84 million acre-feet. If California expects to grow—and I hope she does—she is going to need some more water. Bless your heart, if I represented your people, I would get behind some plan to store water in the upper Colorado River, so that when you do need it for domestic purposes, when you exceed your 7½ million acre-feet, it will be stored up so that somebody can get a drink of water.

Mr. HOSMER. Bless your heart, too, Dr. Miller, because I think you have given us a way to raid all the water from the upper Colorado Basin.

Dr. MILLER. I am referring to the testimony in which he said, if there were water in excess of the need for domestic purposes, and the reservoirs would be full, you would be entitled to it.

Mr. UTT. Will the gentleman yield?

Dr. MILLER. I am through.

Mr. ASPINALL. The Chair recognizes the gentleman from Florida.

Mr. HALEY. I pass, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Chairman, I have listened with interest to all this talk about all these full reservoirs and how much has run down into the ocean, because during the last hearings when we had representatives of the Department up here I directed a question to Mr. Larson essentially as follows: How much water would be withdrawn from Glen Canyon and Echo Park Reservoirs between 1930 and the present time, assuming that the 11 participating projects recommended by the Secretary were in full operation in 1930 and the Echo Park and Glen Canyon storage units were completely full in 1930?

On Saturday morning I received the answer. Instead of having these overflowing reservoirs, it startled me because Glen Canyon today, assuming it was full in 1930, has been drawn down 9 million acre-feet, and Echo Park has been drawn down 2 million acre-feet.

Mr. Chairman, I think this is a very interesting report, and I ask unanimous consent that it be placed in the record at this point.

Mr. ASPINALL. Unless there is an objection, it is so ordered.

Hearing none, it is so ordered.

(The document referred to follows:)

UNITED STATES DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington 25, D. C., April 15, 1955.

Hon. JOHN P. SAYLOR,
House of Representatives, Washington 25, D. C.

MY DEAR MR. SAYLOR: During a noon recess of recent hearings on the Colorado River storage project and participating projects before the House of Representatives Subcommittee on Irrigation and Reclamation, you directed a question to Regional Director E. O. Larson essentially as follows:

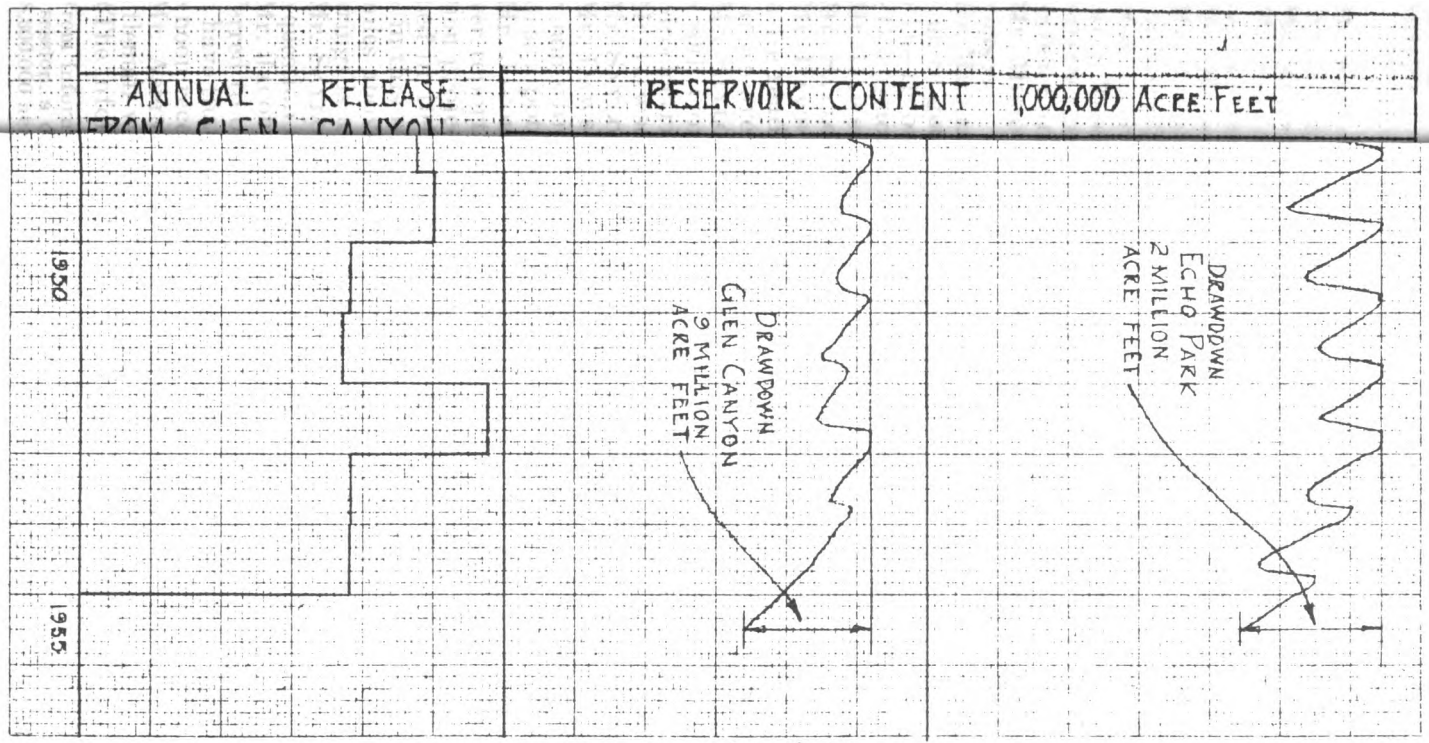
"How much water would be withdrawn from the Glen Canyon and Echo Park Reservoirs between 1930 and the present time assuming that the 11 participating projects recommended by the Secretary were in full operation by 1930 and the Echo Park and Glen Canyon storage units were completely full in 1930?"

An operation study of the Glen Canyon and Echo Park units based on your stated conditions has now been completed. These studies indicate that if Glen Canyon and Echo Park Reservoirs had been full in 1930, with the 11 participating projects recommended by the Secretary in full operation, the two reservoirs would have been drawn down by about one-half their active capacity by 1935. The reservoirs would have gradually regained storage, with the system being nearly full by 1942. With minor fluctuations, the reservoirs would remain essentially full until 1952, at which time drawdown would be started again. By July 1955, the estimated drawdown would be 9 million acre-feet at Glen Canyon and 2 million acre-feet at Echo Park.

In making the operation study it was necessary not only to assume the conditions imposed by your questions, but also to make assumptions with respect to other operating criteria. These included:

(*a*) A minimum allowable reservoir elevation for maintenance of assumed required powerplant capacity.

(*b*) An energy output to be maintained at each reservoir for given conditions of storage and inflow.



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(c) Certain assumptions with respect to powerplant interconnections and marketing of power.

Attached is a chart summarizing the results of the study.

Sincerely yours,

W. A. DEXHEIMER, *Commissioner.*

Mr. SAYLOR. The first question I will ask of Mr. Murdock.

Mr. Murdock, you say you were first in that area around 1924?

Mr. MURDOCK. Yes, sir.

Mr. SAYLOR. Bridge Canyon, Marble Canyon, Glen Canyon dam sites. Is that correct?

Mr. MURDOCK. Correct.

Mr. SAYLOR. I call your attention, Mr. Murdock, to House Document No. 419 of the 80th Congress, which was published by this committee, and on page 206 there is a profile of the river which shows the Canyon Reservoir which was proposed at that time, which would hold 8,600,000 acre-feet of water. Can you tell us what was the height of the Glen Canyon Dam proposed in that document?

Mr. MURDOCK. No; I cannot. Maybe I can refer it to one of the engineers.

Dr. MILLER. I wonder if the reporter could read the question. I did not quite get it.

(The record was read by the reporter.)

(Discussion off the record.)

Mr. DAWSON. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. DAWSON. For the purpose of the record, would you state what you are reading from, what the map is, so we might understand just what we are talking about?

Mr. SAYLOR. The map is on page 206 of House Document 419 of the 80th Congress, entitled "River Profile Showing Reservoirs and Hydroelectric Power Plants, Colorado River Basin."

Mr. DAWSON. Will the gentleman yield further?

Mr. SAYLOR. Yes.

Mr. DAWSON. I think it should also be stated for the record that the dam which the gentleman has inquired about is referred to in the map as a potential dam site.

Mr. JACOBSON. Congressman Saylor is referring to the Colorado River report, which is an inventory of dam sites and potential irrigation projects in the upper and lower Colorado River basins, published in 1947. The particular site referred to as the Glen Canyon site in this report is the site located at mile 4 on the Colorado River, 4 miles above Lee Ferry, whereas the site being considered in these hearings is at mile 15.

Mr. SAYLOR. Let us not get into any explanation. Let us answer the question and then explain all you want to.

Mr. JACOBSON. As far as I can tell, the height of the dam is not referred to on the profile. It is in the narrative of this report. We can have that information for the information of the committee after the noon recess if you so desire.

Mr. ASPINALL. You are requested to bring it at that time. The gentleman will proceed.

(The information referred to follows:)

From information shown on page 146, House Document 419, 80th Congress, 1st session, a dam raising the water surface 401 feet would provide a reservoir of 8,600,000 acre-feet capacity at the mile 4 Glen Canyon dam site.

Mr. SAYLOR. The next question I have, Mr. Murdock, is whether or not you made a geological survey in that area in 1947 prior to the publication of House Document 419.

Mr. ASPINALL. Will the gentleman from Pennsylvania yield to the chairman just a minute?

Mr. SAYLOR. I yield.

Mr. ASPINALL. Mr. Dexheimer, is the dam to which the gentleman refers at this time under consideration in the legislation which is before the committee?

Mr. DEXHEIMER. No, sir; it is not. It has been abandoned for various reasons. We are considering an entirely different dam site, different storage capacity.

Mr. ASPINALL. May the Chair ask you this: What was the reason for the abandonment?

Mr. DEXHEIMER. Largely because mile 15 is the better site, having better rock conditions further along the river and partly because at that time there was an entirely different concept of the development. At that time, during the 80th Congress, the reconnaissance report named the sites that were to be investigated. They have been further investigated since 1947.

Mr. ASPINALL. Then the Chair will have to rule that the matter, as such, is not properly before the committee and is not included within the proposals of the Bureau of Reclamation at this time for the upper Colorado River project in the legislation.

Mr. SAYLOR. Mr. Chairman, I am going to appeal from the ruling of the Chair, because this is typical of what has happened every time anybody has the temerity to come in and question the Bureau of Reclamation. They bring in a set of plans, they publish them, and they put them out as House documents and we rely upon them, and when somebody comes along and asks questions with regard to the documents that are put out, the Bureau always has an answer that they are never at the same place. This committee is entitled to know, and the reason we have these members here today to hear from the Department rather than the people who are from the area is to find out what has happened down in this area and find out why. There is not a member of this committee that has introduced any bills up until this very moment that knew that the dam site that is now being proposed in the present legislation——

Mr. ASPINALL. The Chair takes exception to that, because the bill which the gentleman from Colorado has introduced has nothing to do with what the gentleman is talking about at the present time, and the gentleman from Colorado knows it, he knew it at the time he introduced the bill. I do not object to the gentleman from Pennsylvania getting all the information necessary and that he deems necessary that has to do with the legislation before this committee, but as far as his relationship with the Bureau is concerned, this is no place to thresh that relationship out.

The gentleman may have his opinions of the Bureau, just like the chairman may have his opinions of the Bureau. If the gentleman has finished his appeal, the Chair will just have to say, all those in favor of the appeal that the gentleman from Pennsylvania has made say "Aye."

Those opposed will say "No."

The appeal is denied. The gentleman will proceed in order.

Mr. SAYLOR. The next question I might ask, then, is if there is before this committee any profile of the river since the House Document No. 419 that is available to the members wherein we might discuss and determine the site of the proposed project.

Mr. DEXHEIMER. Printed as House Document No. 364, 83d Congress, 2d session, is the report of the Secretary on the Colorado River storage project and participating projects, and it has been available to this committee for some time.

Mr. SAYLOR. That is not the question I asked, Mr. Dexheimer. I asked where in this report is a profile of the river similar to the one in House Document 419.

Mr. DEXHEIMER. Page 104 is the river profile showing the main stem developments, in the document I just cited.

Mr. SAYLOR. Mr. Murdock, will you turn to page 104 of House Document 364 of the 83d Congress?

Mr. MURDOCK. Yes.

Mr. SAYLOR. There do you find in the potential dam sites of the river profile on the main stem development a place called Glen Canyon?

Mr. MURDOCK. Yes.

Mr. SAYLOR. What work did you do in the area of Glen Canyon Dam site as shown on this profile between July 1947 and April of 1954?

Mr. MURDOCK. We have made a reconnaissance trip down the whole river.

Mr. SAYLOR. When?

Mr. MURDOCK. I personally went down the river in 1947, I think it was, from Moab on down to Lee Ferry. I worked from Lee Ferry up the rivers in connection with tunnel lines.

We started our drilling in 1949. Of course, we had a camp in there for about a year with a resident geologist, and five other Bureau geologists were in and out of the site several times.

We have mapped the dam site in considerable detail. We have examined the entire area for construction materials within the radius of, say, 20 miles. We have made special tests which were designed to furnish more detailed information on the rock, conducted by the laboratory personnel in Denver, and we have used United States geological data, which is considerable in that general area, in our studies.

Mr. SAYLOR. When was the last time you were at this dam site?

Mr. MURDOCK. April of 1954.

Mr. SAYLOR. April of 1954?

Mr. MURDOCK. Yes.

Mr. SAYLOR. Has anybody in your Department that you know of visited the dam site since April 1954?

Mr. MURDOCK. No.

Mr. SAYLOR. On page 3 of your statement, at the end of the second paragraph, you have this statement:

> I consider the geology of the Glen Canyon Dam site entirely favorable and competent to safely support the proposed 700-foot dam.

When did you come to that conclusion?

Mr. MURDOCK. Well, the first time I was in there I considered it safe for a high dam, and I have never had any other opinion. It has always seemed to me like a good dam site since the first time, and each succeeding time I visited it I was more firmly convinced as our investigation went along.

Mr. SAYLOR. If you say that you feel it can support a 700-foot dam, could it support an 800-foot dam?

Mr. MURDOCK. Strictly from geological data or from geologic inspection, say, I do not pretend to be able to limit it to a certain point. Just from looking at it strictly alone, I would have to say, "Yes, it would support an 800-foot dam." But we do not depend on that entirely. The designs have to have something more definite than that to work on. That is why we make these special tests.

Mr. SAYLOR. As far as the geological end of it is concerned, you say there is no limit to which this dam could be built?

Mr. MURDOCK. There is a limit. I would hesitate to say a thousand foot, but 800 foot I think probably, from a geologic standpoint, I would have to say "Yes."

Mr. SAYLOR. Why would hesitate to say a thousand feet?

Mr. MURDOCK. Down in that area we have cliffs a thousand feet high and, of course, sandstone is not quite as heavy as concrete, and you want a little more safety than that. So as far as I know, a thousand foot would be as high as nature is holding those cliffs up. So I would not quite go that far.

Mr. SAYLOR. In other words, the very nature of the cliffs indicates that a thousand feet would be more than you would consider safe?

Mr. MURDOCK. I would hesitate to recommand a thousand-foot dam.

Mr. ASPINALL. The committee will be in recess until 1:30. When we reconvene in session the gentleman from Pennsylvania, Mr. Saylor, will have control of the time.

(Whereupon, at 11:55 a. m., the subcommittee recessed to reconvene at 1:30 p. m. the same day.)

AFTERNOON SESSION

Mr. ASPINALL. The committee will be in session.

The Chair recognizes the gentleman from Pennsylvania.

QUESTION PERIOD OF W. A. DEXHEIMER, COMMISSIONER OF RECLAMATION; J. NEIL MURDOCK, REGIONAL GEOLOGIST, BUREAU OF RECLAMATION; KENNETH B. KEENER, CHIEF DESIGNING ENGINEER, BUREAU OF RECLAMATION; ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR; E. O. LARSON, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, ACCOMPANIED BY C. B. JACOBSON—Resumed

Mr. SAYLOR. I think, Mr. Murdock, when we concluded the hearing this morning you had made the statement that there is no doubt in your mind the geology at Glen Canyon Dam site, as indicated on the river profile showing the main stem development, on page 104 of House Document 364 of the 83d Congress, indicates that it will support at least a 700-foot dam, and you feel maybe even higher than that.

Mr. MURDOCK. Yes.

Mr. SAYLOR. When did you come to this conclusion?

Mr. MURDOCK. When I first looked at the site I was not trying to conclude any definite height of the dam, that it was good for. I just considered it for a high dam and figured we would wait until the results were in on our explorations and special testing, but——

Mr. SAYLOR. That was sometime, then, between 1949 and today?

Mr. MURDOCK. Yes.

Mr. SAYLOR. After the tests were in, when did you come to this conclusion?

Mr. MURDOCK. At the end of 1949, when we got the geological report out, I was in agreement with that report which said it was capable of supporting a dam 700 feet high, or even slightly higher than that. That is as far as I went. From there on the special test data went to the designers and it is their responsibility to fix the height of the dam.

Mr. SAYLOR. Had you been on these reservoir sites since October 26, 1954?

Mr. MURDOCK. No.

Mr. SAYLOR. Have you made any detailed studies of this dam site since October 1954?

Mr. MURDOCK. No, I have not.

Mr. SAYLOR. The next questions I have are directed to Mr. Keener.

Mr. Keener, you have worked for the Bureau since 1926; is that correct?

Mr. KEENE. In Denver, yes. Prior to that time in the field.

Mr. SAYLOR. When did you first go to work for the Bureau?

Mr. KEENER. August 19, 1910.

Mr. SAYLOR. Before you went to work for the Bureau in January 1926 you were engaged in various capacities as field engineer for the Bureau of Reclamation?

Mr. KEENER. That is correct.

Mr. SAYLOR. And since that time I gather that you have been engaged principally in the preparation of specifications and designs on dams that the Bureau has built?

Mr. KEENER. That is correct, up until about October 1952, when my responsibilities were enlarged to include other designs than dams.

Mr. SAYLOR. What do they include now?

Mr. KEENER. I am in charge of the Design Division in the Bureau of Reclamation in Denver.

Mr. SAYLOR. So that all planning of powerhouses, tunnels, canals, anything else that the Bureau needs, comes under your direct supervision?

Mr. KEENER. I would say all designing, yes, is my technical responsibility. Not the project planning. That is ordinarily done in the regions.

Mr. SAYLOR. Now, I understand that in 1947 you quoted Dean Berkey, who was dean of geology at the University of Columbia. Was the inspection at Glen Canyon made by him in 1947 with regard to the site referred to in House Document 419 of the 80th Congress or was it the site of Glen Canyon Dam as reflected in House Document 364 of the 83d Congress?

Mr. KEENE. I think "both" is the correct answer to that question. He was engaged in 1947 to help in picking a site when several sites were up for consideration.

Mr. SAYLOR. The site which is referred to in the document in the 80th Congress is considerably removed from this other site. Now, is it your contention that the statement which you have referred to on page 3 applies to both dam sites?

Mr. KEENER. The first excerpt refers to both dam sites. The second excerpt refers to the one in House Document No. 364. It is at mile 15, shown on drawing No. 557–D–1, later included in that document opposite page 118, and the one currently under consderation.

Mr. SAYLOR. Now, the next question I have to ask is with regard to the Marble Canyon Dam site. Are you in the position today, Mr. Keener, to tell us what the height of a dam is that could be built at Marble Canyon?

Mr. KEENER. I am not.

Mr. SAYLOR. Do you have, or does the Bureau of Reclamation have, if you know, information which could tell us the height to which a dam could be built at Marble Canyon?

Mr. KEENER. I am quite sure we have that information. I have not reviewed it recently.

Mr. SAYLOR. If a competent engineer, one who has had a lifelong experience in the field of designing and in the field of having primary responsibility for large projects, would tell this committee that there could be built at Marble Canyon a dam which was in excess of 800 feet in height, which would back up more water and produce more electric power, would you be inclined to concur in that statement?

Mr. KEENER. I would be inclined to go into the geology of the site and make a preliminary trial load analysis of a dam at that site and see whether the stresses would be excessive before I would come to any conclusion.

Mr. SAYLOR. Assume, Mr. Keener, that you have investigated and determined that the base which could be established for a dam at that height is sufficient to build the dam. Then what would be your conclusions?

Mr. KEENER. And that the compressive strength of the rock at that site with the usual factor of safety was sufficient to resist the stresses in the dam of that height, I would say, yes, the dam could be built there.

Mr. SAYLOR. In other words, I would not want you to assume in the question which I have given you that every factor of safety which you have included in every dam which you have already built or which you have approved the plans for would not be considered. In other words, I am not trying to ask you to commit yourself to building anything which is infeasible or engineeringly unsound. The questions which I have asked you are based upon the assumption that every safety factor in the books which you have ever included would be included at that dam.

Mr. KEENER. I understand.

Mr. SAYLOR. On page 4 of your testimony, at the top of the page, you state:

> As a consequence of the subsurface explorations and a certain amount of testing of drill core samples of the Navaho formation, the Bureau has satisfied itself that a high concrete dam may be designed and constructed at the Glen Canyon site.

Will you give this committee information as to when the subsurface explorations were made, when the core samples were taken, and when the Bureau came to the conclusion that a high concrete dam could be designed and constructed at Glen Canyon?

Mr. KEENER. I believe that the core drilling there was done in 1949. Another dam site 11 miles downstream was tested by three drill holes. Those were drilled, I believe, in 1948, and most of the other drilling was done in 1949. I believe also that the field testing was conducted in 1949. Certain drill cores were taken out of the foundation and sent to our laboratories in Denver for further testing.

Mr. SAYLOR. Have there been any subsurface explorations made by anyone under your supervision or direction since these core drillings and field testings which you have referred to in 1949?

Mr. KEENER. I don't know of any.

Mr. SAYLOR. Have there been any tunnels, drifts, or any experimenting upon the rocks or samples taken at that site by the Department, if you know?

Mr. KEENER. Not that I know of.

Mr. SAYLOR. You state, Mr. Keener, that the Bureau satisfied itself that a high concrete dam may be designed and constructed at the Glen Canyon site. When did you come to that conclusion?

Mr. KEENER. May I ask that the question be repeated, please?

Mr. SAYLOR. Yes.

(The record was read by the reporter.)

Mr. KEENER. I have never had any other conclusion myself but that a high dam could be built at the Glen Canyon site. I do not know just what you mean by a high dam. Are you specifying at some particular site a high dam?

Mr. SAYLOR. All I am reading to you is your own statement, taken from line 3 on page 4.

Mr. KEENER. Yes. I imagine, after the results of these tests, both in the field and in the laboratory, were completed, that the conclusion was warranted that a high dam could be designed and constructed at the Glen Canyon site.

Mr. SAYLOR. Let me ask you this, Mr. Keener: You have used the term "high concrete dam." What is the maximum height of a high concrete dam which you estimate can be built with safety at the Glen Canyon site?

Mr. KEENER. I am satisfied that a dam 700 feet in height could be built with safety at the Glen Canyon site, and possibly we could go some higher.

Mr. SAYLOR. How high?

Mr. KEENER. I do not think you can pick any definite elevation or any definite increased height above 700 feet, but I think that as a matter of judgment we would not be warranted in going higher than that. We only have one dam in the United States that does go higher than that, constructed at the present time—I believe in the world. And I do not believe, considering the foundation as compared with the foundations of some other dams of heights that approach that, we would be warranted to go higher than the 700 feet. As to the safety, if we built a dam here 700 feet or 710 or 715 feet, doubtless there would be no failure. Possibly we could go beyond that. You cannot arbitrarily state a definite height. You cannot figure it mathematically. You have got to use judgment, and you have got to consider the economics connected with it and the planning of the project.

Mr. SAYLOR. Now you are touching upon some of the things I was going to ask you about, as to why you have arbitrarily picked the figure of 700 feet.

Mr. KEENER. That is a nice round figure, and it ties up pretty well with the planning capacity desired. But perhaps I have answered your question already. If not, I will proceed further. Have I answered that in your other question?

Mr. SAYLOR. I would like to ask you, since this is 700 feet from the bed rock foundation, would you feel that it is possible to build a dam 700 feet from the surface of the river?

Mr. KEENER. As a matter of judgment, I would not recommend that that be done. Seven hundred feet from the river would possibly take you out of the topography so that at the top you would have to have a considerably wider dam, for one thing. Economically, it might be infeasible.

Mr. SAYLOR. That would make a dam of 860 feet in height?

Mr. KEENER. Yes, about that, I would not recommend that. I would not want to be back of recommending a height like that at this site.

Mr. SAYLOR. Will you turn now to the second paragraph on page 4, where you indicate some of the studies from the water tests. You indicate that where there was pressure of 50 pounds per square inch there was no loss of water; when the pressure was increased to 150 pounds per square inch, the loss ranged from nothing to 4 gallons per minute.

Now what will be the pounds per square inch of pressure if a 700-foot dam is erected?

Mr. KEENER. About 300 pounds per square inch, at the bottom of the dam, yes. The water pressure at the heel, at the upstream toe of the dam, would be about 300 pounds per square inch. It would be 62.5 times 700 divided by 144.

Mr. SAYLOR. You say you have found in some cases where in the first 20 to 30 feet of bedrock you have lost 25 gallons per minute. What would be the effect of increasing the pressure from 150 pounds to 300 pounds?

Mr. KEENER. I presume it would be directly proportional. You would probably get 50 gallons per minute instead of 25 if you doubled the pressure. Yes, that is for close to the surface rock, of course, as I stated.

I have stated the tests show that in a very few cases, too. We might remember that, if you do not mind.

Mr. SAYLOR. What was that, sir?

Mr. KEENER. I said that in a few cases there would be losses of 25 gallons per minute. We have the record of what they were.

Mr. SAYLOR. As a good engineer, you always consider the worst features as well as the best, do you not?

Mr. KEENER. As well as the best. I think ordinarily we consider the worst features. We are glad to have the best, but in designing for safety we consider the worst features.

Mr. SAYLOR. Would it be possible to increase the height of this dam to 750 feet?

Mr. KEENER. Yes; it would be possible to increase it, but I would not want to take the responsibility in recommending that height here. You are treading on a little dangerous ground when, as I stated before, the dam site is of this formation—it is on sandstone. None of our dams have been on it. When you go to a height exceeding that of Boulder Dam, which has a foundation rock that is at least three times as strong, you hesitate.

Mr. SAYLOR. If the structure at Boulder is three times as strong, what safety factor did you use in determining it would be safe to build one of 700 feet at this height?

Mr. KEENER. We have a safety factor of stresses in the dam as resisted by the strength of the rock of between 6 and 7; while, as regards the structural strength at Boulder, that same safety factor would probably exceed 20; much higher than necessary.

Mr. SAYLOR. Then, if it were found by this committee that instead of a dam of 700 feet, which has been proposed, that the height of the dam should be reduced so that, instead of 26 million acre-feet of storage it was reduced to 13 million acre-feet of storage, the safety factor would be increased to about the same position that it is with regard to Boulder. Is that correct?

Mr. KEENER. We would take care of that in the design of the dam, and whether it was a lower dam in height or a higher one, we pay attention to our unit stresses, and we would design for economy. So we would not make the dam large enough to have those rather excessive factors of safety. We would be wasting money. We do not need any higher factors of safety than 5, 6, or 7. It would not be economical to do that.

Mr. SAYLOR. So that, if you were told to design a dam for Glen Canyon which would have a storage of one-half of the capacity, the design would be materially changed and the cost of it would be materially reduced?

Mr. KEENER. Correct.

Mr. SAYLOR. Do you know of any tests, core drillings or field work, that have been done by you or under your direction on this project since the 26th day of October 1954?

Mr. KEENER. No; I do not know of any tests that have been made since then, except perhaps a little checking of former figures in the laboratory. We did do some checking of the old rate of permeability. We checked the porosity, for instance. As you know, the porosity and the permeability are related. I can go into more detail than that if you care for me to.

Mr. SAYLOR. That is enough. I understand it. If you want to, you are perfectly welcome to.

Mr. KEENER. All right. I would like to say this: Some of our former tests showed porosity rates that were higher than what they actually are. We were pleased in checking this that they were reduced. That was a favorable indication, of course. We were glad to see that. That was done in the laboratory.

Mr. HOSMER. Will the gentleman yield at that point?

Mr. SAYLOR. Yes.

Mr. HOSMER. That is the calculated reduction from 28 to 22 percent?

Mr. KEENER. That is the one I referred to; yes, sir.

Mr. HOSMER. Was that based on a reexamination of cores you had or a reexamination of the data you acquired when you originally tested the cores?

Mr. KEENER. There was a mathematical error in that computation. It was not a retesting, it was a rechecking of the mathematics.

Mr. HOSMER. Have all these other mathematics or conclusions that you base your opinions on been rechecked as well as this one?

Mr. KEENER. Not to my knowledge.

Mr. SAYLOR. I am glad you answered that question, because it seems to me, as a member of this committee, the more questions we ask about the Bureau's figures, the more errors we keep turning up.

The next thing I would like to ask of Mr. Larson.

Mr. Larson, have you checked the evaporation figures on the storage project since——

Mr. LARSON. Since my testimony?

Mr. SAYLOR. Since the hearings last year.

Mr. LARSON. No; I have not myself. Others have.

Mr. SAYLOR. Have you had someone under your jurisdiction check them?

Mr. LARSON. I think the Commissioner's office or the Secretary's office had Mr. Riter, of the Chief Engineer's Office, check them.

Mr. SAYLOR. Will you give, or have the Commissioner give this committee the latest evaporation figures on Glen Canyon?

Mr. DEXHEIMER. There has been no change, Mr. Saylor, from the figures submitted last year, with the exception of those corrections which were made by letter to the committee under Under Secretary Tudor's signature. The only figure in the whole evaporation theory that was ever in error or questioned was the evaporation figure from a proposed higher Glen Canyon dam, introduced for the first time at the hearings last year. It was not a project which the Bureau had recommended or studied in any way. In our enthusiasm to get an answer to the committee the following day, they did make the mistake which we later found in going through the figures and corrected. But in no way——

Mr. SAYLOR. Then you corrected that one, and then you had to admit there was another error. You had a second error which was found.

Mr. DEXHEIMER. That is correct.

Mr. SAYLOR. Now we hear Mr. Keener come along and tell us that in checking the porosity figures, which has been done recently, they found an error, which is a very substantial one.

What I want to know is when we are going to get a set of figures in here before this committee that the Bureau is going to stand on.

Mr. DEXHEIMER. We stand on all of our figures, Mr. Saylor, that have been submitted. The figures that you have in this table Mr. Keener just called your attention to, is one that was given in a field trip report by one of our engineers, I think in 1949. Recently our engineers, in going through those tests and rechecking this field-trip report, have indicated that there was a mathematical error. However, that in no way changes our conclusions or our recommendations on any part of these projects.

Mr. HOSMER. Will the gentleman yield at that point?

Mr. SAYLOR. Yes.

Mr. HOSMER. I want to clear this up. Do you intend to say that the erroneous figure was based on some calculations made during a field trip, or was it calculations made in the Denver office when these tests were made on the cores?

Mr. KEENER. The checking was done in the Denver office, and I believe it checked figures of the first tests that were also made in the Denver laboratory. I could ascertain the correctness of that statement in just a few minutes, I believe.

Mr. HOSMER. Maybe I can help you out by asking this question: You put out a publication——

Mr. KEENER. SP-30, yes, published by the laboratory.

Mr. HOSMER. Yes.

Mr. KEENER. I was going to refer to that and see if I could tell from that.

Mr. HOSMER. That was dated October 1, 1951. It gives the erroneous figure.

Mr. KEENER. Yes.

Mr. HOSMER. So I assume that the recalculations were made subsequent to that time.

Mr. KEENER. I think they were made in the laboratory. I think it was a correction of the permeability tests made in the laboratory.

Mr. HOSMER. Then it was not a field test but the calculations made in the laboratory?

Mr. KEENER. Yes.

Mr. HOSMER. Thank you.

Mr. SAYLOR. I am going to ask the Commissioner the next question. If this Congress, in its wisdom, decides that neither Echo Park or Split Mountain should be built, what will be the effect upon this project?

Mr. DEXHEIMER. It would have a very serious effect on the ability to go ahead with some of the other projects because of reduction in the amount of holdover storage to meet the lower basin commitments, and it would have the additional effect of reducing the power output available to the upper basin area, and would have an economic effect in reducing the power revenue available to support the feasibility of the overall project.

Mr. SAYLOR. Mr. Commissioner, the figures which you have submitted in House Document 364 indicate that the cost of producing power at Echo Park is going to be very close to the sales price. If that is the case, why will this affect the feasibility of the rest of this project?

Mr. DEXHEIMER. The cost of producing power would be rather high at this particular one; yes. Project power would be sold at something over 6 mills, which leaves a part of the sales price to apply against the repayment other than the power investment and interest. When that power investment with interest. When that power investment with interest has been repaid, then all net revenues from the sale of the power are available for repayment on the rest of the project.

Mr. SAYLOR. One of the bases that many of the proponents have put forth for building these power projects is that it will not only help to pay for the projects but it is going to be a cash register for Uncle Sam. Now, according to you, when the project itself is paid for, instead of being a cash register for Uncle Sam and the United States Treasury, it is going to be a cash register for somebody else.

Mr. DEXHEIMER. No, sir. When the overall project is paid for, then certainly whatever revenues are available would go back into the Treasury.

Mr. SAYLOR. But until the overall project is paid for—and by that you mean not only the 2 storage projects and the 11 participating projects which you have specifically recommended, but everything else that the Bureau has planned in the upper Colorado?

Mr. DEXHEIMER. Everything that the Congress authorizes and we are given construction money to build, would presumably participate in these revenues from the overall project; yes.

Mr. SAYLOR. Now, Mr. Larson, in the statement which you submitted when you were here before, am I correct that you have attached

to it a summary of what each of the participating projects will encompass?

Mr. LARSON. Yes, sir.

Mr. SAYLOR. I have made the statement that the principal thing that this upper Colorado project will do will be to increase and subsidize those crops which Uncle Sam already has a surplus of. I have gone over your report and again come to that conclusion. If I am incorrect, I would like you to tell me or point out those projects or parts of projects which would contradict that statement.

Mr. LARSON. I think the very nature of those projects and the other information I submitted contradict that statement in this way: That in furnishing a supplemental water supply to these projects, it makes possible a much greater diversification of crops; it makes possible a better balance between the farmlands and the cattle and sheep industry, to turn feed into meat and poultry products, and so on. It does all of those things.

That has to be coupled with the statement I made that our plan was based on about a 20-year construction program and, further, the statement that I think I have in my testimony, to meet the increased population demands in the years ahead, which the best estimates indicate there will be 210 million people by 1975.

Mr. SAYLOR. Mr. Larson, we will start with your projects here. I thought maybe you would be able to point some out. But if you will turn to your statement, we will look at the summary data on the La Barge project. There you say you propose to produce hay, pasture, and small grain—dairy cows and sheep. I want to know what you are going to produce there that is not already in oversupply.

Mr. LARSON. The La Barge project is located in the Green River Basin in the center of a very extensive forest range area, and on our present Eden project there and other projects, the hay and grain is consumed locally in the sheep and cattle industry, but it is far short of what is needed to make full use of that large range country, and the La Barge project is just one more project that helps that situation, as does the Seedskadee located just downstream.

Mr. SAYLOR. That explains, then, the Seedskadee. The next project——

Mr. DAWSON. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. DAWSON. In order to clarify what we are talking about by crops which are in surplus, does the gentleman contend that wool is in surplus in this country?

Mr. SAYLOR. I have not said wool is in surplus. I am asking the witness to explain here. If he cannot explain, you had better come to his assistance. He is the man that is coming before this committee and asking this committee——

Mr. DAWSON. If you will yield?

Mr. SAYLOR. I am not going to yield any further.

Mr. DAWSON. You asking about coming to his assistance, and I will be glad to.

Mr. SAYLOR. Your time will come.

Is the same answer true for the Lyman project?

Mr. LARSON. That is the same kind of project, which does not add to the surplus because of the cattle and sheep, and especially the dairy industry in that area.

Mr. SAYLOR. We do not have too much butter or dried milk on hand right now?

Mr. LARSON. I think we do, but considering the increase in population that we look to by the time these projects are completed, this is a different situation entirely.

Mr. SAYLOR. Then the Silt project.

Mr. LARSON. The Silt project is located in a mountainous area above Grand Junction, about in the same category, only in addition to hay and grain it can raise sugar beets, potatoes, and some other crops. A very rich little area.

Mr. SAYLOR. Smith Fork project?

Mr. LARSON. The Smith Fork project is in a mountainous area where they raise alfalfa, pasture, and grain for dairy cows and beef cattle mostly.

Mr. SAYLOR. What about the Paonia project?

Mr. LARSON. On the Paonia project they have dairy cows and beef cattle, too, but they have very fine orchards, with apple and peach orchards mixed in quite heavily.

Mr. SAYLOR. What about the Florida project?

Mr. LARSON. That is primarily a dairy and beef cattle area.

Mr. SAYLOR. Now the Pine River extension.

Mr. LARSON. That is similar to the Florida project, ranching, with beef cattle and dairy cows.

Mr. SAYLOR. Now the Emery County project.

Mr. LARSON. Emery County is near a very extensive forest reserve with ranges for beef cattle and sheep, and they have dairying there, and they raise some fruits and vegetables.

Mr. SAYLOR. Next we come to a large item which is not recommended in the bill except in the initial phase, known as the central Utah project.

Mr. LARSON. The initial phase of the central Utah covers an area of varied agricultural projects. It covers units on the Colorado River side in the Uinta Basin with cattle and sheep and dairying, and along the Wasatch front in the Bonneville Basin it covers an area of very high productivity for fruits and vegetables, canning vegetables. It has quite a wide variation in the type of agriculture as a whole, varying from cattle country to intensified agriculture.

Mr. SAYLOR. What about the comprehensive plan for central Utah?

Mr. LARSON. The comprehensive plan is only in the reconnaissance stage. The purpose of including it in my statement was just to give an idea of how the project might be extended some day or added to, and that was the only purpose. Its areas are very similar in agricultural production, however.

Mr. SAYLOR. The Hammond project.

Mr. LARSON. The Hammond project is entirely new land that would be used for alfalfa, grains, beans, and fruit, dairy cows and sheep. It is an area that was once cultivated in the pioneer days many years ago. The diversion dam on the San Juan River washed out and the area has gone back to sagebrush, but it was cultivated long enough to prove that it was a very fertile area.

Mr. WESTLAND. Will the gentleman yield?

Mr. SAYLOR. Yes.

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Mr. WESTLAND. Does the gentleman from Pennsylvania intend to take each one of these projects and ask the same questions?

Mr. SAYLOR. That is right.

Mr. WESTLAND. That is all I wanted to know.

Mr. SAYLOR. What about the Eden project?

Mr. LARSON. The Eden project has a total of 20,000 acres, 9,000 acres are now in farms, and the remaining 11,000 acres are new lands. The project will be used for hay and pasture, dairy cows, sheep, and beef cattle, and it is in the same general area as the Seedskeedee and La Barge projects, in the center of a vast sheep and cattle range area, with millions of acres of rangeland.

Mr. SAYLOR. You do not intend to put the rangeland under this project?

Mr. LARSON. No, sir. The Eden, Seedskadee, La Barge, and the Lyman projects are centrally located to create a better balance between the forest reserve grazing lands and the farmlands, so that the farmers have sufficient hay and grain to carry over their sheep and cattle during the winter months.

Mr. SAYLOR. Now we come to the Curecanti storage unit. I wish you would tell us about the two phases that you have on that.

Mr. LARSON. In the original plan submitted in House Document 364 we included what is known as the large Curecanti Reservoir, with a capacity of 2½ million acre-feet, as a unit of the Colorado storage project, mostly for regulation of the Gunnison River, as a part of the entire Colorado River regulatory system.

Since that time, at the request of the State of Colorado and by the action of the House and Senate committees, this capacity has been reduced to 940,000 acre-feet. After the hearings a year ago, we studied a modified plan to work out a better development for utilizing the powerhead and storage possibilities on the Gunnison River with a smaller Curecanti Reservoir. The purpose of our report on the modified plan is to inform you of what we found out in our reconnaissance investigation. Page 2 of the report included in my statement gives our estimated reconnaissance construction costs, and it shows that by building the small Curecanti with the capacity of 940,000 acre-feet and 3 power dams below Curecanti, that the entire development can be worked out with a power-generation cost mentioned on page 3, namely, the average cost of 6½ mills per kilowatt-hour, which is less than alternative steam power costs given in the table on page 3 as 8.3 mills per kilowatt-hour.

Mr. SAYLOR. Am I right that, if only the Curecanti Reservoir and the Blue Mesa Dam alone is built, the cost of power will be 9.4 mills?

Mr. LARSON. Yes; that is correct.

Mr. SAYLOR. Will you explain to the committee why the alternate costs of steam power would be 9 mills if you only build the Blue Mesa rather than if you built the 4 plants for power?

Mr. LARSON. I believe that is because of a smaller plant to compare with the powerplant at Blue Mesa, and the other would be a larger steam plant to compare with the four dams.

Mr. SAYLOR. Will the Curecanti place any land under cultivation?

Mr. LARSON. It will in the future, but not in the plan as reported. It has never been worked out, what it might do irrigationwise. It is possible that some of the storage water could be used later on for irrigation; yes.

Mr. SAYLOR. But in the present plan that you have, you have nothing—in other words, Curecanti is a mere storage and power unit and there is no diversion of water from that storage dam?

Mr. LARSON. That is correct. This brief report was not intended to show any irrigation possibilities.

Mr. SAYLOR. Is the same thing true with the Juniper unit?

Mr. LARSON. Yes, sir.

Mr. SAYLOR. What will be the cost per kilowatt-hour of that power?

Mr. LARSON. Since the Juniper proposal is relatively new, we have not made a study as to what the generation costs of power would be at that site.

Mr. SAYLOR. But that the powerplant, dam, access roads, and transmission system would cost $16,348,000?

Mr. LARSON. Yes, sir: that is our reconnaissance estimate.

Mr. SAYLOR. Next we come to the Gooseberry project. Since there was opposition from some of the people in the towns of——

Mr. LARSON. Price and Helper.

Mr. SAYLOR. These two towns were Price and Helper. Since we had opposition from the mayors of those two towns, who came in and spoke in opposition, will you tell us what you propose to do since they say this project, Gooseberry, will take their water?

Mr. LARSON. As to the selection of the Gooseberry project, I think that is a matter for the State of Utah to decide and the Congress.

Mr. DAWSON. Will the gentleman yield to me?

Mr. SAYLOR. Yes.

Mr. DAWSON. I might inform the gentleman that there is no disposition on my part to push the Gooseberry project. It is not in the bill of the gentleman from Colorado that is being considered. As far as I am concerned, it is not before the committee.

Mr. SAYLOR. It is before the committee because we are considering all of these bills that have been introduced, and some of them have it in, and it is certainly in the bill which the Senate reported out.

Now next is the Navaho project. Will that place any land under cultivation?

Mr. LARSON. Yes, sir.

Mr. SAYLOR. Practically all the land in that will be in the Indian reservation; is that right?

Mr. LARSON. No, sir. A large part of the area is within the Indian reservation, but some 28,250 acres of new land is non-Indian land outside of the reservation.

Mr. SAYLOR. I might ask Mr. Bennett this question: Will the report of the master in the case of *Texas* v. *The State of New Mexico*, which is now before the United States Supreme Court, have any effect on the Navaho project or the San Juan-Chama project?

Mr. BENNETT. I am advised that the claims being litigated in that action do not affect water rights so far as any of the lands within the San Juan-Chama or the Navaho project are concerned.

Mr. SAYLOR. The master's report indicates that the State of New Mexico already owes the State of Texas over a half million acre-feet of water which they propose to divert from these rivers. I was just wondering why it would not have some effect.

Mr. BENNETT. I think perhaps the best answer to that is that the Rio Grande compact which is involved in that litigation certainly created no obligation on New Mexico so far as any of the waters of the

Colorado River system are concerned, and the San Juan-Chama is a diversion from the Colorado River system.

Mr. SAYLOR. Last year there was a great deal of concern expressed by representatives from Texas and that if the Navaho and the San Juan-Chama projects were authorized it would affect the financial feasibility of Elephant Butte.

Mr. BENNETT. I am not really familiar with that to the point where I can state with certainty any of the background to the Texas position. I understand, however, that it is predicated largely on a belief that there will be additional uses of Rio Grande water as well as the diversion of Colorado River system waters. Now that is subject to correction, but that is my understanding of the background of the Texas position.

Mr. SAYLOR. Mr. Larson, my figures indicate to me that these projects which are proposed would supply irrigation water to approximately 200 square miles of new land and to about 400 square miles of land which would receive supplemental waters.

Mr. LARSON. Sir, I have not worked it out in square miles. We give the new land and the supplemental land by acres under each project, but I have not worked it out in square miles.

Mr. SAYLOR. What is the total that you have for new lands and supplemental lands?

Mr. LARSON. On the 11 participating projects and the Eden project included in the Secretary's recommendation, there is shown 143,020 acres of new land and 243,470 acres of supplemental land.

In my previous testimony I listed all of the other additional projects in table 2 (a) of my statement which shows the new and the supplemental lands for each project, but I note that it is not totaled up because these projects were included in different combinations in the different bills. We can supply that information, however, if you desire it.

Mr. SAYLOR. The figures which you are referring to are on the two charts which follow your statement?

Mr. LARSON. Tables 1 and 2 (a), included in my statement; yes, sir.

Mr. SAYLOR. I have this question to ask you, Mr. Larson, since you are down there in the Bureau of Reclamation: Is it the philosophy or policy of the Bureau of Reclamation that regardless of how much money we spend upon a project, as long as you put water on the land, it is justified?

Mr. LARSON. No, sir; I would not say that is the policy.

Mr. SAYLOR. When you have presented to this committee a project which calls for the expenditure on a number of participating projects of more money that the land will be worth when it is fully developed, what economic justification do you give to this committee?

Mr. LARSON. The same economic justification, practically, we have been using over the years. That has been true in reclamation in many cases for the past 50 years—that you cannot judge the value to the Nation simply by the cost per acre that you can sell the land for when the project is built.

Mr. DEXHEIMER. If I might add a little to that, Mr. Saylor, I think the same thing would apply if you were going to buy a business property and you paid a certain sum for the land. Then you invested a million dollars in a building. You are planning to conduct a business which will show a profit on that investment. I think the same thing

applies generally to investments of most any kind. It is the crop return and the value to the man of having a home and opportunities for his family. The taxes that he pays, the crops that he raises, the diversified crops make our standard of living possible.

Mr. SAYLOR. You certainly, Mr. Dexheimer, would not ask a man to go out and spend more money on a piece of land than he could get for it if he went to sell it, would you?

Mr. DEXHEIMER. Yes, sir; and many of them are doing it today, and there are a thousand applications for every one of those farms we have available. They are putting in homes, machinery, putting in years of work, and if he were to turn around and sell it during that time, he probably would be unable to get the entire investment that had been made in the land. That is the reason, I think the fundamental reason, why in 1902 the Reclamation Act was passed—to make it possible to add to the Nation's economy in that way over a long period with investments by the Federal Government of non-interest-bearing funds. Those things make possible our economic development.

Mr. SAYLOR. Of course, Mr. Dexheimer, in the 1902 act you got non-interest-bearing funds for 10 years.

Mr. DEXHEIMER. Originally; yes, sir.

Mr. SAYLOR. On that same philosophy which was given out, upon which you are now relying in saying that Uncle Sam was going to help, you have now extended this to over 40 years.

Mr. DEXHEIMER. That is correct. The same thing has happened with the loans to housing and small business and many other things.

Mr. SAYLOR. Yes, but they all pay interest.

Mr. DEXHEIMER. In some ways they do.

Mr. SAYLOR. Not in some ways. In every way they pay interest.

Mr. DEXHEIMER. There are a great many of our civil works, of course, that do not. I think Congress still feels that they are an economic advantage to the country.

Mr. SAYLOR. Last year I submitted to the Secretary's office a list of 23 questions with regard to this project. I submitted them on the 31st day of March. The 7th day of April I had a letter from the Secretary acknowledging the receipt of those questions, telling me that he would immediately proceed to assemble the answers. The 17th day of June I received a letter from him telling me that he was sorry that the answers were not ready, but they had been sent out to region 4 office for information upon which to base the reply. Now we are in a new session of Congress, but the same questions apply except there are new bill numbers, and I would like to know why we have not received an answer.

Mr. DEXHEIMER. If I may, Mr. Saylor, I would like to answer that. The questions which you proposed in those letters were assumptions which take us away beyond anything that we have studied. In some cases they are assumptions based on things which we would under no circumstances endeavor to do, and because of the timing and so on it would be impractical to do so. They are entirely theoretical assumptions, and up to now we have not had the staff of engineers, economists, and others to complete those studies and to carry on our other work.

Mr. SAYLOR. That is very interesting, Mr. Dexheimer. I was just looking at question No. 2—"What is the cost allocated to irrigation for all participating projects proposed for the initial authorization,

and what percentage of such cost is the estimated repayment by the irrigation water users in the proposed 50-year repayment period, separately for each project, and combined?"

And now, if that is based on an assumption, then my knowledge of the English language is sadly neglected.

Mr. DEXHEIMER. That particular question, Mr. Saylor, has been answered very fully in the testimony and in the record of this committee.

Mr. SAYLOR. It may have been answered, but it has not been sent to me. It is a sad commentary on a downtown Bureau, especially when the Secretary of the Interior sends me two letters and tells me that he has the people who are working for him preparing the answers and that they will be forthcoming, that a year later I still do not have them.

That is all, Mr. Chairman. I reserve the balance of my time.

Mr. ASPINALL. Now let the chairman understand about the reservation. As I understand it, you reserve your time for further questioning on the geological questions after you have studied the report?

Mr. SAYLOR. That is right.

Mr. ASPINALL. The reservation will be respected.

The Chair recognizes the gentleman from California, Mr. Sisk.

Mr. SISK. Mr. Bennett, I would just like to ask a few questions with reference to your discussion this morning pertaining to the legal aspects of the Colorado River compact and the effect that this bill might have upon that particular compact.

If you have the bill, H. R. 3383, in front of you, I would like to ask you to check with me quickly as we go through the bill. I find that on page 2 of this bill reference is made to the provisions of the Colorado River compact. Line 3 of page 2.

Mr. BENNETT. Will you give me the reference again?

Mr. SISK. Do you have H. R. 3383 there?

Mr. BENNETT. I do now, yes.

Mr. SISK. Starting on page 2, line 3, the author of this bill mentioned "consistently with the provisions of the Colorado River compact." Again on page 4, line 9, mention is made with reference to "apportioned to the upper Colorado River Basin by the Colorado River compact." Again on page 6, line 12, mention is made of "fixed in the Colorado River compact." Again on page 10, line 23, mention is made of "with the operation of any provision of the Colorado River compact."

Then on page 12, line 6:

> Nothing contained in this act shall be construed to alter, amend, repeal, construe, interpret, modify or be in conflict with any provision * * * of the Colorado River compact.

Then on page 13, line 16, "the Secretary of the Interior is directed to comply with the applicable provisions of the Colorado River compact."

Now with reference to all of those cited instances in the bill, do they refer to the compact that you discussed this morning?

Mr. BENNETT. That is correct, sir.

Mr. SISK. In your opinion, did the author of this bill have in mind that such legislation as is before us should in every way and at all times comply with the provisions of the Colorado River compact?

Mr. BENNETT. I think that is indelibly clear, sir.

Mr. SISK. Do you feel that in view of the fact that we in California are dependent to a large extent upon Colorado River water particularly that portion of the State which is south of the Tehachapi Mountains, that we are adequately protected under the provisions of H. R. 3383 to the waters apportioned to us under the Colorado River compact of 1922?

Mr. BENNETT. We certainly do, sir. I might also say that the bill before the committee is nearly identical in all respects in these matters of compliance with the compact with that which was submitted a year ago by the Secretary of the Interior to the Congress and recommended for adoption. At that time, in drafting that language, we were particularly concerned with satisfying the need for reassurances in the lower basin so far as the lower basin's rights under the compact were concerned.

Mr. SISK. Mr. Bennett, in view of the fact that there are certain parts of the compact that are at present in litigation, do you feel that there are any provisions of the Colorado River compact at present in litigation that could possibly affect the delivery of water to southern California as it might be affected by this bill?

Mr. BENNETT. We do not, sir. As I pointed out this morning, the largest package proposed in any of the bills for authorization would not exceed 4,800,000 acre-feet of consumptive uses in the upper basin when you take the projects authorized in these bills and add them to the present uses, and the projects which have been authorized but not yet constructed in the upper basin.

Mr. SISK. What was the figure again?

Mr. BENNETT. 4.8 million acre-feet of water. As you know, the apportionment to the upper basin in article 3 (a) of the compact was 7.5 million acre-feet of water. It is our view that the cushion of 2.7 million acre-feet, which represents the difference between the 4.8 and the 7.5, is certainly adequate to absorb whatever adverse decisions might be made with respect to any of the issues involved in the litigation before the Supreme Court.

I might point out that in his statement before this committee Mr. Ely stated that these issues involved something like 2 million acre-feet of water.

I should also like to mention the fact that we do not know whether, in speaking of 2 million acre-feet of water as being in controversy there between the upper and the lower basins, he means that it is 2 million acre-feet of water from existing apportionments or whether he is starting that figure on the basis of a conflict of claims to the use of surpluses, in which event the amount of water in issue within the apportionment, the varying interpretations of the apportionments themselves, would be considerably less than 2 million acre-feet of water, thus making this safety margin of 2.7 appear all the more adequate.

Mr. SISK. Of course, Mr. Bennett, you are familiar with the various estimates that have been made with reference to the water that is in litigation and, of course, there have been statements made by some—I do not believe later testimony bears it out—that every drop of water within the river is in the litigation. Do you hold that to be true?

Mr. BENNETT. Not at all. As a matter of fact, the statement by Mr. Ely would indicate that that is not the claim of California even.

I might point out that in his statement—I believe the exact statement was that the total of California's claims in that litigation with Arizona is a total of five-million-three-hundred-some-odd thousand acre-feet of water, that that was all California was claiming by virtue of the California Self-Limitation Act and her own interpretations of her rights to use of surplus. That being the case, I do not believe that the California interests themselves believe that every drop of water in the river is in litigation in that lawsuit. At least I cannot so interpret their statements.

Mr. SISK. Then let me ask you this: Assuming the completion of the Glen Canyon project and reservoir, what do you feel will be the effect upon California during the so-called stage of filling? In what manner do you feel that California's water will be protected in view of the fact, of course, that a proposed storage of 26 million acre-feet is involved here, which will certainly take some considerable period of time during which that reservoir will have to be filled? Now during that period of filling what, in your understanding of the Colorado River compact, will be the position of California during that time? What is the actual maximum amount of water then that the upper basin States must release through Glen Canyon continuously during that time to fulfill their obligations?

Mr. BENNETT. That would depend almost entirely on the amount of water that was available in the stream over the period of years involved. California has apportioned water, that water she is entitled to, and no one, I believe, is entitled to hold it back from her. I think that type of question depends, first, on the water supply conditions in the river system at the time that the filling is being accomplished. As I believe Mr. Larson testified, there are a number of different ways of filling a reservoir. I think when he says a number of different ways of filling a reservoir, he means that the method used would have to depend on whether we were in a wet cycle or a dry cycle, or just exactly what our water supply condition was during that period of filling.

Mr. SISK. I would certainly understand, of course, that the length of time required to fill the reservoir would be dependent upon the flow of the river. That, of course, is very irregular and one of the reasons why storage is needed.

Mr. BENNETT. That is correct.

Mr. DEXHEIMER. I might clarify that a little bit. Water deliveries in the lower basin are all made under contracts with the Secretary of the Interior. The Secretary has no inclination to abrogate those contracts or to short the water deliveries if it is physically possible for him to make those deliveries from the water available in the river. So, to that extent, I think that California and all of the lower basin can certainly rely on the contracts which they have for water to be fulfilled, and any arrangement for filling the upper Colorado reservoirs would have to be consistent with those contract commitments for water.

Mr. SISK. The only effect that this project would have upon California then, according to your belief and understanding, would be possibly a lessening in the amount of power produced at Hoover Dam, which, of course, is produced now with this surplus water that is flowing out into the Pacific. Is that correct?

Mr. DEXHEIMER. There is power not only from the Hoover Dam but the other dams downstream where the same water goes through the turbines to generate power. There would be a holding back of additional power, perhaps, over and above the water requirements, and the contracts for the power entered into in 1931, I believe originally, and again finally arrangements were made in 1936 provide for just such decreases in the output of power.

Mr. SISK. In other words, what we are actually receiving now is just a little bit of gravy from this surplus water that is going down the river; is that correct?

Mr. DEXHEIMER. You have been getting about 25 percent of that gravy at a very cheap rate for about 20 years.

Mr. SISK. I would like to direct 2 or 3 questions to Mr. Keener and Mr. Murdock, who have testified this morning.

With reference to your testimony, Mr. Keener, do you have any doubt whatsoever with reference to the safety factor of any of the proposed dams in this project?

Mr. KEENER. I can answer that by saying "No." I would like to refresh my mind on a few of the dams in the project that I have not looked up recently that have been designed in years past, but my answer is "No" right now. I do not think any of them are excessive, because I think that practically all those dams were designed in the design division of the Denver office, and we would not digress from any of our factors of safety. So I think the answer is "No."

Mr. SISK. You would be willing, then, to stake your reputation as an engineer on the engineering feasibility of each one of these proposed dams?

Mr. KEENER. I would like to say "Yes," from a design standpoint, insofar as the designs of these dams have been prepared in the Denver office. Once in a while we have some dams that have been designed in the field that we have not had a chance to review, and I would not want to stake my reputation on those until we had checked those designs. I do not know but what one of these dams you are talking about is Curecanti, for instance, and I do not think we have made a design of Curecanti Dam. That has been made in the field. I do not want to pass on that, if that is one of these.

Mr. SISK. I was not attempting to put you on the spot by the question. But in view of the fact that Curecanti is one of the proposed dams, along with Echo Park, Flaming Gorge, and Glen Canyon—certainly they are proposed in the bill—and as such, I feel it would be of interest to this committee whether or not you feel that beyond question of doubt they are engineeringly feasible.

Mr. KEENER. I think so, because I know somewhat of the profile and the rock at Curecanti, and the design that was made in the field is adequate, or I would say more than adequate, because I understand it is a concrete gravity dam, and I believe an arch dam can be designed there. Considerable money could be saved in such a design for that dam rather than the one that has been submitted. I think it is more than safe.

Mr. SISK. You think possibly they have gone overboard, then?

Mr. KEENER. I think they may have gone overboard.

Mr. SISK. Tending to have a higher factor of safety than actually will be needed?

Mr. KEENER. Than is necessary; yes, sir.

Mr. SISK. Now, Mr. Murdock, I would like to direct the same question to you. As an engineer, do you have any doubts whatsoever in your mind with reference to the engineering feasibility of any of these projects?

Mr. MURDOCK. None whatever. I, however, am not an engineer but a geologist.

Mr. SISK. You feel that the type of soil and type of rock and type of formation in each case is completely satisfactory for the type of structure which the Department proposes to construct?

Mr. MURDOCK. I think I have seen every damsite and worked on every damsite that is in the project plans, and I have written reports which state that I feel they are entirely suitable from a geological standpoint.

Mr. SISK. I believe that is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Utah, Mr. Dawson.

Mr. DAWSON. Mr. Dexheimer, a question was propounded by my colleague from Pennsylvania with regard to the economic feasibility of these participating projects, and he was referring to the fact that it may not be advisable to put water on land which costs more than the cost of the land itself. Is it a fact that a better way to figure these projects is over the full payout period—that is, so much a year paid back—rather than to dump the whole cost in 1 year on the land, and then compare it with the value of the lands?

Mr. DEXHEIMER. I think that is correct, Mr. Dawson. That is the whole theory of this development—the cost is over the repayment period. And certainly the returns from crops justify such an investment.

Mr. DAWSON. In other words, the feasibility has been figured out on that basis of the ability of the irrigator to pay, and he can pay back the amounts which are contemplated in these various participating projects over the period of time and still not only operate at a profit, but return money back to the Federal Treasury in the form of income taxes?

Mr. DEXHEIMER. Not only income taxes, but a great many other taxes that he pays either directly or indirectly on everything that he buys, and even the shows that he goes to.

Mr. DAWSON. That has been the theory of all irrigation projects we have had in the past?

Mr. DEXHEIMER. Yes, sir.

Mr. DAWSON. Mr. Saylor also referred to the fact that some information had been requested of the Senate committee which might require considerable length of time to prepare. I am interested in knowing just what that information was and if it is going to take time.

Mr. DEXHEIMER. The original inquiry we had from Senator Anderson, the chairman of the subcommittee in the Senate, was on March 11. Attached to his letter, which just transmitted this material, is a series of questions—are you referring to the original questions?

Mr. DAWSON. I am referring to the ones requested in the Senate.

Mr. DEXHEIMER. Just during this session?

Mr. DAWSON. That is right.

Mr. DEXHEIMER. That is what I thought you had in mind.

Attached to Senator Anderson's letter was a letter from Mr. Northcutt Ely, of California, or representing California interests, and he and Senator Kuchel had propounded a list of questions which they titled "Questions Directed to the Secretary of the Interior Regarding the Colorado River Storage Project" on Senate bill 500.

Among those questions—I would like to read, if I may, a principal part to illustrate why it will take us some time to prepare the answers. In effect, also, I would like to point out to this committee that we have in those questions the same type of assumptions which are impossible of accomplishment and make us go into the assumed planning of an entirely different project from what we are recommending or what is proposed in these bills, and in fact quite different even from the Senate bill as it was reported out of committee.

Mr. DAWSON. Would you read one for an example?

Mr. DEXHEIMER. Yes. The first question:

Furnish a detailed financial analysis in tabular form showing for each storage unit and each participating project (1) the date construction would be started, (2) date construction would be completed and operations started, and (3) construction costs and allocations, capital advances, annual costs and annual revenues or payments received from each designated source for each year from the start of construction to the end of the overall repayment period, showing how and when the reimbursable construction costs would be repaid, including the amount repaid each year, and from what sources.

Now under that he has three subquestions. The first one is lettered "A," is for the projects recommended by the Secretary. Now that information, of course, has been furnished both to this committee and to the Senate committee. That is comparatively an easy question to answer because that is the project we have studied.

Under B it reads:

For the projects proposed for authorization in the bill S. 500, including the Navaho and San Juan-Chama projects.

That, of course, includes projects we have not studied in detail. We have not made these cost analyses for all of them. We would have to make assumptions as to the date when the Congress would authorize them, when they would appropriate money to get the construction started, and over a period of years how long it would take to get them completed. Being mere assumptions on our part, they would probably be far from the true picture.

Mr. DAWSON. I take it, when those projects are brought back to the Congress for authorization, at that time you would probably have your reports and material ready to submit; and until they were authorized, there would be no opportunity for you to gather that information. Is that correct?

Mr. DEXHEIMER. That is correct. The bill, S. 500, as reported out of Mr. Anderson's committee, very definitely provides that many of these participating projects, which have been added over and above the Secretary's recommendation, very specifically must come back to the Congress for authorization before any construction is started. That information would necessarily be furnished at the time when we propose to start those projects.

Then under C is the third part of the question:

For all projects proposed for authorization, including the 18 or 20 additional participating projects proposed by Governor Johnson, of Colorado.

Now, for many of those we have very limited, or practically no detailed information, and we would have to make certain field investigations, economic studies, and other things before we could comply with the request that has been made in that detail.

Mr. DAWSON. It is also my understanding that in S. 500 those projects are not authorized.

Mr. DEXHEIMER. Yes; very specifically, under S. 500 as reported out by the Senate committee—I would like to read from it, if I may. On page 5 of that bill is says: "Except as hereinafter provided, section 1 (c) of the Flood Control Act of 1944 shall not be applicable to such supplemental project reports", and then "*Provided further*," and it names a great many of these participating projects. Then "Such projects shall have been approved and authorized by Act of Congress."

So that if this bill passes in that form, we would have to come back and have full hearings and present the reports before we could do any more than carry on this investigation. So it was obviously anticipated that a proper evaluation of those projects would take some months, and in many cases years, before we would be prepared even to recommend them to the Congress.

Now on March 17 we furnished to Senator Anderson, in response to his request, the details in answer to question 1 (a), which I just read, and most of the other information under question 1 (b). But, as I pointed out, it would be impractical for us, without some months of study, to comply with the additional requests based on that assumption. And I do not believe that the Senate, nor this committee, will give us blanket authority for these 20 or 30 additional projects without having to come back for that authorization; so that we could spend a great deal of time and money in compiling this. Regardless of how much money we might have, we still would need considerable time to go through the detailed planning estimates and preliminary designs in order to properly answer that question.

Today I see no particular useful purpose that that information could have to either the Senate or to this committee in consideration of the bills before them, because I do not believe that you are going to give us blanket authorization for these 20 or 30 projects without having to return for further authorization. So I say again that I see no reason for this committee, nor for the Senate, to hold up final consideration of the project's authorization pending the receipt of that information.

Mr. DAWSON. Do you know of any other reason why consideration of this measure should be held up?

Mr. DEXHEIMER. I know of no reason that seems entirely valid to me.

However, I realize that the members of the committee have questions about this. We hope that we can comply as fully as possible in giving you full information.

But just to delay consideration, asking for information based on assumptions which are impossible of accomplishment, seems to me unwarranted.

Mr. DAWSON. That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from Washington, Mr. Westland.

Mr. WESTLAND. I was interested in one thing. That is an earlier statement by Mr. Bennett that the priority for water in the lower basin States for domestic and agricultural use exceeded that for power in the upper basin.

The thing I would like to know is whether or not any studies have been made for future demands, anticipated demands, for the agricultural and domestic use in the lower basin States, whether any projection has been made, and, if so, what effect that might have on the proper operation, full functioning of, say, Glen Canyon power project.

Mr. DEXHEIMER. The anticipated uses, of course, in the lower basin, so far as our planning is concerned, have been confined to uses of the Colorado River within the terms of the Colorado River compact.

Now, I do not doubt there have been many studies made by various interests in the lower basin projecting their water needs. But we do not at present have those available to us.

Mr. WESTLAND. The thing I was questioning about, or was in my mind, Mr. Dexheimer, is the demand for water for agricultural and domestic purpose could exceed 7½ million acre-feet per year, or 75 million feet for 10 years, as a priority against use of water for power in the upper basin. That is correct, is it not?

Mr. DEXHEIMER. Yes, sir.

Mr. WESTLAND. Now, suppose this country down there grows enough in the next 10 or 20 years so that their demand for domestic and agricultural uses does exceed this allocated water under the compact, would that adversely affect the operation of the Glen Canyon power project?

Mr. DEXHEIMER. The only way that that could affect it, Mr. Westland, would be that the Congress might see fit at that time to grant to the Secretary of the Interior the right to sell power facilities or other facilities, or the power output, and let that water be available for other purposes, but it would require a special act of Congress, I believe, to make that possible.

Mr. WESTLAND. Now, I see Mr. Larson shaking his head there. It looks as though he has something to add.

Mr. LARSON. Maybe I understood the question a little differently. The upper basin has been allocated 7½ million acre-feet in perpetuity, providing they do not deliver less than 75 million feet in any consecutive 10-year period.

That being true, if the upper basin delivers to the lower basin what the lower basin is entitled to, then there would be continual firm power at the Glen Canyon Dam. That is exactly what the plan assumes.

Mr. WESTLAND. That there would always be 7½ million acre-feet of water available in the upper-basin States.

Mr. LARSON. There would be delivered a minimum of 75 million acre-feet in any 10 consecutive years plus any surplus to which the lower basin is entitled.

In order to generate firm power, naturally we would want to release water from Glen Canyon Reservoir each year so that it would be more or less of a constant flow except in occasional high years when the releases would be much larger.

Mr. WESTLAND. Even though the demand in the lower-basin States for domestic and agricultural purposes exceeded their allocation?

Mr. DEXHEIMER. The compact allocates water to both basins on equal priority, as I understand it.

Mr. ASPINALL. The Chair recognizes the gentleman from California.

Mr. HOSMER. I think the gentleman from Arizona would like to go ahead.

Mr. ASPINALL. That will be all right if the gentleman from Arizona wishes to proceed first with this understanding: that we will adjourn this afternoon at 4:15. We will adjourn at that time until Wednesday afternoon at 1:30 with the hope that we may be able to get the permission of the House to come back Wednesday afternoon.

If we cannot and we need more time than Wednesday afternoon, we will go over until Saturday. That is the only time we will have available.

If the gentleman from Arizona wishes to proceed at this time, it will be perfectly agreeable.

Mr. RHODES. I thank the Chair and the gentleman from California.

Mr. Dexheimer, I would like to ask you a question or two about marketing the power from Glen Canyon, assuming Glen Canyon is constructed.

You will recall in the hearings in the 83d Congress there were provisions for power preference to the States of the upper basin.

I note in the report from the Department and in the bills now, there is no such power preference for any State.

Is it the thought of the Department that the power from Glen Canyon would be marketed on a free and open market, or is there some other thought behind the Department's plans?

Mr. DEXHEIMER. Of course, we are bound to the present preference laws and the 1937 act. But at the present time we do not know, and we probably won't until we are ready to enter into negotiations for those contracts, who the customers will be nor how much power they will take nor how long a period of time the contract should be made for.

Mr. RHODES. Is it the thought of the Department, then, that the marketing of power from Glen Canyon will be to those customers, first, which have a preference under the reclamation law, and, second, to those customers to whom sales can be made that are determined to be most advantageous to the Federal Government and the economy of the West?

Mr. DEXHEIMER. Normally that would be the case unless there should be some provision in the authorization that would be controlling.

Mr. RHODES. But for the present time there is no such provision, as I read it.

Mr. DEXHEIMER. Nothing in these bills that I know of.

Mr. DAWSON. If I recall in the bills that were introduced last year, there were provisions written into the bills themselves which would limit the marketing of power to the upper basin. And those restrictions are not in the bill this year.

Mr. RHODES. That is correct.

I don't know to whom I should direct this question. I will ask the question and anybody who wants to may answer it.

Down the stream from Glen Canyon there is a canyon called Marble Canyon, which has from time to time been considered as a dam site. Perhaps this will go to the geologist.

Have you made any studies of the Marble Canyon site, Mr. Murdock?

Mr. MURDOCK. Our region did not participate in those investigations, but region 3 at Boulder City carried on very extensive inves-

tigation down at Marble Canyon. They carried on the same type of investigation which we described at Glen Canyon.

Mr. RHODES. Are you or Mr. Dexheimer familiar with the results of that investigation?

Mr. MURDOCK. I am familiar with them.

Mr. RHODES. As to the two sites in Marble Canyon would it be feasible to construct a high dam in Marble Canyon?

Mr. MURDOCK. Yes; they concluded a high dam could be constructed in Marble Canyon.

Mr. RHODES. How high a dam?

Mr. MURDOCK. I can't answer that.

Mr. LARSON. Sufficiently high to back the water up to the base of the Glen Canyon Dam.

Mr. RHODES. In other words, a high dam at Marble Canyon would inundate the Glen Canyon site?

Mr. LARSON. The maximum height considered would back the water up to near the Glen Canyon Dam.

Mr. RHODES. Would it be your conclusion, Mr. Larson, that it would be impossible to build both a high Marble Canyon Dam and a Glen Canyon Dam?

Mr. LARSON. Yes, sir; I think from the standpoint of planning and the provisions of the compact and for other reasons—and there are many reasons why we didn't get into that; that is, we stayed away from a higher dam at Marble Canyon.

Mr. RHODES. Of course, Marble Canyon is physically below Lee Ferry and therefore in the lower basin.

Mr. LARSON. That is right.

Mr. RHODES. Would it be possible to construct the dam at both sites?

Mr. LARSON. At both sites?

Mr. RHODES. Yes, sir.

Mr. LARSON. Yes.

Mr. RHODES. However, not a high dam at Marble Canyon.

In other words, the dam at Marble Canyon would have to be low enough so that it would not flood the Glen Canyon site?

Mr. LARSON. Yes, but it would still have to be a high dam.

Mr. RHODES. How high would it have to be?

Mr. LARSON. I don't have that figure, but it is a pretty high dam and backs water up to the Glen Canyon Dam.

Mr. RHODES. Do you have any idea as to how many acre-feet of storage would be in a dam such as Marble?

Mr. LARSON. The storage would be relatively small.

Mr. RHODES. In Marble Canyon.

Mr. LARSON. Yes. It is very small compared to Glen Canyon; less than 1 million acre-feet, I believe.

Mr. RHODES. Would a high dam at Marble Canyon store more water than that—than the figure you just gave?

Mr. LARSON. Yes; a high dam there going beyond Glen would store more water. I don't know what the capacity would be.

Mr. RHODES. It would be a rather considerable capacity?

Mr. LARSON. Yes, sir.

Mr. RHODES. And a rather considerable powerhead for the production of hydroelectric power?

Mr. LARSON. Yes; but it would not be as much power as both of those dams if they were constructed—not nearly so much.

Mr. RHODES. Would it be as much as Glen Canyon, assuming you build only one site?

Mr. LARSON. If it were built to the same height, yes; but it would lose that additional head up at Glen.

Mr. RHODES. Is it your thinking that both sites could be constructed, Mr. Dexheimer?

Mr. DEXHEIMER. Yes; you could construct a relatively high dam at either or both of those sites. If you use the Marble Canyon and Glen Canyon, of course, you are limited on Marble Canyon to backing water up to the powerplant at Glen Canyon.

The profile I have in this House Document No. 364 indicates that that Marble Canyon Dam would be between three and three hundred and fifty feet in height to back water up to the Glen Canyon.

Mr. RHODES. So that if it is contemplated building both dams the Marble Canyon would have to be considerably lower than it would be if just the Marble Canyon site were used?

Mr. DEXHEIMER. Yes.

Mr. RHODES. Of course, the attendant circumstances would require a much smaller storage reservoir and smaller powerhouse; would it not?

Mr. DEXHEIMER. That is correct, because you have a long reach of relatively narrow steep canyon that would not hold as much water and, therefore, the power output would be considerably less.

Mr. RHODES. Is the rock formation in Marble Canyon similar to the rock formation in Glen Canyon?

Mr. MURDOCK. No; it is much older rock. It is all limestone down at Marble Canyon. The dam would rest on limestone.

Mr. RHODES. How would you compare the sites as far as suitability for construction of a dam?

Mr. MURDOCK. The limestone, the best limestone at Marble Canyon is a stronger rock than the Navaho sandstone at Glen Canyon, but deep beneath the foundation of the river is Bright Angel shale, which brings up another problem. It is below the dam but it is still there and it is a weak formation.

You might say the limestone is better in Marble Canyon and the shale is worse.

Mr. RHODES. But would the effect of the shale be to cause a greater amount of seepage?

Mr. MURDOCK. No; shale is very impervious, but it is soft and weak. It is likely to squeeze. It is two or three hundred feet below the river bottom so that it is not actually in contact with the dam.

Mr. RHODES. So that a considerable structure could be put on the limestone?

Mr. MURDOCK. That is right.

Mr. RHODES. I think that is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from California.

Mr. HOSMER. I would like to start out by asking Mr. Larson some questions about the statement you made to the committee.

Mr. Dexheimer might possibly want to answer some of them.

As I understand it, the Bureau at this time is recommending the construction of 2 power dams and 11 participating projects plus Eden.

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. What is your attitude with respect to other projects contained in some of these bills that are not on that list?

Mr. DEXHEIMER. I think we have furnished a report on these under date of March 8, to Mr. Engle at his request, which in effect summarizes the various bills before the committee.

Mr. HOSMER. Are you opposed to those other projects at this time?

Mr. DEXHEIMER. No, sir; we are not opposed to any of them. A great many of them we have not studied.

Mr. HOSMER. Are you in favor of them?

Mr. DEXHEIMER. We would have no objection to their being authorized, but we would not be in a position to comment or recommend a great many of them because we have not completed the necessary studies as to their feasibility, economic necessity, engineering adequacy, and other matters.

Mr. HOSMER. You are apparently neutral at this point, then; is that right?

Mr. DEXHEIMER. That is correct, on many of them, simply because we don't have the completed information to make a recommendation one way or the other.

Mr. HOSMER. Then there is one of them, however, that you recommended last year that you did not recommend this year. I think that that was that Navaho Shiprock project.

What occurred to change your mind on that one?

Mr. DEXHEIMER. That has been treated somewhat differently by the Secretary's office this year in that the large part to irrigate the Indian lands is treated by the Bureau of Indian Affairs as a means for helping the Navaho Indian out of his economic straits and providing for him opportunities to support himself.

Mr. HOSMER. Do you mean by that, then, that that is a Bureau of Indian Affairs project and not a Bureau of Reclamation project?

Mr. DEXHEIMER. The part relating to the Indian lands; yes, sir.

Mr. HOSMER. Now, Mr. Larson, do you have in your report again this year that the construction of these projects would provide sediment control for the lower basin? Do you recall that last year we went into that in quite some detail? I do not want to take up a lot of time on it today, but just how much sediment control are you going to get with respect to existing facilities in the lower basin?

Mr. LARSON. The large catchment basin for sediment is in Glen Canyon. Out of the 26 million feet capacity, initially, 20 million acre-feet of that capacity would be live storage, and the 16 million acre-feet eventually would be dead storage.

Mr. HOSMER. You mean 6 or 16 million?

Mr. LARSON. Sixteen million. But over the years, quite a long time, when some sediment is deposited in the present live storage, but we have figured that we would have silt protection for 200 years at Glen Canyon and a longer time at some of the other reservoir sites of the plan.

Mr. HOSMER. I do not think you understood my question. My question was about sediment control for the lower basin which you say will be provided by these projects.

Mr. LARSON. By catching the sediment at Glen Canyon certainly would preclude that sediment from going into Bridge Canyon or the Marble Canyon Reservoirs if they were built, or into Lake Mead.

Mr. HOSMER. Now, I think we brought out last year that there was the storage enough to keep Lake Mead in operation for 199 years.

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Now, I want to know what additional period of time these projects are going to make Lake Mead useful?

Mr. LARSON. Several hundred years. I can't give you the exact number, of course.

Mr. HOSMER. Have you figured it out?

Mr. LARSON. No, sir.

Mr. HOSMER. This is an opinion or speculation, then?

Mr. DEXHEIMER. I think, Mr. Hosmer, it must be more or less speculation, because the sedimentation depends a great deal on erosion control, what periods these storage reservoirs may be built and many other factors.

Our best judgment is that the Glen Canyon, as Mr. Larson said, will probably increase the active storage life, full active storage life in the Lake Mead for another 200 years and perhaps more, that is above the 200 already provided.

Mr. HOSMER. That is an opinion or speculation on your part, too?

Mr. DEXHEIMER. That is our best judgment based on what we know about the stream and the possibilities of when these other things may be done.

Mr. HOSMER. But not based on any calculation?

Mr. DEXHEIMER. It would be very difficult to calculate because you have to make certain assumptions as to what may be done upstream before you can arrive at a value to use in your calculations.

Mr. HOSMER. Now, Mr. Larson, as I understand your testimony, it is to the effect that the beneficial consumptive uses involved in the 11 proposed storage projects can be made in the upper basin without the necessity for holdover storage to meet the requirements of article IV (d) of the compact; is that right?

Mr. LARSON. I have stated in my previous testimony that development could go on up to possibly around 4 million acre-feet or a little more, but at that time it would be difficult to fill the reservoirs.

The quicker we fill the reservoirs, the easier the plan works.

Mr. HOSMER. What I said is correct, then?

Mr. LARSON. Yes; we could go with some development beyond what we are now.

Mr. HOSMER. Now, the upper basin at the present time is meeting its requirements for delivery?

Mr. LARSON. Yes; that is automatic because the average flow is——

Mr. HOSMER. Just answer my question.

Mr. LARSON. Yes, sir.

Mr. HOSMER. This storage that is proposed, then, is in no way connected with meeting any present obligations of the upper basin to the lower basin; is that correct?

Mr. LARSON. I assume the obligation is there at all times.

Mr. HOSMER. I know, but my question was whether or not the storage projects are in any way connected with meeting the present upper basin obligation?

Mr. LARSON. No, sir; they are not.

Mr. DEXHEIMER. No, sir; they are not, as long as the lower basin gets the entire flow of the river with the small exception for upper basin uses that have been in effect for some time in the upper basin; naturally the upper basin is meeting its present commitments to the lower basin.

Mr. HOSMER. In other words, the storage projects are needed for future anticipated consumptive uses; is that right?

Mr. DEXHEIMER. Yes, that is correct, they are needed for holdover storage to be able to make a utilization of the water in the upper basin to which they are entitled under the compact.

Mr. HOSMER. Recognizing, then, that the upper basin must make its beneficial consumptive uses so as to comply with this provision of the compact?

Mr. DEXHEIMER. Yes.

Mr. HOSMER. And I refer to future benefits for consumptive use.

In other words, we are putting in the storage project just so that the upper basin will not stop meeting the commitments it has met so far; is that right?

Mr. DEXHEIMER. Yes, and to make it possible for them to use beneficially the water to which they are entitled.

Mr. HOSMER. And, of course, then the lower basin States are obtaining no benefit out of the upper basin storage project from this angle?

Mr. DEXHEIMER. I think they will receive a very remarkable benefit in that——

Mr. HOSMER. I am talking about any benefit with respect to the requirements of III (d).

Mr. DEXHEIMER. I think, Mr. Hosmer, they probably would in the event of a dry cycle.

Mr. HOSMER. There has been no dry cycle so far that has prevented the upper basin from meeting its requirement of consumptive use of water to such an extent that it would cause the flow in any 10-consecutive-year period to be less than 75 million acre-feet; that is true; is it not?

Mr. DEXHEIMER. Up to now it has been possible, although there have been flows as low as 4 million acre-feet total runoff in 1 year.

Mr. HOSMER. Is it understood that the evaporation losses are chargeable to the upper basin and not to the lower basin?

Mr. DEXHEIMER. I think that is understood, yes.

Mr. HOSMER. Could you operate and control the project with that idea in mind?

Mr. DEXHEIMER. Yes, sir; I think we would in the absence of some other decision by the Supreme Court, or others.

Mr. ASPINALL. Has there been any other contention on the part of the upper-basin representatives than that which has been suggested?

Mr. HOSMER. I would like to answer that question and state that the gentleman himself made that contention last year.

Mr. DEXHEIMER. So far as I know there has been no contention on the part of the upper basin that they would not be charged with the evaporation in the upper-basin reservoirs.

Mr. HOSMER. If the chairman is interested his statements in that connection were on page 180 of last year's hearings.

Now, you are going to sell this power to somebody and you have had some companies come in here and testify that they would like to buy power; is that right?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. You do not have any contracts to sell the power; have you?

Mr. DEXHEIMER. No, sir.

Mr. HOSMER. Is it not true that when Hoover Dam was authorized that it was a requirement before construction began that contract be executed to fully pay out the dam before construction began?

Mr. DEXHEIMER. No, sir; they were negotiated and commitments made to sell sufficient power to pay out the power investment with interest over a 50-year period as a condition to construction of the power facilities.

Mr. HOSMER. Contracts were executed; were they not?

Mr. DEXHEIMER. I believe the contracts were not executed until about the time that the power was available. That was in the middle of 1936.

Mr. HOSMER. What was the requirement in the Boulder Canyon Project Act with respect to the contract?

Mr. DEXHEIMER. I think that the requirement was that the Secretary be assured that he would be able to have contracts which would repay the power investment with interest within 50 years.

Mr. HOSMER. If that was a good idea then, would it not be a good idea now?

Mr. DEXHEIMER. I think it would be.

Mr. HOSMER. Mr. Larson, on page 3 of your testimony describing the Glen Canyon Dam, you stated that it was 16 miles upstream from Lee Ferry. That is about the middle of the page.

Mr. LARSON. Yes, sir.

Mr. HOSMER. What I am getting at, we have heard about the 4-mile proposal and the 15-mile proposal, but is this something different, or did you mean the 16-mile site?

Mr. LARSON. One measurement is from Lee's Ferry and the other one Lee Ferry. These are two points on the Colorado River. One is the Lee's Ferry gaging station 1 mile above Lee Ferry, and Lee Ferry is the dividing point in the compact.

Mr. HOSMER. Is this place you propose to put the dam what is known as mile 15?

Mr. LARSON. Yes; this is mile 15.

Mr. HOSMER. But it is 16 miles above the division line, or the gage?

Mr. LARSON. Yes; above Lee Ferry the division point which is 1 mile below Lee's Ferry.

Mr. HOSMER. We are not taking about another dam site?

Mr. LARSON. No, sir.

Mr. HOSMER. You mentioned earlier when you were testifying about some protection for the Rainbow Bridge National Monument?

Mr. LARSON. Yes; we mentioned that.

Mr. HOSMER. What protection would you have to give?

Mr. LARSON. The maximum water surface of the Glen Canyon Reservoir for a capacity of 26 million acre-feet backs water up in the canyon under the Rainbow Bridge.

Mr. HOSMER. You mean up under the Rainbow Bridge?

Mr. LARSON. Yes, in the canyon, but not under the abutments.

Mr. HOSMER. How far away?

Mr. LARSON. There is the small, narrow canyon and then the abutments of the bridge begin a short distance out from there.

Mr. HOSMER. Would it be under the arch?

Mr. LARSON. Yes; the water would go up there.

The investigations made up to now in agreement with the Park Service would call for some protection—we know that we can build a

dam in the little narrow canyon below the Rainbow National Monument and keep the water from going up to the bridge.

Mr. HOSMER. How far away from the bridge would that be?

Mr. LARSON. About a mile, I think. Way down out of sight anyway.

Then above the bridge there is a tunnel site about a mile long so that any water occuring in that dry creek could be diverted into another creek to the south and the debris catchment basin would be built there at the tunnel intake if that becomes necessary.

Mr. HOSMER. Are you going to have to do that?

Mr. LARSON. What is that?

Mr. HOSMER. Do you plan to do that?

Mr. LARSON. If you care, Mr. Chairman, I can read the very short agreement with the Park Service.

Mr. HOSMER. I do not want you to read the agreement. I want you to tell us as concisely as you can what the answer to my question is.

Mr. LARSON. We plan to do that if it is necessary after conference with the Park Service, yes, we plan for the necessary protection.

Mr. HOSMER. You mean you are going to spend $421 million for this Glen Canyon project?

Mr. LARSON. Yes, sir.

Mr. HOSMER. You tell me now that you may have to spend more; is that right, to build a tunnel?

Mr. LARSON. No sir, there is enough in that estimate to take care of the protection we need for the Rainbow Natural Bridge.

Mr. HOSMER. How much of the $421 million is allocated to protection for this bridge?

Mr. LARSON. We have a sum in the estimate, but I can't give you that sum at the moment.

Mr. HOSMER. Would you have one of your assistants——

Mr. LARSON. It is one of the contingent items. We have a contingency factor in that estimate to cover such items as the bridge protection.

Mr. HOSMER. I wonder if Mr. Jacobson or somebody could get that figure for us while we are going on to something else.

Mr. LARSON. I don't believe we can.

Mr. HOSMER. It is an unspecified amount, then?

Mr. LARSON. Yes sir, a mile tunnel is a matter of a million dollars or so. It is a very small figure in the contingency for a $421 million dam.

Mr. HOSMER. That is right, it is a lot of money we are talking about, I guarantee you that.

Now, you may have to build a tunnel to protect the water that comes down the canyon in which the arch is located. You will have to protect the dam, put in a dam on the other side of the arch to keep the water from the proposed lake, coming in under the arch from the opposite direction; is that right?

Mr. LARSON. Yes sir, those are the possibilities we will have to provide for.

Mr. HOSMER. How high a dam would you have to have to keep the lake water from coming in?

Mr. LARSON. About 210 feet as I recall. One site is 210 and the other site is 240 feet.

Mr. HOSMER. How wide a dam?

Mr. LARSON. What is that?

Mr. HOSMER. What is the length of the arc?

Mr. LARSON. At one site it is less than 100 feet. It is a very, very narrow canyon.

Mr. HOSMER. What is it on the other site?

Mr. LARSON. It is similar. It is broader, but I don't recall. It is over 100 feet.

Mr. HOSMER. Now, you have a dam a couple hundred feet high and somewhat over a hundred feet wide to put in. How much is it going to cost to do it?

Mr. LARSON. I can't give you that, but it would be a relatively small figure because it is more or less a concrete plug.

Mr. HOSMER. Isn't any dam a concrete plug?

Mr. LARSON. Well, this would not have a spillway and outlet works and everything like that.

Mr. HOSMER. I recognize you are not going to put a power station in there probably as much as you would like to, but it is not in dam language a small dam, is it?

Mr. LARSON. In that narrow canyon it is a relatively inexpensive dam.

Mr. HOSMER. You know you are going to build this thing to protect Rainbow Bridge, yet you do not have any figures in your calculations in that $421 million as to what it is going to cost; is that right?

Mr. LARSON. That is correct. We don't have any figures because at that time we didn't know what the Park Service might require. What might be worked out. It is possibly two or three or four million dollars. That certainly is a figure within the contingency factor that we used.

Mr. HOSMER. How can you do it for that? That is a pretty good-size dam, is it not?

Mr. DEXHEIMER. I think, Mr. Hosmer, a dam at the base of perhaps 70 feet and at the crest 100 feet or a little more——

Mr. HOSMER. Did you not say 200 feet high?

Mr. DEXHEIMER. Two hundred feet high—would probably not exceed a million dollars. And probably another million dollars or so to build the 1-mile tunnel to drain the stream that comes in through the bridge from upstream.

Mr. HOSMER. How do you know you can put a dam at either one of those sites? Have you taken any bores, have you done any examination?

Mr. LARSON. The Navaho sandstone is exposed on both sides, also at the bottom.

Mr. HOSMER. I realize that, but how far up from mile 15 is it?

Mr. MURDOCK. It is not on the main stream. It is east about 20 miles.

Mr. HOSMER. Down there at mile 4 you did not want to put a dam because you had faulting and other conditions in that Navaho limestone that was not good.

What is the condition of this limestone up here where you want to put the dam?

Mr. MURDOCK. It is suitable. There are no joints or cracks.

Mr. HOSMER. How do you know? He did not know.

Mr. MURDOCK. Well, he is not supposed to.

Mr. HOSMER. Well, you answer the question.

Mr. MURDOCK. I can state that it is sound rock there and there are several sites suitable to build a dam on.

Mr. HOSMER. You have looked at it?

Mr. MURDOCK. Yes.

Mr. HOSMER. Have you taken any cores?

Mr. MURDOCK. No.

Mr. HOSMER. You never tried to grout any in there?

Mr. MURDOCK. We can tell by faults and fissures.

Mr. HOSMER. It is exposed on both sites you mentioned this morning, that somebody took a look at this mile 15 site and they thought it was such a sweetheart that you would go ahead and spend all the money it took to drill cores. You did the same thing down at mile 4 because you drilled cores there.

You found faults and fissures and everything else so that you did not want to put the dam in.

I am trying to find out if you know anything about this site up there 20 miles above that is suposed to protect this beautiful natural piece of scenery that is going to have nature lovers all over the country down on your neck if you do not attempt to preserve every particle of sand that is in the thing.

Now, I think that the bureau had better come up with some better answers than they hove come up so far in connection with the preservation and protection of Rainbow Natural Bridge.

I will leave that subject, then.

Mr. DEXHEIMER. Mr. Hosmer, may I comment on that?

Mr. HOSMER. Yes, because maybe I have another question.

Mr. DEXHEIMER. We have satisfied ourselves that the cost of a dam which will protect the Rainbow Natural Bridge and the tunnel or other means of diverting water so that we would not have a stagnant pool behind that dam, would not be excessive. They are entirely feasible at 1 or 2 sites we have looked at.

We don't know yet the exact location of that because it will be determined to a large extent on negotiations with the Park Service and other interested people.

Mr. HOSMER. The Sierra Club?

Mr. DEXHEIMER. Probably. I don't think the Sierra Club has visited that. With their great interest in the outdoors I doubt if any members of that club have been there, but they no doubt will be.

In any event, we are entirely satisfied we can build the necessary works there to protect that bridge in the manner suitable to the National Park Service and others that are interested within the amounts of money that we have estimated in our overall estimate for the Glen Canyon Dam and Reservoir, and we have no question about the economic engineering or practical feasibility of taking care of that monument.

Mr. HOSMER. That dam would be, roughly, 200 feet high?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. Now, could you put a dam 235 feet high at this location?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. How much bigger structure would it involve?

Mr. DEXHEIMER. Perhaps the cost estimate might be 5 to 10 percent more.

Mr. HOSMER. Are your canyon walls sufficient at that point to put yourself up another 35 feet on top of the 200?

Mr. DEXHEIMER. I think we could find a location near there anyway where the would be practical.

Mr. HOSMER. You are getting to the top of the Navaho sandstone formation, are you not, there, and also pretty close to the top of the configuration which spreads out?

Mr. DEXHEIMER. Of course, as we move up toward the Rainbow Natural Bridge, that canyon bottom moves up considerably and there is a limitation there because of the abutments of the bridge itself.

Mr. HOSMER. You would not want to put the dam on top of the bridge, would you?

Mr. DEXHEIMER. On the ultimate water surface. You see, if the water-surface elevation in the reservoir of 3,700 feet, mean sea level, which is what we plan, were not confined and kept out of that area, it would move up the canyon and be very close to the base of the bridge, the base of the bridge there being on the one side 3,721 feet above sea level.

Mr. HOSMER. Is it not a fact that you do not want to put the dam at mile 15 up to 735 feet because you could not protect Rainbow Natural Bridge if you did so?

Mr. DEXHEIMER. It has some bearing, but we could build a dam to take care of it.

Mr. HOSMER. I yield to the gentleman from Pennsylvania at this point.

Mr. SAYLOR. Mr. Dexheimer, in using the word "estimate" you referred to the Bureau of Reclamation that made such excellent estimates on that project known as the Eklutna. Is that the same group that estimated with such accuracy the Eklutna project?

Mr. DEXHEIMER. We made some estimates on it; yes, sir. But I don't think that our engineer's estimates were always available to the Congress.

Mr. SAYLOR. Were all the engineer's estimates on this project available to the Congress?

Mr. DEXHEIMER. Yes, sir.

Mr. SAYLOR. That is all.

Mr. HOSMER. Mr. Dexheimer, have you ever given this committee a complete breakdown of the cost figures for both Glen Canyon and Echo Park Dam, including power generation, transmission line, and so forth?

I want to know if you have.

Mr. DEXHEIMER. Yes, sir; I think you will find them in House Document 364.

Mr. HOSMER. I think you said there were no changes since last year in the cost of building them; is that right?

Mr. DEXHEIMER. No substantial change; no, sir.

Mr. HOSMER. Now, Mr. Larson, I want to ask you about your statement on page 6 of your testimony in which you say that the Colorado River compact in article III (a) affords in perpetuity to the upper basin exclusive consumptive use of 7½ million acre-feet per annum.

I believe the correct language is exclusive beneficial consumptive use. Is that not correct?

Mr. LARSON. That I would have to check. I think it is beneficial consumptive use.

Mr. HOSMER. Mr. Bennett, is that correct?

Mr. BENNETT. That is correct.

Mr. HOSMER. Since those two things might be interpreted differently, and since this cross-examination is so far in the record from Mr. Larson's original statement, I wonder if it would be possible to put the correct language in Mr. Larson's statement in the record. If so, I ask unanimous consent that that be done.

Mr. ASPINALL. It is not possible for the committee to correct Mr. Larson's statement.

Mr. HOSMER. Would you be willing to have your statement corrected?

Mr. LARSON. I was not trying to copy the language out of the compact, but we have no objection to putting in the word. That is all right.

Mr. HOSMER. Could we understand that word "beneficial" appears between "exclusive" and "Consumptive" on page 6 of Mr. Larson's original statement?

Mr. ASPINALL. The Chair would suggest that the gentleman get together with Mr. Larson and agree and give the statement to the staff member so that we may have no misunderstanding.

With that understanding that request is granted.

Mr. HOSMER. Now, somewhere along the line you indicated that the testimony we had before brought out that the lower basin is using less than 7½ million acre-feet of 3-A water at the present time.

Now, in your storage plan for the upper basin storage project, do you intend to cut the lower basin down to what is actually beneficially consumptively used, or just down to the 7½ million acre-feet on a 10-year annual average figure?

Mr. LARSON. The plan intends to follow the provisions of the compact where the release of water from the upper basin would not be less than 75 million acre-feet in any consecutive 10-year period plus any surplus to which the lower basin is entitled.

Mr. HOSMER. This House Document 364, over on page 152, I refer you to a table on that page and ask you what that table purports to show.

Mr. LARSON. What is your question?

Mr. HOSMER. What is that table supposed to show?

Mr. DEXHEIMER. I think, Mr. Hosmer, on page 151, starting there "Storage capacity required for river regulation" explains to a large extent that table.

Mr. HOSMER. Is it a sample of how, if the project had been in operation over the years 1914 to 1947, that storage would have been accomplished in the upper basin?

Mr. DEXHEIMER. No; it is a requirement of active storage to permit the full utilization of apportioned consumptive uses.

Mr. HOSMER. To permit those uses in the uuper basin?

Mr. DEXHEIMER. With the commitments, of course, being met to the lower basin, yes.

Mr. HOSMER. In other words, that is an example of how this project would operate, is it not?

Mr. DEXHEIMER. Well, it is the active storage requirement if you had full utilization as I understand it.

Mr. HOSMER. Well, as I understand it, this storage is being put in to permit full utilization, is it not?

Mr. DEXHEIMER. The storage we are proposing, of course, would not in itself permit full utilization as far as——

Mr. HOSMER. It is being put in, then, shall we say, to permit increased utilization of 3–A water in the upper basin?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. As storage projects in addition to the 11 in the bill?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. I am trying to find out if there is anything in this book that covers how the storage would be accomplished in filling the reservoirs that are to be built under the project.

Mr. DEXHEIMER. I don't believe, Mr. Hosmer, that in this document there is a table giving you just how and under what circumstances the proposed reservoirs would be filled.

Mr. HOSMER. Well, we have in Mr. Larson's statement on page 8, that the portion of water presently not consumed in the upper basin would greatly facilitate the initial building of the storage reservoirs.

What I am trying to get at is, How are you going to do the storage Let us assume that in some year you have 20 million acre-feet of water in the river. Now, are you going to take all but 7½ million of that and use it to fill the storage capacity in these reservoirs? How are you going to do it?

Mr. LARSON. It does not need to be done that way if you look at the average flows. The average historical flow from 1914 to 1945 at Lee Ferry is over 13 million acre-feet. That is the historical flow.

Mr. HOSMER. Yes.

Mr. LARSON. And from 1946 to 1951, for example, it is 11,865,000. For the lowest 10-year period we have ever had, the historical flow from 1931 to 1940, was 10,151,000.

Mr. HOSMER. Do you not see, Mr. Larson, that does not answer my question. What I am trying to find out is how you are going to fill the storage reservoirs.

Mr. LARSON. I am going on to that. Naturally it is much easier to fill the reservoirs during these higher cycles or average 10 years than it is during the 10 years of the drought period that we had, but you can take the top of most annual flows and fill the reservoirs very slowly, cut the river flow to 10½ million acre-feet average or you can take a little more and let 9½ million acre-feet go, or cut the river flow more and let 8½ million acre-feet go down below Lee Ferry and still fill Glen Canyon Reservoir.

Mr. HOSMER. That depends on the period of the year. I heard something about a 20-year filling period.

Is not that what you plan to use?

Mr. LARSON. You could take 20 years, or 15 years.

Mr. HOSMER. You do realize how important it is to us in the lower basin?

Mr. DEXHEIMER. I think the answer to your question is this: As I pointed out earlier, the Secretary of the Interior has contracts for the delivery of water in the lower basin.

Mr. HOSMER. That is right.

Mr. DEXHEIMER. He also has certain contracts for hydroelectric power. Those contracts, plus the treaty agreement with Mexico, would be a first requirement providing there is sufficient water in the overall flow of the river to provide those requirements.

Mr. HOSMER. Then this power generation at Hoover Dam is a priority?

Mr. DEXHEIMER. No, sir. As I pointed out, we are curtailing the power production today because we need to store that water for the water contracts for beneficial use that we have in the lower basin, and they would be curtailed.

So that the first call on the water at the river is to meet those contracts.

Mr. HOSMER. Which contracts, water contracts, or the power contracts?

Mr. DEXHEIMER. The water contracts that are already in effect.

Mr. HOSMER. That amounts to what? Six and a half million acre-feet a year?

Mr. DEXHEIMER. I think diversions are in that neighborhood. Over 5 million, anyway.

Mr. HOSMER. Let us get this settled.

How much water has to go through the generator at Hoover each year to meet the firm power commitments under the Hoover contracts?

Mr. DEXHEIMER. Well, that would be difficult to say in acre-feet because those contracts are in kilowatt-hours of energy.

The head that you have available makes quite a difference, particularly at Hoover powerplant.

Mr. HOSMER. Now, then, let us take it in some period of time that you have had some experience on. Let us take it for last year, or the year before, or any other year.

Mr. DEXHEIMER. Well, for any year up until the present time and including the present year, we have run more water through the turbines than we are required to run to meet the commitments under the power contracts.

Mr. HOSMER. For firm power?

Mr. DEXHEIMER. For firm power, yes.

Mr. HOSMER. So you have surplus power?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. Have you sold that pursuant to the contract you have for the sale of surplus power?

Mr. DEXHEIMER. That is correct.

Mr. HOSMER. As I understand the prices for firm and surplus power were calculated in some relation to each other; is that not correct?

Mr. DEXHEIMER. Well, in relation to the cost and amortization of the investment.

Mr. HOSMER. I mean from the standpoint of the power purchased. Did they not find that they could pay a little bit more for firm power in anticipation of the surplus power they might get at a little bit lesser rate?

Mr. DEXHEIMER. I don't know. I presume they did, yes.

Mr. HOSMER. Would that not be a factor for anybody to consider in negotiating a contract in connection with the price they pay for firm or surplus power?

Mr. DEXHEIMER. That is correct, plus the losses they have in getting it to their system and uses and the cost of steam power to augment that surplus power to make it salable at rates that they could collect.

Mr. HOSMER. As a matter of fact, when they build their line they have to build a capacity to handle that surplus as well as a firm power; do they not?

Mr. DEXHEIMER. Yes, sir; if they are going to use it.

Mr. HOSMER. It is not a fact that the generation of firm power at Hoover to meet the contract commitments requires about 10 million acre-feet a year of water?

Mr. DEXHEIMER. No, I don't believe that could be that much.

Mr. HOSMER. Is it 2 million?

Mr. DEXHEIMER. I do not have the figure available. I would have to make a study on that.

Mr. HOSMER. That is one of the things that is going to be considered in operating this upper-basin storage project, yet at this point you know nothing about it.

Mr. DEXHEIMER. I don't believe, Mr. Hosmer, that that need enter the picture at all. I don't believe that the firm-power commitments could possibly exceed the lower-basin allocation of firm-water supply.

Mr. HOSMER. Which is what?

Mr. DEXHEIMER. A minimum of 75 million acre-feet in a 10-year period.

Mr. HOSMER. Is that the maximum figure that you propose to let down to the lower basin during the storage period unless you find that you have to put some additional into it for the Mexican water?

Mr. DEXHEIMER. No, sir; we would release from the upper basin all commitments for water deliveries and whatever other water might be available depending on our plan for filling.

Mr. ASPINALL. Will the gentleman yield to the chairman?

Mr. HOSMER. Yes, sir.

Mr. ASPINALL. At this time the committee will stand adjourned until 1:30 Wednesday afternoon.

Will that be satisfactory to the members of the Bureau and the regional office?

Mr. DEXHEIMER. Yes, sir.

And may I ask the committee what are your plans for the rest of the week?

I have people in here from out of town. I am also appearing today and tomorrow before the Appropriations Committee, and probably this week and next.

So I would like, if possible, to have a definite timing.

Mr. ASPINALL. This committee will not be in session Tuesday, Thursday, or Friday.

If we can meet Wednesday afternoon, we will do so.

If not, we will go over until Saturday morning.

Thank you very much.

Mr. HOSMER. Mr. Chairman, would it be convenient, since I have the time, do you want me to take the geologists first and let them be released? Would that be helpful to you?

Mr. DEXHEIMER. We would appreciate taking anyone that could be released. I personally would like to be released because of our appropriations hearings.

Mr. HOSMER. Between you and the geologists, what is the priority? I am just trying to work it out for your convenience if I can get the geology in hand by Wednesday afternoon.

Mr. DAWSON. Mr. Saylor has reserved some time to cross-examine the geologists further, and if you take him on for a while and he has to call him back, we will not save any time.

Mr. HOSMER. I am sure Mr. Saylor will cooperate with me and all of us to try to work it out.

(Thereupon, at 4:15 p. m., the committee recessed, to reconvene at 1:30 p. m., Wednesday, April 20, 1955.)

COLORADO RIVER STORAGE PROJECT

WEDNESDAY, APRIL 20, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND
RECLAMATION OF THE COMMITTEE
ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 2:05 p. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will now be in session for the further consideration of H. R. 3383 and other similar bills having to do with the authorization of the upper Colorado River storage and development project.

The reason that we were unable to meet at 1:30 was because the House was not in general debate. Permission to meet in committee meeting while the House is in session is only granted to the commitee while the House is in general debate upon legislation.

(Discussion off the record.)

Mr. ASPINALL. We will now be in position to carry on until 10 minutes after 4, at which time we will either adjourn the hearings or adjourn until Saturday morning, depending upon the wishes of the committee.

When the committee adjourned its last session the time was in the control of the gentleman from California, Mr. Hosmer. The Chair recognizes the gentleman from California, Mr. Hosmer, at this time.

QUESTION PERIOD OF W. A. DEXHEIMER, COMMISSIONER OF RECLAMATION; J. NEIL MURDOCK, REGIONAL GEOLOGIST, BUREAU OF RECLAMATION; KENNETH B. KEENER, CHIEF DESIGNING ENGINEER, BUREAU OF RECLAMATION; ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR; E. O. LARSON, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, ACCOMPANIED BY C. B. JACOBSON—Resumed

Mr. HOSMER. Mr. Larson, at the conclusion of the last session we were discussing the matter of filling the reservoirs, but before we get into that again, I believe you submitted to the Senate Interior Committee some tables that have not yet been submitted to this committee with respect to the payout schedule, did you not?

Mr. LARSON. Yes, sir.

Mr. HOSMER. Would you say what those are?

Mr. LARSON. On page 557 of this year's Senate hearings on S. 500, there is contained table 1–A, the Colorado River Storage Project and Participating Projects—Financial Repayment Schedule. This table shows the irrigation costs repaid from power revenues following the repayment of the power costs.

Mr. HOSMER. What does the other table show?

Mr. LARSON. I should mention that table 1–A includes the net revenues from the sale of power at Glen Canyon and Echo Park units and the powerplant of the initial phase of the central Utah project.

Mr. HOSMER. So that includes the 11 projects?

Mr. LARSON. Yes, sir; the 11 participating projects plus the Eden project previously authorized.

Mr. HOSMER. Right.

Mr. LARSON. Table 1–B, on page 560 of the same hearings, shows the power costs repaid in 50 years with residual revenues from the sale of power applied to the repayment of irrigation costs, concurrently as power is paid out.

Mr. HOSMER. Mr. Chairman, I ask unanimous consent that those two tables be printed in our own hearings so that we can have the information available on this side.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

(The tables referred to follow:)

TABLE 1A.—*Colorado River storage project and participating projects—Financial repayment schedule*

[Units, $1,000]

[Irrigation costs repaid from power revenues following repayment of power costs]

Year of study	Year of power operation	Fiscal year	Net revenues from sale of power at Glen Canyon, Echo Park, and initial phase of the central Utah project at 6.0 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
				Application of net revenues							Power		Irrigation	
			Total	Excess	Power investment	Interest	Irrigation investment	By power users	By water users [2]	Total	Power investment including interest during construction	Unpaid balance	Irrigation investment	Unpaid balance
0													1,900	1,900
1														1,900
2													5,600	7,500
3													10,600	18,100
4									17	17			11,395	29,478
5									17	17			25,228	54,689
6									17	17			14,687	69,359
7	0	1961	0	0	0	0			50	50	364,970	364,970	103,339	172,648
8	1	1962	8,361		−763	9,124			50	50	53,830	419,563	31,272	203,870
9	2	1963	13,928		3,439	10,489			91	91	30,366	446,490	9,000	212,779
10	3	1964	16,690		5,528	11,162			135	135	30,366	471,328	21,000	233,644
11	4	1965	19,386		7,603	11,783			209	209	30,366	494,091	22,000	255,435
12	5	1960	22,058		9,706	12,352			216	216	31,373	515,758	22,000	277,219
13	6	1967	24,691		11,797	12,894			216	216	25,235	529,196	5,000	282,003
14	7	1968	24,945		11,715	13,230			302	302	19,700	537,181		281,701
15	8	1969	26,081		12,651	13,430			429	429		524,530	5,000	286,272
16	9	1970	25,961		12,848	13,113			515	515		511,682	4,000	289,757
17	10	1971	25,835		13,043	12,792			515	515		498,639	9,000	298,242
18	11	1972	25,709		13,243	12,466			548	548		485,396	4,354	302,048
19	12	1973	25,587		13,452	12,135			668	668		471,944		301,380
20	13	1974	25,452		13,653	11,799			667	667		458,291		300,713
21	14	1975	25,326		13,869	11,457			668	668		444,422		300,045
22	15	1976	25,206		14,095	11,111			682	682		430,327		299,363
23	16	1977	25,080		14,322	10,758			681	681		416,005		298,682
24	17	1978	24,954		14,554	10,400			682	682		401,451		298,000
25	18	1979	24,834		14,798	10,036			682	682		386,653		297,318
26	19	1980	24,708		15,042	9,666			681	681		371,611		296,637

TABLE 1A.—*Colorado River storage project and participating projects—Financial repayment schedule*—Continued

Year of study	Year of power operation	Fiscal year	Net revenues from sale of power to Glen Canyon, Echo Park, and initial phase of the central Utah project at 6.0 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
											Power		Irrigation	
			Total	Application of net revenues				By power users	By water users [2]	Total	Power investment including interest during construction	Unpaid balance	Irrigation investment	Unpaid balance
				Excess	Power investment	Interest	Irrigation investment							
27	20	1981	24,576		15,286	9,290			691	691		356,325		295,946
28	21	1982	24,378		15,470	8,908			691	691		340,855		295,255
29	22	1983	24,186		15,665	8,521			713	713		325,190		294,542
30	23	1984	23,988		15,858	8,130			713	713		309,332		293,829
31	24	1985	23,790		16,057	7,733			713	713		293,275		293,116
32	25	1986	23,598		16,266	7,332			713	713		277,009		292,403
33	26	1987	23,400		16,475	6,925			713	713		260,534		291,690
34	27	1988	23,202		16,689	6,513			713	713		243,845		290,977
35	28	1989	23,010		16,914	6,096			713	713		226,931		290,264
36	29	1990	22,812		17,139	5,673			713	713		209,792		289,551
37	30	1991	22,608		17,363	5,245			713	713		192,429		288,838
38	31	1992	22,416		17,605	4,811			713	713		174,824		288,125
39	32	1993	22,218		17,847	4,371			713	713		156,977		287,412
40	33	1994	22,020		18,096	3,924			713	713		138,881		286,699
41	34	1995	21,828		18,356	3,472			713	713		120,525		285,986
42	35	1996	21,630		18,617	3,013			713	713		101,908		285,273
43	36	1997	21,432		18,884	2,548			713	713		83,024		284,560
44	37	1998	21,240		19,164	2,076			713	713		63,860		283,847
45	38	1999	21,042		19,445	1,597			713	713		44,415		283,134
46	39	2000	20,844		19,734	1,110			713	713		24,681		282,421
47	40	2001	20,646		20,029	617	0	0	713	713		4,652		281,708
48	41	2002	20,448		4,652	116	15,680	15,680	713	16,393		0		265,315
49	42	2003	20,250		0	0	20,250	20,250	713	20,963				244,352
50	43	2004	20,058				20,058	20,058	713	20,771				223,581
51	44	2005	19,860				19,860	19,860	713	20,573				203,008
52	45	2006	19,662				19,662	19,662	713	20,375				182,663
53	46	2007	19,470				19,470	19,470	713	20,183				162,450
54	47	2008	19,272				19,272	19,272	713	19,985				142,465
55	48	2009	19,074				19,074	19,074	713	19,787				122,678
56	49	2010	18,882				18,882	18,882	713	19,595				103,083
57	50	2011	18,684				18,684	18,684	692	19,376				83,707
58	51	2012	18,588				18,588	18,588	693	19,281				64,426
59	52	2013	18,486				18,486	18,486	672	19,158				45,268

60	53	2014	18,390				18,390	18,390	627	19,017				26,251
61	54	2015	18,294	0			18,294	18,294	553	18,847				7,404
62	55	2016	18,192	14,013			4,179	4,179	545	4,724				2,680
63	56	2017	18,096	18,096			0	0	544	544				2,136
64	57	2018	18,000	18,000					472	472				1,664
65	58	2019	17,898	17,898					345	345				1,319
66	59	2020	17,802	17,802					259	259				1,060
67	60	2021	17,706	17,706					246	246				814
68	61	2022	17,604	17,604					215	215				599
69	62	2023	17,508	17,508					93	93				506
70	63	2024	17,412	17,412					93	93				413
71	64	2025	17,310	17,310					93	93				320
72	65	2026	17,214	17,214					63	63				257
73	66	2027	17,118	17,118					63	63				194
74	67	2028	17,016	17,016					50	50				144
75	68	2029	16,920	16,920					50	50				94
76	69	2030	16,824	16,824					50	50				44
77	70	2031	16,722	16,722					22	22				22
78	71	2032	16,626	16,626					22	22				0
Total			1,475,042	291,789	586,206	328,218	268,829	268,829	36,546	305,375	586,206		805,375	

[1] Includes revenues from the sale of a small amount of pumping energy at 3.0 mills per kilowatt-hour.

[2] Following a development period for each block of irrigation, the repayment ability of the irrigators has been based on 50 equal annual payments excepting the authorized Eden and Paonia projects which require 60 and 68 annual payments, respectively.

TABLE 1B.—*Colorado River storage project and participating projects—Financial repayment schedule*

[Units, $1,000]

[Power costs repaid in 50 years. Residual revenues from sale of power applied to repayment of irrigation costs]

Year of study	Year of power operation	Fiscal year	Net revenues from sale of power at Glen Canyon, Echo Park, and initial phase of the central Utah project at 6.0 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
				Application of net revenues							Power		Irrigation	
			Total	Excess	Power investment	Interest	Irrigation investment	By power users	By water users [2]	Total	Power investment including interest during construction	Unpaid balance	Irrigation investment	Unpaid balance
0		1954											1,900	1,900
1		1955												1,900
2		1956											5,600	7,500
3		1957							0	0			10,600	18,100
4		1958							17	17			11,395	29,478
5		1959							17	17			25,228	54,689
6		1960							17	17	0	0	14,687	69,359
7	0	1961	0		0	0	0	0	50	50	364,970	364,970	103,339	172,648
8	1	1962	8,361		−1,948	9,124	1,185	1,185	50	1,235	53,830	420,748	31,272	202,685
9	2	1963	13,928		1,455	10,519	1,954	1,954	91	2,045	30,366	449,659	9,000	209,640
10	3	1964	16,690		3,106	11,241	2,343	2,343	135	2,478	30,336	476,919	21,000	228,162
11	4	1965	19,386		4,738	11,923	2,725	2,725	209	2,934	30,336	502,547	22,000	247,228
12	5	1966	22,058		6,390	12,564	3,104	3,104	216	3,320	31,373	527,530	22,000	265,908
13	6	1967	24,691		8,022	13,188	3,481	3,481	216	3,697	25,235	544,743	5,000	267,211
14	7	1968	24,945		7,791	13,619	3,535	3,535	302	3,837	19,700	556,652		263,374
15	8	1969	26,081		8,483	13,916	3,682	3,682	429	4,111	0	548,169	5,000	234,263
16	9	1970	25,961		8,589	13,704	3,668	3,668	515	4,183		539,580	4,000	264,080
17	10	1971	25,835		8,691	13,490	3,654	3,654	515	4,159		530,889	9,000	268,911
18	11	1972	25,709		8,798	13,272	3,639	3,639	548	4,187		522,091	4,354	269,078
19	12	1973	25,587		8,910	13,052	3,625	3,625	668	4,293		513,181	0	264,785
20	13	1974	25,452		9,013	12,830	3,609	3,609	667	4,276		504,168		260,509
21	14	1975	25,326		9,127	12,604	3,595	3,595	668	4,263		495,041		256,246
22	15	1976	25,206		9,248	12,376	3,582	3,582	682	4,264		485,793		251,982
23	16	1977	25,080		9,368	12,145	3,567	3,567	681	4,248		476,425		247,734
24	17	1978	24,954		9,490	11,911	3,553	3,553	682	4,235		466,935		243,499
25	18	1979	24,834		9,622	11,673	3,539	3,539	682	4,221		451,313		239,278
26	19	1980	24,708		9,750	11,433	3,525	3,525	681	4,206		447,563		235,072
27	20	1981	24,576		9,877	11,189	3,510	3,510	691	4,201		437,686		230,871
28	21	1982	24,378		9,948	10,942	3,488	3,488	691	4,179		427,733		226,692
29	22	1983	24,186		10,027	10,693	3,466	3,466	713	4,179		417,711		222,513
30	23	1984	23,988		10,101	10,443	3,444	3,444	713	4,157		407,610		218,356

31	24	1985	23,790		10,179	10,190	3,421	3,421	713	4,134		397,431		214,222
32	25	1986	23,598		10,263	9,936	3,399	3,399	713	4,112		387,168		210,110
33	26	1987	23,400		10,344	9,679	3,377	3,377	713	4,090		376,824		206,020
34	27	1988	23,202		10,427	9,421	3,354	3,354	713	4,067		366,397		201,953
35	28	1989	23,010		10,517	9,160	3,333	3,333	713	4,046		355,880		197,907
36	29	1990	22,812		10,605	8,897	3,310	3,310	713	4,023		345,275		193,884
37	30	1991	22,608		10,689	8,632	3,287	3,287	713	4,000		334,586		189,884
38	31	1992	22,416		10,786	8,365	3,265	3,265	713	3,978		323,800		185,906
39	32	1993	22,218		10,880	8,095	3,243	3,243	713	3,956		312,920		181,950
40	33	1994	22,020		10,977	7,823	3,220	3,220	713	3,933		301,943		178,017
41	34	1995	21,828		11,080	7,549	3,199	3,199	713	3,912		290,863		174,105
42	35	1996	21,630		11,182	7,272	3,176	3,176	713	3,889		279,681		170,216
43	36	1997	21,432		11,286	6,992	3,154	3,154	713	3,867		268,395		166,349
44	37	1998	21,240		11,398	6,710	3,132	3,132	713	3,845		256,997		162,504
45	38	1999	21,042		11,507	6,425	3,110	3,110	713	3,823		245,490		158,681
46	39	2000	20,844		11,620	6,137	3,087	3,087	713	3,800		233,870		154,881
47	40	2001	20,646		11,734	5,847	3,065	3,065	713	3,778		222,136		151,103
48	41	2002	20,448		11,853	5,553	3,042	3,042	713	3,755		210,283		147,348
49	42	2003	20,250		11,973	5,257	3,020	3,020	713	3,733		198,310		143,615
50	43	2004	20,058		12,102	4,958	2,998	2,998	713	3,711		186,218		139,904
51	44	2005	19,860		12,220	4,655	2,976	2,976	713	3,689		173,979		136,215
52	45	2006	19,662		12,360	4,349	2,953	2,953	713	3,666		161,619		132,549
53	46	2007	19,470		12,499	4,040	2,931	2,931	713	3,644		149,120		128,905
54	47	2008	19,272		12,635	3,728	2,909	2,909	713	3,622		136,485		125,283
55	48	2009	19,074		12,775	3,412	2,887	2,887	713	3,600		123,710		121,683
56	49	2010	18,882		12,924	3,093	2,865	2,865	713	3,578		110,786		118,105
57	50	2011	18,684		13,072	2,770	2,842	2,842	692	3,534		97,714		114,571
58	51	2012	18,588		13,313	2,443	2,832	2,832	693	3,525		84,401		111,046
59	52	2013	18,486		13,556	2,110	2,820	2,820	672	3,492		70,845		107,554
60	53	2014	18,390		13,810	1,771	2,809	2,809	627	3,436		57,035		104,113
61	54	2015	18,294		14,070	1,426	2,793	2,793	553	3,351		42,965		100,767
62	55	2016	18,192		14,331	1,074	2,787	2,787	545	3,332		28,634		97,435
63	56	2017	18,096		14,604	716	2,776	2,776	544	3,320		14,030		94,115
64	57	2018	18,000		14,030	351	3,619	3,619	472	4,091		0		90,024
65	58	2019	17,898		0	0	17,898	17,898	345	18,243				71,781
66	59	2020	17,802				17,802	17,802	259	18,061				53,720
67	60	2021	17,706				17,706	17,706	246	17,952				35,768
68	61	2022	17,604				17,604	17,604	215	17,819				17,949
69	62	2023	17,508	158			17,350	17,350	93	17,443				506
70	63	2024	17,412	17,412			0	0	93	93				413
71	64	2025	17,310	17,310					93	93				320
72	65	2026	17,214	17,214					63	63				257
73	66	2027	17,118	17,118					63	63				194
74	67	2028	17,016	17,016					50	50				144
75	68	2029	16,920	16,920					50	50				94
76	69	2030	16,824	16,824					50	50				44
77	70	2031	16,722	16,722					22	22				22
78	71	2032	16,626	16,626					22	22				0
Total			1,475,042	153,320	586,206	466,687	268,829	268,829	36,546	305,375	586,206		305,375	

[1] Includes revenues from the sale of a small amount of pumping energy at 30 mills per kilowatt-hour.

[2] Following a development period for each block of irrigation, the repayment ability of the irrigators has been based on 50 equal annual payments excepting the authorized Eden and Paonia projects which require 60 and 68 annual payments, respectively.

TABLE 1.—*Summary of initial units of Colorado River storage project and 12 participating projects*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [2]		
	New	Supplemental				Total [1]	Nonreimbursable	Reimbursable allocations			By water users [3]	By initial power units (Echo Park-Glen Canyon-central Utah)	Total
								Power	Municipal water	Irrigation			
Colorado River storage project initial units:													
	Acres	*Acres*	*Kilowatts*	*Acre-feet*	*Acre-feet*								
Echo Park unit, Colorado, Utah			200,000		87,000	$176,426,000		$128,383,000		$48,043,000		$176,426,000	$176,426,000
Glen Canyon unit, Arizona, Utah			800,000		526,000	421,270,000		370,974,000		50,296,000		421,270,000	421,270,000
Subtotal, initial units			1,000,000		613,000	597,696,000		499,357,000		98,339,000		597,696,000	597,696,000
Recreation development of Dinosaur National Monument, Colorado, Utah						21,000,000	$21,000,000						
11 participating projects:													
LaBarge, Wyoming	7,970				14,200	1,673,300				1,673,300	$495,000	1,178,300	1,673,300
Seedskadee, Wyoming	60,720				110,400	23,272,000				23,272,000	4,785,000	18,487,000	23,272,000
Lyman, Wyoming		40,600			0	10,564,000				10,564,000	2,255,000	8,309,000	10,564,000
Silt, Colorado	1,900	5,400			5,800	3,356,000	73,600			3,282,400	1,020,000	2,262,400	3,282,400
Smith Fork, Colorado	2,270	8,160			7,500	3,367,000	24,000			3,343,000	1,045,000	2,298,000	3,343,000
Paonia, Colorado	2,210	14,830			9,000	6,944,000	152,400			6,791,600	2,414,000	4,377,600	6,791,600
Florida, Colorado	6,300	12,650			12,900	6,941,500	437,900			6,503,600	1,711,500	4,792,100	6,503,600
Pine River project extension, Colorado, New Mexico	15,150				28,300	5,027,000				5,027,000	2,045,000	2,982,000	5,027,000
Emery County, Utah	3,630	20,450			15,500	9,865,500	229,000			9,636,500	3,715,000	5,921,500	9,636,500
Central Utah (initial phase), Utah	28,540	131,840	61,000	48,800	189,400	231,044,000	5,991,000	46,699,000	$45,500,000	127,354,000	[4] 60,691,000	[5] 158,862,000	[6] 219,553,000
Hammond, New Mexico	3,670				7,900	2,302,000				2,302,000	370,000	1,932,000	2,302,000
Subtotal, 11 initial projects	132,360	233,930	61,000	48,800	400,900	304,356,300	6,907,900	46,699,000	45,500,000	199,749,400	80,546,500	211,401,900	291,948,400

Additional participating project authorized and under construction: Eden, Wyoming	10,660	9,540			32,400	7,287,000				7,287,000	1,500,000	5,787,000	7,287,000
Total, 12 participating projects	143,020	243,470	61,000	48,800	433,300	[7] 311,643,300	6,907,900	46,699,000	45,500,000	207,036,400	82,046,500	217,188,900	299,235,400
Grand total	143,020	243,470	1,061,000	48,800	1,046,300	[7] 930,339,300	27,907,900	546,056,000	45,500,000	305,375,400	82,046,500	814,884,900	896,931,400

[1] Exclusive of nonreimbursable CRDF expenditures.
[2] Costs allocated to power and municipal water are repaid with interest, including interest during construction.
[3] Repayment by water users toward construction costs over 50-year repayment period beyond a reasonable irrigation development period except 60-year period for Eden project and 68-year period for Paonia project.
[4] Includes $15,191,000 in irrigation revenues and $45,500,000 from municipal and industrial water users.
[5] Includes $27,838,000 of excess power revenues from the central Utah project powerplants accruing during the irrigation repayment periods of this project.
[6] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.
[7] Includes cost ($7,287,000) of authorized Eden project now nearing completion and $2,035,000 expended on Paonia project under previous authorization.

TABLE 2.—*Summary with additional units of Colorado River storage project and additional participating projects added to table 1*

Project and State	Lands to be irrigated		Generating capacity	Municipal water annually	Stream depletion annually	Construction costs					Repayment of reimbursable costs [2]		
	New	Supplemental				Total [1]	Nonreimbursable	Reimbursable allocations			By water users [3]	By power	Total
								Power	Municipal water	Irrigation			
Colorado River storage project:													
Subtotal initial units (table 1)	*Acres*	*Acres*	*Kilowatts* 1,000,000	*Acre-feet*	*Acre-feet* 613,000	$597,696,000		$499,357,000		$98,339,000		$597,696,000	$597,696,000
Additional units:													
Cross Mountain, Colo.			60,000		70,000	50,225,000		36,329,000		13,896,000		[4] 50,225,000	
Curecanti, Colo.			40,000		18,000	49,305,000		41,205,000		8,100,000		[4] 49,305,000	
Flaming Gorge, Utah-Wyo.			72,000		56,000	82,942,000		52,042,000		30,900,000		[4] 82,942,000	
Subtotal			172,000		144,000	182,472,000		129,576,000		52,896,000		182,472,000	
Total storage units			1,172,000		757,000	780,168,000		628,933,000		151,235,000		780,168,000	
Recreational development of Dinosaur National Monument, Colo.-Utah (table 1)						21,000,000	$21,000,000						
Participating projects:													
Subtotal 12 initial projects (table 1)	143,000	243,470	61,000	48,800	433,300	311,643,300	6,907,900	46,699,000	$45,500,000	207,036,400	$82,046,500	217,188,900	299,235,400
Additional projects:													
Gooseberry, Utah		16,400			12,500	5,760,500	33,000			5,727,500	2,375,000	[5] 3,352,500	
Navaho, N. Mex.	137,250				341,400	[6] 211,237,300	1,298,000			209,939,300	30,730,000	[5] 179,209,300	
San Juan-Chama, N. Mex.		225,000		55,800	255,000	[6] 135,169,000	470,000		26,775,000	107,924,000	54,665,000	[5] 80,034,000	
Subtotal	137,250	241,400		55,800	588,900	352,166,800	1,801,000		26,775,000	323,590,800	87,770,000	262,595,800	
Total participating projects	280,270	484,870	61,000	104,600	1,022,200	663,810,100	8,708,900	46,699,000	72,275,000	530,627,200	169,816,500	[7] 479,784,700	
Grand total	280,270	484,870	1,233,000	104,600	1,779,200	1,464,978,100	29,708,900	675,632,000	72,275,000	681,862,200	169,816,500	1,259,952,700	

[1] Exclusive of nonreimbursable Colorado River development fund expenditures.
[2] Costs allocated to power and municipal water are repaid with interest, including interest during construction.
[3] Repayment by irrigation water users toward construction costs over a 50-year repayment period following a reasonable development period.
[4] A power rate of more than 6 mills would be required for these units to repay their construction cost in 50 years at 2.5 percent interest.
[5] Would require an extension of the payout period used in table 1 or an increase in the average power rate.
[6] $800,000 of the $36,400,000 estimated cost for Navaho Dam and Reservoir allocated to the San Juan-Chama project for added capacity necessary to serve the San Juan-Chama project.
[7] Exclusive of $5,500,000 allocable to purposes of the ultimate phase of central Utah project.

Mr. HOSMER. Mr. Larson, there is an alternate financing method proposed in one of the bills introduced by Mr. Aspinall, is there not?

Mr. LARSON. Yes, sir.

Mr. HOSMER. Briefly, what is that?

Mr. LARSON. That alternate was based on paying out the irrigation allocations first and then paying out the power allocations.

Mr. HOSMER. Can you give us a similar payout schedule to those two that you just finished discussing, as pertains to this latter payout method?

Mr. LARSON. Yes, sir; it will take 2 or 3 days, probably, to get it in shape.

Mr. HOSMER. Mr. Chairman, I ask unanimous consent that that table also appear in our record.

Mr. ASPINALL. Without objection, it is so ordered.

(The schedule referred to follows:)

TABLE I (d).—*Colorado River storage project and participating projects—financial repayment schedule in accordance with repayment condition specified in H. R. 3383 for storage units and participating projects recommended by Secretary, February 1955*

[Units: $1,000]

Year of study	Year of power operation	Fiscal year	Net revenue from sale of power at Glen Canyon, Echo Park, and initial phase of the Central Utah project at 6 mills per kilowatt-hour [1]					Repayment of irrigation costs			Project investment			
				Application of net revenues							Power investment		Irrigation investment	
			Total	Excess revenues	Power investment	Interest	Irrigation investment	By power users	By water users	Total [2]	Investment including interest during construction	Unpaid balance	Investment	Unpaid balance
0													1,900	1,900
1														1,900
2													5,600	7,500
3													10,600	18,100
4									17	17			11,395	29,478
5									17	17			25,228	54,689
6									17	17			14,687	69,359
7	0	1961							50	50	364,970	364,970	103,339	172,648
8	1	1962	8,361		−3,073	9,124	2,310	2,310	50	2,360	53,830	421,873	31,272	201,560
9	2	1963	13,928		1,213	10,547	2,168	2,168	91	2,259	30,366	451,026	9,000	208,301
10	3	1964	16,690		2,913	11,276	2,501	2,501	135	2,636	30,366	478,179	21,000	226,665
11	4	1965	19,386		4,804	11,962	2,620	2,620	209	2,829	30,366	504,041	22,000	245,836
12	5	1966	22,058		6,780	12,601	2,677	2,677	216	2,893	31,373	528,634	22,000	264,943
13	6	1967	24,691		8,798	13,216	2,677	2,677	216	2,893	25,235	545,071	5,000	267,050
14	7	1968	24,945		8,116	13,627	3,202	3,202	302	3,504	19,700	556,655		263,546
15	8	1969	26,081		8,186	13,916	3,979	3,979	429	4,408		548,469	5,000	264,138
16	9	1970	25,961		8,044	13,712	4,205	4,205	515	4,720		540,425	4,000	263,418
17	10	1971	25,835		8,119	13,511	4,205	4,205	515	4,720		532,306	9,000	267,698
18	11	1972	25,709		7,962	13,308	4,439	4,439	548	4,987		524,344	4,354	267,065
19	12	1973	25,587		7,472	13,109	5,006	5,006	668	5,674		516,872		261,391
20	13	1974	25,452		7,523	12,922	5,007	5,007	667	5,674		509,349		255,717
21	14	1975	25,326		7,586	12,734	5,006	5,006	668	5,674		501,763		250,043
22	15	1976	25,206		7,559	12,544	5,103	5,103	682	5,785		494,204		244,258
23	16	1977	25,080		7,621	12,355	5,104	5,104	681	5,785		486,583		238,473
24	17	1978	24,954		7,686	12,165	5,103	5,103	682	5,785		478,897		232,688
25	18	1979	24,834		7,759	11,972	5,103	5,103	682	5,785		471,138		226,903
26	19	1980	24,708		7,826	11,778	5,104	5,104	681	5,785		463,312		221,118
27	20	1981	24,576		7,824	11,583	5,169	5,169	691	5,860		455,488		215,258
28	21	1982	24,378		7,822	11,387	5,169	5,169	691	5,860		447,666		209,398
29	22	1983	24,186		7,660	11,192	5,334	5,334	713	6,047		440,006		203,351
30	23	1984	23,988		7,654	11,000	5,334	5,334	713	6,047		432,352		197,304
31	24	1985	23,790		7,647	10,809	5,334	5,334	713	6,047		424,705		191,257
32	25	1986	23,598		7,646	10,618	5,334	5,334	713	6,047		417,059		185,210
33	26	1987	23,400		7,640	10,426	5,334	5,334	713	6,047		409,419		179,163
34	27	1988	23,202		7,633	10,235	5,334	5,334	713	6,047		401,786		173,116
35	28	1989	23,010		7,631	10,045	5,334	5,334	713	6,047		394,155		167,039

36	29	1990	22,812		7,624	9,854	5,334	5,334	713	6,047		386,531		161,022
37	30	1991	22,608		7,611	9,663	5,334	5,334	713	6,047		378,920		154,975
38	31	1992	22,416		7,609	9,473	5,334	5,334	713	6,047		371,311		148,928
39	32	1993	22,218		7,601	9,283	5,334	5,334	713	6,047		363,710		142,881
40	33	1994	22,020		7,593	9,093	5,334	5,334	713	6,047		356,117		136,834
41	34	1995	21,828		7,591	8,903	5,334	5,334	713	6,047		348,526		130,787
42	35	1996	21,630		7,583	8,713	5,334	5,334	713	6,047		340,943		124,740
43	36	1997	21,432		7,574	8,524	5,334	5,334	713	6,047		333,369		118,693
44	37	1998	21,240		7,572	8,334	5,334	5,334	713	6,047		325,797		112,646
45	38	1999	21,042		7,563	8,145	5,334	5,334	713	6,047		318,234		106,599
46	39	2000	20,844		7,554	7,956	5,334	5,334	713	6,047		310,680		100,552
47	40	2,001	20,646		7,545	7,767	5,334	5,334	713	6,047		303,136		94,505
48	41	2,002	20,448		7,536	7,578	5,334	5,334	713	6,047		295,599		88,458
49	42	2,003	20,250		7,526	7,390	5,334	5,334	713	6,047		288,073		82,411
50	43	2,004	20,058		7,522	7,202	5,334	5,334	713	6,047		280,551		76,364
51	44	2,005	19,860		7,512	7,014	5,334	5,334	713	6,047		273,039		70,317
52	45	2,006	19,662		7,502	6,826	5,334	5,334	713	6,047		265,537		64,270
53	46	2,007	19,470		7,498	6,638	5,334	5,334	713	6,047		258,039		58,223
54	47	2,008	19,272		7,487	6,451	5,334	5,334	713	6,047		250,552		52,176
55	48	2,009	19,074		7,476	6,264	5,334	5,334	713	6,047		243,076		46,129
56	49	2,010	18,882		7,471	6,077	5,334	5,334	713	6,047		235,605		40,082
57	50	2,011	18,684		7,506	5,890	5,288	5,288	692	5,980		228,099		34,102
58	51	2,012	18,588		9,564	5,702	3,322	3,322	693	4,015		218,535		30,087
59	52	2,013	18,486		9,747	5,463	3,276	3,276	672	3,948		208,788		26,139
60	53	2,014	18,390		10,224	5,220	2,946	2,946	627	3,573		198,564		22,566
61	54	2,015	18,294		10,503	4,964	2,827	2,827	553	3,380		188,061		19,186
62	55	2,016	18,192		10,720	4,702	2,770	2,770	545	3,315		177,341		15,871
63	56	2,017	18,096		10,891	4,434	2,771	2,771	544	3,315		166,450		12,556
64	57	2,018	18,000		11,545	4,161	2,294	2,294	472	2,766		154,905		9,790
65	58	2019	17,898		12,509	3,873	1,516	1,516	345	1,861		142,396		7,929
66	59	2020	17,802		12,952	3,560	1,290	1,290	259	1,549		129,444		6,380
67	60	2021	17,706		13,228	3,236	1,242	1,242	246	1,488		116,216		4,892
68	61	2022	17,604		13,692	2,905	1,007	1,007	215	1,222		102,524		3,670
69	62	2023	17,508		14,504	2,563	441	441	93	534		88,020		3,136
70	63	2024	17,412		14,771	2,200	441	441	93	534		73,249		2,602
71	64	2025	17,310		15,038	1,831	441	441	93	534		58,211		2,068
72	65	2026	17,214		15,447	1,455	312	312	63	375		42,764		1,693
73	66	2027	17,118		15,737	1,069	312	312	63	375		27,027		1,318
74	67	2028	17,016		16,076	676	264	264	50	314		10,951		1,004
75	68	2029	16,920	5,431	10,951	274	264	264	50	314		0		690
76	69	2030	16,824	16,560			264	264	50	314				376
77	70	2031	16,722	16,556			166	166	22	188				188
78	71	2032	16,626	16,460			166	166	22	188				0
Total			1,475,042	55,007	586,206	565,000	268,829	268,829	36,546	305,375	586,206	0	305,375	0

[1] Includes revenue from the sale of a small amount of pumping energy at 3 mills per kilowatt-hour.

[2] The repayment by irrigation water users has been based on 50 years following the development period, for each project or irrigation block, except as otherwise provided for Eden and Paonia projects and Indian lands. The repayments by the irrigation water users together with assigned net power revenues will be sufficient to repay the irrigation investment in equal annual installments within a period of 50 years, in addition to any development period, from the date of completion of the various units, participating project or separable feature, except as otherwise provided by applicable laws.

Mr. HOSMER. I have one question for Mr. Dexheimer.

(Discussion off the record.)

Mr. HOSMER. I understood your testimony the other day was that with respect to additional projects that are contained in some of the bills before this committee and some of the bills that were before the Senate committee, you had been asked on the other side for financial data and payout schedules and so forth, but due to the large number of uncertainties, X factors in these, you were unable to supply the material; is that right?

Mr. DEXHEIMER. That is correct. Many of the projects which are named in some of the bills and particularly in S. 500 in the Senate, we do not have sufficient information to give the engineering and economic details, and in some of them we have practically no information which would be suitable for such a study. In addition to that, we would have to make certain assumptions as to when the Congress might authorize those additional participating projects and when funds might be available for starting construction. With those assumptions, and being so indefinite, and the fact that it would take some time to make these studies that would be necessary to come up with that detailed report, we felt it would take at least 60 days to comply with that request and we have so informed the chairman of the Senate subcommittee.

Mr. HOSMER. In other words, we draw a blank when it comes to the information we need to analyze those projects?

Mr. DEXHEIMER. Well, the reason, of course, I do not feel it is important either to the Senate committee or to this committee, or to the Congress, is that in Senate bill 500 those are only provisionally provided for and definitely the bill specifies at this time that we must come back to the Congress with feasibility-type reports after those studies have been completed for authorization and therefore, under any of the bills that are before the Congress, as I read them, those matters are not important to consideration and should not and need not hold up consideration of any of the bills before either of the committees, in the House or in the Senate.

Mr. HOSMER. Thank you.

Mr. ASPINALL. Will the gentleman yield to the chairman for just a minute?

Mr. HOSMER. Yes.

Mr. ASPINALL. Mr. Dexheimer, are you going to be able to be with us Saturday morning?

Mr. DEXHEIMER. Mr. Chairman, I would like to be able to get away. I am scheduled to be out in Nevada Saturday evening and for several days, and if it is possible I would like to be excused for that day, but I can be here if the committee so desires.

Mr. ASPINALL. Will the gentleman yield to me further in regard to that?

Mr. HOSMER. Yes.

Mr. ASPINALL. Mr. Dexheimer, you have prepared a statement which you have had handed to me, which is entitled "How Expenditures for Upper Colorado River Storage Project Are Distributed Throughout the Nation." Is that correct?

Mr. DEXHEIMER. Yes, sir; we had that illustration prepared just to illustrate to the committee and to anyone else who is interested how expenditures for the project that we have recommended would be

dispersed and the man-hours that would be required for the construction phases of this project, and how that money and man-hours of labor would be distributed throughout the various States in the country.

Mr. ASPINALL. And you feel this would be helpful to the committee and to Congress, to have this study for their examination, as I understand it?

Mr. DEXHEIMER. I do. I feel it would be particularly helpful because of the implication and accusation that these projects are paid for by the taxpayers of the other States. Actually, this shows to some extent how the construction work on these projects is distributed and actually increases the business throughout the United States and particularly in the manufacturing areas of the East.

Mr. ASPINALL. In other words, it is supposed to bring about an equitable picture of not only the costs of the projects to the other States with evidence already in, but also as to some of the benefits that would go to the other States. Is that right?

Mr. DEXHEIMER. This statement is confined only to those benefits during the construction period, of the purchase of construction material.

Mr. ASPINALL. So I understand. Is there any objection at this time to it?

Dr. MILLER. Reserving the right to object, I would not object to this except, as I look at this report, it does go just to the things that would go into construction of these reservoirs and dams and so forth, and not to the benefits that would occur after they had been in, the years ahead.

Mr. DEXHEIMER. That is right, Dr. Miller. This does not include at all any of the information which was printed as Committee Print No. 27 of this committee last October. That Committee Print No. 27, which was made at your request, shows how the benefits of the reclamation development are distributed after these projects are completed. This only goes to the construction phase.

Dr. MILLER. One other question, Mr. Chairman.

This study was made by you or your group, I presume?

Mr. DEXHEIMER. Yes, sir.

Dr. MILLER. Has any other group made an objective study, that are not interested in what the study might show?

Mr. DEXHEIMER. I do not believe that anyone has made an overall study. There are individual specific studies in various phases.

Dr. MILLER. You do feel the study does reflect accurately the man-hours and value of the material going into the dams?

Mr. DEXHEIMER. Yes, sir I do, because we have experience in just what has happened in other projects, similar projects, and we know about where the money will be spent and the materials will be purchased that go into the construction.

Mr. HOSMER. Reserving the right to object, Mr. Chairman.

Mr. ASPINALL. Mr. Hosmer.

Mr. HOSMER. I wonder if the consent might also include permission for me to introduce following this statement my own study of a similar nature?

Mr. ASPINALL. Is there any objection?

Hearing none, both requests will be granted.

(The studies referred to follow:)

STATEMENT: HOW EXPENDITURES FOR UPPER COLORADO RIVER STORAGE PROJECT ARE DISTRIBUTED THROUGHOUT THE NATION

Construction of the upper Colorado River storage project will consist of 2 large dams, Glen Canyon and Echo Park, and those features included in the 11 participating projects. There will be constructed 2 concrete arch dams, with the combined volume of 7,740,000 cubic yards as well as 7 earthfill dams with approximate embankment volume of 43,140,000 cubic yards. The combined storage capacity created by these structures will be approximately 34,382,000 acre-feet. In addition, there will be 2 diversion dams (145,000 cubic yards), 10 miles of concrete-lined canal, 780 miles of canals and laterals without concrete lining, 40 miles of tunnels, 80 miles of concrete pipelines, 2,575 miles of transmission lines from the Glen Canyon and Echo Park Dams, and about 116 miles of transmission lines in the 11 participating projects. Glen Canyon and Echo Park will have powerplant capacities of approximately 800,000 and 200,000 kilowatts, respectively, and some 61,000-kilowatt capacity will be installed in the balance of the project.

The principal physical features of the Glen Canyon and Echo Park Dams are as follows:

Physical data, Glen Canyon and Echo Park Dams

	Glen Canyon	Echo Park
Reservoir storage ... acre-feet	26,000,000	6,460,000
Maximum water surface elevation ... feet	3,710	5,570
Type of dam	(1)	(1)
Volume of concrete in dam ... cubic yards	5,060,000	2,680,000
Crest elevation ... feet	3,715	5,575
Height above stream bed ... do	580	535
Height above foundation ... do	700	690
Spillway capacity ... cubic feet per second	253,000	80,000
Powerplant ... kilowatts	800,000	200,000
Transmission lines (various voltages) ... miles	2,040	535
Substations	22	9

1 Concrete arch.

In the construction of the project works on these dams and the participating projects, it is estimated that the expenditures at the site will be $140,766,000, representing 28,154 man-years, or only about 15 percent of the total, and that the off-site expenditures and the number of man-years required throughout the Nation for associated activities will be 5½ times those required at the site of construction. A tabulation of on- and off-site expenditures and man-years for the 2 principal dams and 11 participating projects are shown below:

Feature	On-site		Off-site	
	Expenditures	Man-years	Expenditures	Man-years
Glen Canyon	$64,244,000	12,849	$357,026,000	71,405
Echo Park	30,108,000	6,022	167,318,000	33,463
11 participating projects	46,414,000	9,283	257,942,000	51,588
Total (includes recreational development at Dinosaur National Monument)	140,766,000	28,154	782,286,000	156,456

It should be pointed out that the on-site figures shown in the table represent expenditures primarily for the services of laborers, mechanics, and other skilled construction workmen. The off-site requirements, which represent equipment and material and transportation, are for (*a*) materials used in construction and incorporated in the physical works (*b*) equipment installed at the site but manufactured elsewhere and (*c*) the materials utilized and expended by the construction forces but not incorporated in the works. About 10 million barrels of cement will be required, some 417,000 tons of steel products, about 41 million

board-feet of lumber products, 350 tons of rubber products and other steel, petroleum, and nonferrous materials will be required. An analysis of the materials requirements shows the following:

PRINCIPAL CONSTRUCTION MATERIALS REQUIRED IN CONSTRUCTION AT SITE BUT PURCHASED OFF-SITE

		Glen Canyon	Echo Park	Participating projects
Lumber	million board feet	1,700	1,000	9,000
Cement	barrels	5,000,000	2,850,000	1,060,000
Steel products	tons	130,000	42,500	58,000
Aluminum	do	20,000	5,000	400
Copper	do	5,000	1,250	600
EQUIPMENT INCORPORATED IN FEATURES AT SITE BUT PURCHASED OFF-SITE				
Reinforcing steel	tons	10,000	6,000	29,000
Structural steel (tunnels, canals, dams and powerplants)	do	3,000	2,700	14,000
Penstocks and outlet pipes	do	5,900	4,500	12,000
Gates, valves, hoists, trashracks	do	6,600	3,500	1,600
Turbines and governors	do	4,500	1,200	500
Generators:				
Steel	do	8,800	1,800	800
Copper	do	1,000	250	100
Transmission lines:				
Structural steel	do	72,000	18,000	100
Lumber products	million board feet	3,000	2,000	1,000
Conductor ACSR	tons	20,000	5,000	600
Insulators, hardware, etc	do	8,000	2,000	300
Switchyards and substations:				
Steel products	do	20,000	5,000	700
Copper	do	4,000	1,000	500
Cement	barrels	1,000	500	200
PRINCIPAL ITEMS OF MATERIALS UTILIZED BY CONTRACTOR IN CONSTRUCTION OF FEATURES BUT WHICH ARE NOT INCORPORATED IN FEATURE				
Lumber products	million board feet	10,000	5,000	8,000
Steel products	tons	2,000	2,000	1,500
Petroleum products	do	7,500	3,600	20,000
Rubber products	do	60	40	250

It is estimated that on the average about 30 percent of the on-site expenditures to contractors are for payrolls. The contractor's principal items of cost is in the equipment which he must use in the construction of the physical works.

On this project it is estimated that some $225,225,000 worth of equipment will be required to carry on the construction operations at the site. The principal categories of equipment consists of those required for moving earth, for the concrete mixing and placing operations, and for the equipment necessary for transportation of the contractor's plant and the materials installed in the project works. These consist of a great variety of such items as tractors, draglines, shovels, cranes, inclined railways, shop and communication equipment. Approximately 45,000 man-years will be required to manufacture the equipment that the contractors will require for construction.

The expenditures of some 184,610 man-years include 156,456 that will be required primarily in the industrial sections of the United States, that is outside of the project area, for the manufacture and fabrication of materials and equipment necessary for construction of the project. This represents some $782,286,000 of the total of $923,052,000 for payments for basic products of crucial importance which must be secured from far flung sources, such as iron, steel, cement, electrical equipment and supplies, machine shop products, lumber, etc.

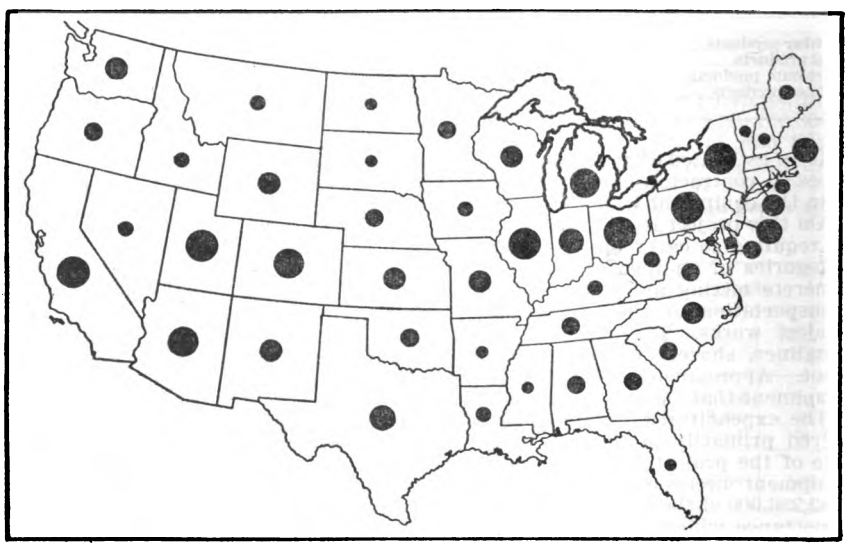
Every State in the country is affected. The estimated amount of off-site employment required in each of the States for the construction of the upper Colorado River storage project is given below:

Distribution by States of expenditures for labor and materials—Initial units of Colorado River storage project

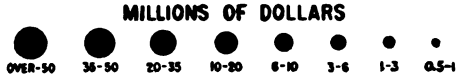
State	Dollars (in thousands)	Man-years	State	Dollars (in thousands)	Man-years
Alabama	7,025	1,405	Nevada	4,667	933
Arizona	37,036	7,407	New Hampshire	2,441	488
Arkansas	2,145	429	New Jersey	33,400	6,680
California	125,248	25,050	New Mexico	17,006	3,401
Colorado	47,981	9,596	New York	77,398	15,480
Connecticut	15,181	3,036	North Carolina	13,158	2,632
Delaware	1,429	286	North Dakota	1,403	281
District of Columbia	774	155	Ohio	50,844	10,169
Florida	2,797	559	Oklahoma	7,809	1,562
Georgia	8,157	1,631	Oregon	9,847	1,970
Idaho	5,963	1,193	Pennsylvania	55,549	11,110
Illinois	53,463	10,693	Rhode Island	5,240	1,048
Indiana	23,815	4,763	South Carolina	6,370	1,274
Iowa	5,357	1,071	South Dakota	2,056	411
Kansas	10,270	2,054	Tennessee	7,681	1,536
Kentucky	5,953	1,191	Texas	34,575	6,915
Louisiana	5,536	1,107	Utah	61,716	12,343
Maine	3,452	690	Vermont	1,191	238
Maryland	9,108	1,822	Virginia	8,395	1,679
Massachusetts	26,970	5,394	Washington	14,631	2,926
Michigan	41,556	8,311	West Virginia	5,299	1,060
Minnesota	8,157	1,631	Wisconsin	18,100	3,620
Mississippi	2,382	476	Wyoming	10,719	2,144
Missouri	12,980	2,596			
Montana	4,275	855	Total	923,052	184,610
Nebraska	6,547	1,309			

DISTRIBUTION BY STATES OF EXPENDITURES FOR LABOR AND MATERIALS

INITIAL UNITS OF COLORADO RIVER STORAGE PROJECT AND 11 PARTICIPATING PROJECTS



MILLIONS OF DOLLARS



BUREAU OF RECLAMATION ECONOMICS PHONY AS THREE-DOLLAR BILL

(Statement by Hon. Craig Hosmer)

The expressed philosophy of the Bureau of Reclamation embraces the contention that reclamation is all things to all men. As it has done year after year in the past, the Bureau has come forward again with a thesis attempting to illustrate the great benefits to be derived by the Nation from a proposed western irrigation project. The subject this time is the multi-billion-dollar upper Colorado River project. It is the Bureau argument that if the doors of the Federal Treasury are opened to the proponents of this fiscal monstrosity, every State of the Union will get some of the loot.

The Bureau undoubtedly employs accomplished hydrologists and construction engineers, but when it comes to economists the Bureau is woefully deficient. The economics of the Bureau of Reclamation are as unsound and as phony as a three-dollar bill.

If the Congress were to accept the Bureau's affirmations, then it follows that the Federal Government should subsidize all new industrial development in the United States on the ground that the spending of such public money would benefit all States.

The Bureau's thesis is that if General Motors, for instance, desires to build a new plant at Denver, the Federal Government should put up the money for it, because construction materials, equipment, and labor would come from many States, and thereby those States would benefit.

The Bureau's policies have been called creeping socialism. I submit that the Bureau's economics wouldn't be tolerated by the most ardent Socialist. And they certainly are not creeping policies. They are advancing with the speed of a jet plane, and if the Congress does not halt them, they will have the taxpayers of the Nation burdened to the point of complete collapse, the national debt will be increased beyond any hope of future reduction, and the national economy will be in a straitjacket.

The Bureau has furnished the House Interior Committee with a statement purporting to show how many dollars each State will get from the building of the upper Colorado River project. This is the largest conglomeration of dams and irrigation ditches ever put together under one title. It contains either 2, 4, or 6 power dams, and either 11, 12, or 33 irrigation projects. Nobody seems to know exactly what it contains, how much it will cost, or much else about it.

In its learned paper analysing the dollar benefits to be derived for each State, however, the Bureau conveniently has omitted mentioning anything about subsidy. This is considerable. In other reports the Bureau has admitted that the project would cost the taxpayers $1,153 million in lost interest. Evidence has been presented to the Congress showing that this subsidy by the Federal Treasury would amount to $1 billion, possibly more.

In its analysis, the Bureau presents a table which is intended to show the amount of money to be spent in each State for materials and equipment for the project.

I have appended to this table the amount of money which the taxpayers of each State will have to pay if the project is built.

The comparisons are somewhat startling.

For instance, the State of New York will receive, according to the Bureau, $77,398,000, but the taxpayers of New York will have to fork out $493,600,000 for the project.

Who does the Bureau of Reclamation think it's kidding?

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Here is the table:

State	Amount Bureau says it will receive	Cost to taxpayers	State	Amount Bureau says it will receive	Cost to taxpayers
Alabama	$7,025,000	$46,000,000	Nebraska	$6,547,000	$34,000,000
Arizona	37,036,000	20,400,000	Nevada	4,667,000	6,800,000
Arkansas	2,145,000	27,200,000	New Hampshire	2,441,000	12,000,000
California	125,248,000	372,800,000	New Jersey	33,400,000	144,000,000
Colorado	47,981,000	36,400,000	New Mexico	17,006,000	15,200,000
Connecticut	15,181,000	69,600,000	New York	77,398,000	493,600,000
Delaware	1,429,000	14,800,000	North Carolina	13,158,000	66,800,000
District of Columbia	774,000		North Dakota	1,403,000	12,000,000
Florida	2,797,000	67,600,000	Ohio	50,844,000	236,000,000
Georgia	8,157,000	61,200,000	Oklahoma	7,809,000	44,800,000
Idaho	5,963,000	13,600,000	Oregon	9,847,000	44,000,000
Illinois	53,463,000	276,000,000	Pennsylvania	55,549,000	277,600,000
Indiana	23,815,000	102,400,000	Rhode Island	5,240,000	20,800,000
Iowa	5,357,000	62,000,000	South Carolina	6,370,000	34,400,000
Kansas	10,270,000	52,400,000	South Dakota	2,056,000	13,200,000
Kentucky	5,953,000	50,800,000	Tennessee	7,681,000	55,600,000
Louisiana	5,536,000	53,600,000	Texas	34,575,000	194,000,000
Maine	3,452,000	18,800,000	Utah	61,716,000	16,000,000
Maryland	9,108,000	102,400,000	Vermont	1,191,000	7,600,000
Massachusetts	26,970,000	127,600,000	Virginia	8,395,000	67,600,000
Michigan	41,556,000	196,400,000	Washington	14,631,000	68,400,000
Minnesota	8,157,000	69,600,000	West Virginia	5,299,000	35,600,000
Mississippi	2,382,000	26,000,000	Wisconsin	18,100,000	88,000,000
Missouri	12,980,000	100,000,000	Wyoming	10,719,000	8,000,000
Montana	4,275,000	16,000,000			

All told, the Bureau claims that $923,052,000 will accrue to the 48 States.

The Bureau says nothing about the fact that the taxpayers of the same 48 States will spend $4 billion.

Thus, if the upper Colorado River project is built the States stand to lose a cool $3,076,948,000.

In the depth of the recent great depression, there was little argument against public spending. Pump priming was necessary for the simple reason of sustaining life and to give our battered economy a chance to recuperate.

The Bureau of Reclamation is advocating the upper Colorado River project in the face of the greatest prosperity we have ever known.

When the warehouses and storerooms of the country are bursting with $8 billion worth of surplus food and fiber, the Bureau of Reclamation wants Congress to authorize a gigantic loss to the taxpayers of the Nation so that a desert project can be built to grow more surplus food.

With only a comparatively small amount of unemployment in the country, largely consisting of unskilled and white-collar workers, the Bureau of Reclamation asks Congress for permission to transport thousands of skilled men thousands of miles to build a project that cannot be justified on any sound basis.

Most of the dams and irrigation works in the proposed upper Colorado River project are located in the most remote sections of the United States. Some of them are in places accessible only to mountain goats or intrepid explorers. Some of them have been seen by only a few persons, most of whom have been Bureau engineers who get a wild gleam in their eyes every time they see an undammed canyon.

Construction of the various, widely separated units of this project would involve, in addition to the transporting of thousands of men from all parts of the Nation, the building of towns, business houses, and perhaps brothels. The workers who would be uprooted from their home communities would also be taken from their families. There would be no schools, no churches, few physicians in these wind-swept, barren desert towns that would have to be built.

Of course, it is possible the Bureau of Reclamation intends to ask Congress for another subsidy for churches and schools. The Bureau will build anything. All it needs is more taxpayers' money. The zeal and spirit of the Bureau officials are boundless and inborn.

I forgot to mention that the Bureau also would have to build highways, utility plants, fire and police stations, and motels for visitors.

Now, what happens to all this after the dams are built? Let's consider Echo Park Dam. It would stand in one of the most magnificent canyons in the world,

in the midst of a land of unsurpassed natural beauty, the Dinosaur National Monument.

A lake longer than a press-agent's nightmare will lie behind Echo Park Dam. This is a power dam. Some years will be dry years. The lake level will go up or down, each year. The shoreline will be made up of mud, dirty rock walls, smelly reaches, deep cracks. It will be barren of vegetation. The fishing in the lake will be lousy. There will be no algae in the water, no weeds, no natural habitats for fish.

The proponents of the upper Colorado River project cite Lake Mead, behind Hoover Dam, as an example of fine recreation areas made from big dams. They ought to look at Lake Mead today. The only good recreation there is enjoyed by lizards. The beaches are a mile from the beach houses. Boats are several miles inland from water. Fishing is horrible.

What does the Bureau mean by recreation areas? This?

Echo Park today is really a fine recreation area. All that is needed to make it easily accessible are a few roads. God put everything else there for people to enjoy.

Now, what about building the project? Does the Bureau know who will be the successful contractor? Maybe the Bureau has that all figured out.

If the company which gets the major contract is from Arkansas, then will the benefits to other States be vastly different from the table supplied by the Bureau?

This is just one point that makes the Bureau's table worthless.

And what about equipment contracts? If the major equipment contract comes from Chicago, will the Bureau credit it to Illinois?

The ridiculousness of such figuring seems to be obvious.

Let's look at the States that will benefit from this project—Colorado, Wyoming, Utah and New Mexico.

According to the Bureau, if the project were built, these States would get the following:

Colorado	$47,281,000
Wyoming	10,719,000
Utah	61,716,000
New Mexico	17,006,000
Total	137,422,000

How much would the taxpayers of these States pay for the hidden subsidies of the bill?

This is the answer to that:

Colorado	$36,400,000
Wyoming	8,000,000
Utah	16,000,000
New Mexico	15,200,000
Total	75,600,000

The only 4 States which would get more money than they pay for construction of the project are the 4 States that benefit from it. The other 44 States pay through the nose.

How, then, can the Bureau of Reclamation honestly make the statement that such projects benefit the Nation as a whole?

In the face of this evidence, how can Reclamation Commissioner W. A. Dexheimer tell Congress, as he did in February of this year: "Reclamation is good sound business"?

The Federal reclamation projects that are "good sound business" can be counted on 1 hand of a man with 3 fingers.

It is up to Congress to stop this phoney propaganda of the Reclamation Bureau. For more than 50 years now, the Bureau has been able to make eastern States swallow its line.

If anyone chooses to swallow it, well, this is a free country. But those of us who are fighting for a sound economy, built on national benefits, had better put a stop to this unfair scheme of giving a few mountain and desert areas billions of dollars of public money for projects we don't want or need.

I, for one, want to stop this Treasury raiding.

Mr. ASPINALL. Now, if the gentleman will yield further, because there will not be any chance to ask any other member of the Bureau further questions I have in mind——

Mr. HOSMER. Yes.

Mr. ASPINALL. Mr. Dexheimer, while we were in the beginning of the hearings, and referring to the report, Congressman Rogers, of Denver, asked Assistant Secretary Aandahl if the Department or Bureau favored the inclusion of what is known as section 11 in the Dawson bill, which permits the Secretary of the Interior to sell the power rights of the Green Mountain Reservoir to the city and county of Denver.

As I remember, the answer of Mr. Aandahl was to the effect that the Department offered no opposition, and that is in accordance with the report. Now, do you know of any opposition in the Bureau or in the Department to like requests which might be made by the towns and cities of western Colorado, below Glenwood Springs or Dotsero, if they made the same request to the Department of the Interior?

Mr. DEXHEIMER. No, sir; I do not believe that the Department and not the Bureau of Reclamation—we would have no objection to providing water for any municipality as provided under the State laws. Most of our Western State laws provide that municipalities shall have a priority to the use of water. In other words, municipal-industrial water for municipalities has a prior right.

However, in the case of the Green Mountain Dam, we have a large Federal investment in the power facilities there. There are certain water rights downstream in the Colorado Basin that have first priority to use of certain parts of that water for irrigation and other uses.

The additional amount of water in the Green Mountain Reservoir is primarily stored and released for the production of power, and that power revenue from that plant is included in the overall payout required to return these Federal investments; and we would be interested only in seeing that the Federal investment is properly repaid, and that the water could then be taken by any of the municipalities under State law with appropriate arrangements being made——

Mr. ASPINALL. It really is not the sale of power rights involved, it is the sale of power rights that carries the water with them; is that right?

Mr. DEXHEIMER. That is correct.

The Bureau, of course, to be able to utilize water, must establish under State law a water right to the use of that water. And we have established, and the Supreme Court of Colorado has upheld, our prior filing for the use of that water for power as contested by the city of Denver and others. To that extent we feel that the Federal Government is protected on the rights of the use of that water for the power development.

Mr. ASPINALL. As far as your position is concerned, it might just as well be competitive between a municipality on the eastern slope and a municipality on the western slope to protect their present or potential uses; is that right?

Mr. DEXHEIMER. That is right; under any State law and particularly under Colorado law they have that right and privilege. But, recognizing that whoever might have made the investments under a right which is clearly established, the municipality must reimburse those people for the costs—in this case, the Federal Government.

Mr. ASPINALL. And as you look toward any such proposed sale of power rights carrying the right to the use of water, you do not look toward a temporary situation but you have in mind a more or less permanent situation; is that not correct also?

Mr. DEXHEIMER. That is correct. And I believe our original report on the possible diversion of Blue River water to the east slope contemplated some such arrangement with municipalities so that they could get the water that they may need in the future.

Mr. ASPINALL. Thank you very much, and thank the gentleman from California.

Dr. MILLER. I have some questions.

Mr. ASPINALL. The gentleman from California has the time.

Dr. MILLER. Will we have another hearing? I did have some questions I will want to ask the Department, but I will not be able to stay this afternoon.

Mr. ASPINALL. The Chair has to advise the gentleman that the gentleman used his time, unless the gentleman from California wishes to yield to the gentleman.

Mr. HOSMER. If it is not going to constrict my questioning I will be glad to yield to the doctor.

Dr. MILLER. I just want to ask a question. Maybe they cannot answer it now. But I would like to have an answer to these 3 or 4 questions either now or in writing.

One is, Has there been a ceiling placed on the amount of water that California can use?

Mr. DEXHEIMER. Under the Colorado River compact and under the California Self-Limitation Act, which the Congress required the California Legislature to pass before it gave its consent to the original Colorado River compact's becoming effective with a six-State ratification, there was a ceiling placed on the amount of water which California could use.

Dr. MILLER. For consumptive use?

Mr. DEXHEIMER. For beneficial consumptive use. However, there is some difference in interpretation as to beneficial consumptive use.

Dr. MILLER. And were they not entitled to one-half of the excess surplus of unappropriated water in that same compact or in a different agreement? Is that not right, Mr. Bennett?

Mr. DEXHEIMER. Yes, sir; that was generally conceded.

Dr. MILLER. Has that been determined as to how much that water might be?

Mr. DEXHEIMER. I think that is one of the problems before the Supreme Court because of its implications with such things as evaporation and the measurement of beneficial consumptive use and so on.

Dr. MILLER. How many acre-feet of water in Lake Mead is allocated to flood control? Is 9 million feet right?

Mr. DEXHEIMER. I believe 9½ million is correct, doctor.

Dr. MILLER. If these other reservoirs were built upstream, like Glen Canyon, would it be possible to allocate some waters in the Mead Reservoir to flood-control upstream? Or would that take a new compact?

Mr. DEXHEIMER. No, sir. That would be just a question of allocation as between the Corps of Engineers and ourselves, I think, as to the flood control.

Dr. MILLER. That could be done? The 9½ million feet of water as far as flood-control purposes could be allocated upstream?

Mr. DEXHEIMER. Yes, sir.

Dr. MILLER. Glen Canyon, if built, would hold about 26 million acre-feet of water?

Mr. DEXHEIMER. Yes, sir.

Dr. MILLER. What benefits do the upper basin States get out of Glen Canyon? Do they use any of that water for irrigation?

Mr. DEXHEIMER. No, sir; there would be no water diverted from the Glen Canyon Reservoir directly for use in the upper basin.

Dr. MILLER. Just power?

Mr. DEXHEIMER. It would generate power; yes, sir.

Dr. MILLER. Then the building of Glen Canyon would be of some benefit in keeping the Mead Reservoir from filling up with silt and perhaps give it a longer life?

Mr. DEXHEIMER. Yes, sir. That extension of life, because of the building of Glen Canyon, is estimated anywhere from 200 to 1,000 years.

Dr. MILLER. Since these dams have not been built upstream, is not some of the water in Lake Mead or the Hoover Dam water that ordinarily would belong in the upper States? Does it not confine some water from the upper States?

Mr. DEXHEIMER. The entire flow of the river, with the exception of the beneficial consumptive uses now in effect in the upper basin, has been flowing into Lake Mead.

Dr. MILLER. In other words, their uses have been flowing into Lake Mead outside of what they have been using as it goes down?

Mr. DEXHEIMER. Yes, sir.

Mr. HOSMER. If the gentleman will yield for an observation, I will say the nonuses are reflected in Lake Mead, not their uses.

Dr. MILLER. Their nonuses are reflected. I think that is correct. Their nonuses are reflected.

I think that covers it. I would like to know more about the excess water that might be in these reservoirs that would be built under this bill—Echo Park and Glen Canyon and the others—and what share, if any, California might have, the lower basin States might have, in the waters that would be stored back in excess of their needs of their 7½ million acre-feet, and the surplus unappropriated water.

Mr. ASPINALL. If the gentleman from California will yield to me, I believe that this project contemplates that the upper basin States would only store that water which rightfully belongs to them and which can be put to use by them for exchange purposes or other uses which are on an equal priority with the lower basin. Now if there is any water stored in the upper basin which is surplus to the use of the lower basin, that rightfully belongs to the lower basin. I am right, am I not, Mr. Dexheimer, that there must be some kind of a working agreement between the upper basin and the lower basin to take care of the rights to store that and the methods of discharge from the reservoirs?

Mr. DEXHEIMER. Yes, sir. We think that is covered under the provisions of the compact, where the upper basin is required to not deplete the flow over 75 million acre-feet in any 10 years, and certain rights, of course, to surplus waters to be divided, and certain commitments under the treaty with Mexico, which in case of shortage

must be met out of the upper and lower basins' share equally. But there has been quite an extensive record in these hearings as to the amount of water that has been wasted into the gulf, which has not been used, and the uses that might be made of the water in the upper basin if this project were completely developed. That shows that even with this complete development the upper basin would still be using much less than its apportioned share without considering the surplus. In fact, it could only use, with this full development, 4 million to 4½ million acre-feet, depending on the number of participating projects.

Mr. HOSMER. I would like to say to the gentleman from Nebraska, it is my intention to examine the conclusions with respect to the compact apportionment of water in detail during this afternoon or Saturday, if I can.

Dr. MILLER. Thank you very much. I think you should. I would like to have you bring out what happens if you are only going to use 4½ million acre-feet in the upper basin, and who is entitled to the rest.

Mr. HOSMER. That will be brought out.

Dr. MILLER. Thank you very much.

Mr. HOSMER. There is one question I would like to ask you, Mr. Dexheimer, as long as you are on the stand and as long as you mentioned the Self-Limitation Act, and apparently contemplate that it is a perpetual bar to California's use of the water.

I would like to point out this possibility: That the Self-Limitation Act was passed in contemplation of a 6-State and not a 7-State; that subsequently in the suit of *Arizona* v. *California* there is purported to be allegation on the part of Arizona that the compact is now a 7-State compact. Should it be so determined by the Court, it is most probably that California would be relieved and in a position to repeal the Self-Limitation Act, and, as a consequence, the answers which you gave Dr. Miller probably would not apply.

Now I am going to turn to Mr. Larson. I direct your attention, Mr. Larson, to page 164 of House Document 364.

Mr. ASPINALL. Mr. Hosmer, as I understand it, we are now through with Mr. Dexheimer and he may be excused.

Mr. HOSMER. Yes.

Mr ASPINALL. Thank you very much, Mr. Dexheimer. We appreciate your cooperation. You may be excused from any further hearings.

Mr. DEXHEIMER. Thank you very much.

Mr. HOSMER. Do you have that page, Mr. Larson?

Mr. LARSON. Yes, sir.

Mr. HOSMER. On that page there appears a table giving a hypothetical 20-year filling. For the reservoirs, filling to a total of 48½ million acre-feet of water. The table is based on the average flows of the period 1914 to 1945. The page does not show it, but the average flow for that period is 15,638,000 acre-feet per year.

The table shows the amount of depletion by the upper basin exclusive of project reservoir evaporation, the amount of project reservoir evaporation, the amount of storage gain in the project reservoirs, and the totals of those three columns.

I direct your attention to the column headed "Total." Do you see it there?

Mr. LARSON. Yes; next to the last column on page 164.

Mr. HOSMER. Yes. Now that column shows that the total depletion by the upper basin would range in extent from 3,445,000 acre-feet in year zero to 8,138,000 in year 1, and thereafter varies in ranges from upward of 8 million, upward of 6 million, upward of 5 million in the various other 18 years. Is that correct?

Mr. LARSON. Yes; the depletion there includes storage in reservoirs as well as beneficial consumptive uses.

Mr. HOSMER. And those are depletions at Lee Ferry?

Mr. LARSON. Yes, sir; under one certain assumption as explained on pages 163 and 164.

Mr. HOSMER. Therefore, this table is based on measurements of beneficial consumptive use in the upper basin by the quantity of depletion at Lee Ferry; is that correct?

Mr. LARSON. Yes, sir.

Mr. HOSMER. When you total all the figures in the "Total" column an average amount is not given on the table here, but I have averaged it, and it amounts to an average use in each year of 6,514,800 acre-feet per year. That average is the basis upon which you intend to fill the reservoir, is it not? In other words over some period of time your average uses would be limited to the 7½ million acre-feet of water mentioned in the compact for beneficial consumptive use by the upper basin.

Mr. LARSON. Yes, sir; that table would be based on storing maybe fairly larger amounts in the reservoirs in years of high runoff.

Mr. HOSMER. I think the table, as stated in the text, is based on the average year, each year's flow that would be equivalent to the average year. I am going to get in a moment over to the individual years.

Mr. LARSON. Yes, sir.

Mr. HOSMER. But you base that table on average years.

Now, I want you to go back to page 147 in the same document and open up the chart on that page which is entitled "Colorado River Storage Project—River Flow at Lee Ferry." I direct your attention to the years 1941 through 1947, inclusive. Mr. Bennett, I wish you would follow this, too, because I want to do this: I want to take these years of actual flow now and have Mr. Larson, assuming that he is in charge of filling these reservoirs, give me an idea of the amount of water that would be withheld from going down to Lee Ferry by your filling of the reservoirs.

Take the first year, 1941, see what you have got there, and tell me what, in your best judgment, if that were your first year, you would put in storage in the upper basin out of the 1941 flow.

Mr. LARSON. First of all, you are assuming that the construction of the dam is far enough along—the Glen Canyon Dam—to store water.

Mr. HOSMER. You are at a point now where you are going to put in your first year's storage, and you probably can assume that your construction is pretty much like it would be in these payout schedules that you submitted to us earlier today.

Mr. LARSON. I would assume, if the dam construction is quite far along, during the year 1940——

Mr. HOSMER. It is 1941 I want.

Mr. LARSON. Well, in 1941.

Mr. HOSMER. Yes.

Mr. LARSON. In 1941, when you start storing some water——

Mr. HOSMER. You can store as much as you want in 1941. Let us assume that. So go ahead and physically store as much as you want. Go ahead and tell me what you would store.

Mr. LARSON. Maybe 8 million acre-feet or maybe even more, depending on the status of the construction of the dam, of course.

Mr. HOSMER. You are in a position all of that year to take what you want. So tell me what you would take without physical limitation.

Mr. LARSON. It will cut down to 8 million acre-feet, not 9 million acre-feet. It depends on the status of construction somewhat.

Mr. HOSMER. You are in a position for either 8 or 9. You have got the storage capacity for the water.

Mr. LARSON. If I were operating the entire river, I would also pay attention to the status of storage in Lake Mead. I would expect that, when Glen Canyon has some flood capacity up there, any surplus water turned down the river would be stored in Lake Mead to build up the storage, since some of the flood protection would automatically be up at Glen. It would be desirable to obtain 6 or 7 million acre-feet in Glen in those 2 years during construction to get up to the dead waterline, to fill the dead-water capacity. That is 6 or 7 million acre-feet.

Mr. HOSMER. Would you take 6 or 7 or 6½? Give me some definite figure.

Mr. LARSON. It is slightly over 6 million acre-feet at the dead water level elevation.

Mr. HOSMER. Would you say, then, 6 million acre-feet?

Mr. LARSON. Yes, sir; 6 million is O. K. for that.

Mr. HOSMER. Six million is O. K. Let us take the year 1942 and do the same thing.

Mr. LARSON. In this high year another 7 million could probably be taken off.

Mr. HOSMER. Let's go to 1943.

Mr. LARSON. When we get up to that point, then we would only be looking for 3 more million acre-feet, which could be obtained in 1944 along there, and then we are up to about——

Mr. HOSMER. Wait a minute now. In 1943 then, what are you taking?

Mr. LARSON. About 3 million acre-feet more. We would be up, then, to the full capacity of the powerplants. We would have 85 percent of our head and the full output of the powerplant at Glen Canyon with 15 million acre-feet in the reservoir.

Mr. HOSMER. About this time, you know, you have got Echo Park coming along and some of these participating projects which you are filling, and I am trying to get the fill for the whole upper basin.

Mr. LARSON. They are so small that they are relatively unimportant. Echo Park, of course, has about 6 million acre-feet capacity, and with the 1 million acre-feet requirement for dead water it would be quite simple to fill. From there on out our troubles would be over.

Mr. HOSMER. So far you have filled Glen Canyin with 15 million acre-feet; have you not?

Mr. LARSON. Yes. We would not have any problem in our full power output at that time and, if necessary, could take our time in getting the balance of the storage in Glen Canyon, depending on the situation in the lower basin and what we desired be done.

Mr. HOSMER. I am trying to get you to project yourself along with these other projects that are coming along also in these years. You have only filled Glen to 15 million, and you have got 26 million capacity there. So let us go on to the year 1944 and see what you do.

Mr. LARSON. We would take some in 1944 and some in 1945, and certainly a large amount in 1947.

Mr. HOSMER. Let us just go year by year because I am putting these figures down. Let us take 1944.

Mr. LARSON. You understand there is not just one way of operating, there are many assumptions that can be made.

Mr. HOSMER. You see what I am trying to do, Mr. Larson: I do not know of any other way to get you to give me an answer on how we could anticipate these storages being carried on in the upper basin. If Mr. Bennett sees anything illegal, I want him to stop you.

Mr. LARSON. Take 2 million more in 1945.

Mr. HOSMER. How many did we take in 1944?

Mr. LARSON. Fifteen million up to that time, I believe.

Mr. HOSMER. Are you going to take any during the year of 1944?

Mr. LARSON. Yes, sir; 4 million acre-feet.

Mr. HOSMER. Now 1946.

Mr. LARSON. In 1946, nothing for this assumed operation.

Mr. HOSMER. 1947?

Mr. LARSON. And for 1947, 4 million acre-feet.

Mr. HOSMER. I want you to skip back to the year 1932 and assume that that was the next year after 1947, and tell me what you would take then.

Mr. JACOBSON. For the year 1932?

Mr. HOSMER. Yes.

Mr. LARSON. I think there would be sufficient there to fill Glen Canyon Reservoir.

Mr. HOSMER. What would the amount be?

Mr. LARSON. Have you the total before that year?

Mr. HOSMER. Yes. Just a moment. You have got 25 million acre-feet that you have stored in 7 years, from which you take approximately half a million acre-feet a year for evaporation, which brings you down to 21½ million acre-feet of water in storage.

Mr. LARSON. I think from the figures, then, the Glen Canyon Reservoir would spill with a year like 1932 added on.

Mr. HOSMER. Pardon?

Mr. LARSON. I believe that would cause the reservoir to spill with a year like 1932 added onto what you had.

Mr. HOSMER. You see, you have got Echo Park now, too, that you are filling, and you have got some of these 11 participating projects that are taking up some amount of water.

I think the total figure that is in your report, or in the record somewhere, is it is going to take between 44 million and 48 million acre-feet of water to fill up these storage units.

Mr. LARSON. It is 32 million for these first 2 reservoirs.

Mr. HOSMER. Glen Canyon and Echo Park.

Mr. LARSON. And the 11 participating projects in the construction schedule——

Mr. HOSMER. Make it 32 million. We have got 21½ million of that stored.

Mr. LARSON. We have assumed a construction period of 20 years for the participating projects, so that the depletions for those would come in very slowly.

Mr. HOSMER. You just want to talk about Glen Canyon and Echo, so I brought it down to the 32 million we have got in Glen Canyon and Echo to store.

Mr. LARSON. I am sure that Echo would be filled by another year by 1932.

Mr. HOSMER. You have got Echo to fill. So let us take 1932. How much are we going to take in 1932?

Mr. LARSON. About 6 million acre-feet.

Mr. HOSMER. Then we have got 1933.

Mr. LARSON. Less than a million acre-feet in 1933.

Mr. HOSMER. Half a million?

Mr. LARSON. Less than a million. It is pretty hard for me to get down that fine.

Mr. HOSMER. I want to put something down here.

Mr. LARSON. Say a million.

Mr. HOSMER. Do you want a half or a quarter?

Mr. LARSON. Say a million acre-feet.

Mr. HOSMER. A million?

Mr. LARSON. Yes.

Mr. HOSMER. How about 1934?

Mr. LARSON. Zero.

Mr. HOSMER. Zero?

Mr. LARSON. Yes. We may turn water out for the production of power during that particular year.

Mr. HOSMER. You might turn it out for the production of power. All right. Let us just go now independently to the year 1917 and assume that that year you have capacity that is unlimited to store water, and tell me what amount of water you feel that you would store in the year 1917. Your reservoirs are empty, it is year one, and you are just starting to fill them up; so you have unlimited capacity.

Mr. LARSON. What are the years—you mean 1917?

Mr. HOSMER. Yes, just taking one year, 1917, and trying to find out how much you would store that year.

Mr. LARSON. Assuming that the preceding 10 years had produced 75 million acre-feet for the lower basin, or whatever is required under the compact, then——

Mr. HOSMER. Just a minute. I did not understand what you said.

Mr. LARSON. If the reservoirs were empty, and assuming that we had delivered enough water before this year to keep up the consecutive 10-year average for 75 million acre-feet, and whatever other water is required under the compact——

Mr. HOSMER. Yes.

Mr. LARSON. Then about 12 million acre-feet would be stored that year, a year like 1917.

Mr. HOSMER. That storage water would be in addition to existing depletion by the upper basin?

Mr. LARSON. Yes.

Mr. HOSMER. And if we were going to use this graph which we have been working from, it would also be in addition to the cross-hatched sections, which are the estimated additional beneficial consumptive uses by reason of the storage?

Mr. LARSON. Yes.

Mr. HOSMER. So that the total of the three figures would be the amount of water that is being depleted from Lee Ferry on account of these operations during any one of these years?

Mr. LARSON. That is correct.

Mr. HOSMER. Mr. Chairman, I have the three figures, and I have inserted the figures that Mr. Larson has given us. For the purposes of clarity in the record, I would ask unanimous consent to put them in the record in such form at this point so we have a summary of what he has told us so far.

Mr. ASPINALL. The gentleman's request is in order, and it is so ordered.

(The table referred to follows:)

Summary tabulation of uses in upper basin during selected 10 years of reservoir filling using flows during past years

	1941	1942	1943	1944	1945	1946	1947	1932	1933	1934	1917
Existing depletions	2,096	2,096	1,840	1,933	1,865	1,681	1,957	1,957	1,611	1,244	2,144
Estimated additional depletions	531	615	494	474	485	401	638	668	634	374	1,135
Storage	6,000	6,000	3,000	4,000	2,000	0	4,000	6,000	1,000	0	12,000
Total	8,627	8,711	5,334	6,407	5,350	2,082	6,595	8,625	3,245	1,618	15,279

Mr. LARSON. I would like to make the one comment, Mr. Hosmer, that figuring quickly through here, we would, of course, in actual operation check ourselves to see that we were complying with the compact each time. I have gone through these pretty rapidly here.

Mr. HOSMER. Yes, I understand that. I think you did say that you were going to comply with the 7½ million acre-feet minimum, and you also said whatever else was needed to go down.

Mr. LARSON. Yes. Required under the compact to go down.

Mr. HOSMER. What else is required under the compact?

Mr. LARSON. Some years, water for the Mexican Treaty, and any surpluses that were required to go down.

Mr. HOSMER. Surpluses. What do you mean by that?

Mr. LARSON. Somewhere along there we would have the reservoirs filled, and certainly there would be surplus water, and we could not hold it, so it would go on downstream.

Mr. HOSMER. Surplus to what?

Mr. LARSON. Reservoir spills.

Mr. HOSMER. You are not using "surplus" with some type of meaning under the compact?

Mr. LARSON. No, sir.

Mr. HOSMER. Just using the general term "surplus"?

Mr. LARSON. That is right.

Mr. HOSMER. In filling these reservoirs, would you be certain that the total amounts that were used each year over some period of time did not average more than the 7½ million acre-feet that the upper basin is entitled to under 3 (a)? And you can refer to your attorney for that answer if you wish.

Mr. BENNETT. I think those figures, if you deduct them from the total figures available in this chart, will show an average going past Lee Ferry in excess of the 7½ million.

Mr. HOSMER. Yes, but you see, Mr. Bennett, that was not my question. I will ask the reporter to read it back.

Mr. BENNETT. I thought it was. I am sorry.

(The record was read by the reporter.)

Mr. BENNETT. Did not exceed. And what I answered was that the figures he shows, the figures he gave you will reflect, as against the total water availability on this graph, a total in excess of 7½ million going past Lee Ferry each year, Congressman, as I caught his figures running down the line here.

Mr. HOSMER. I believe that is quite true. But what I am trying to determine is whether or not Mr. Larson feels that the Upper Basin can make use of more than its 7½ million acre-feet of III (a) water on the average.

Mr. BENNETT. That is a little different question, Congressman. Go ahead and see what he would say to that specific question. It is a little different from the other one because there we were dealing with the figures that he had used in answering your question.

Mr. HOSMER. I disagree with you on that, but go ahead and answer that question, Mr. Larson.

Mr. LARSON. I assume that the Upper Basin cannot use more than 7½ million acre-feet, that is, for beneficial consumptive use.

Mr. HOSMER. That is not in any one year, though, that is on an average of some kind?

Mr. LARSON. That I cannot answer.

Mr. HOSMER. According to your 1917 figure you are taking 15,279,000 acre-feet of water and holding it up, depleting the flow at Lee Ferry by that amount.

Mr. LARSON. Yes, sir.

Mr. HOSMER. That is a lot more than the 7½ million acre-feet.

Mr. LARSON. That is by placing the water in storage so that the Upper Basin States may make it possible to use the water beneficially and consume it on the land.

Mr. HOSMER. In later years?

Mr. LARSON. Right.

Mr. HOSMER. So you are trying not to exceed the use of 7½ million acre-feet of water on an average. Is that not right?

Mr. LARSON. No. I am trying to say that we are trying to fill the reservoirs, meet the commitments of the compact, but we may consume and store more than 7½ in one year, but not beneficial consumptive use alone. That figure would not exceed 7½, but we would have the right to store above the 7½ million acre-feet. Just like it is done at Hoover——

Mr. HOSMER. That is what I understand. But you have been measuring your beneficial consumptive use in terms of depletion at Lee Ferry, and you are exceeding in 1917, under the figures you gave me, by an amount in excess of 15 million acre-feet.

Mr. LARSON. We have assumed in our plan that the upper basin would have the right to store water in the reservoirs for future beneficial consumptive use, and store it in the same manner that you fill Lake Mead.

Mr. HOSMER. I understand that.

Mr. LARSON. You have to do the same thing there.

Mr. HOSMER. I think probably I will question Mr. Bennett about that a little later so we can go on here.

At this point I think I can shift over now and try to get these geologists out of the way in the next 45 minutes.

Mr. ASPINALL. Will the gentleman yield to me for a question?

Mr. HOSMER. Yes.

Mr. ASPINALL. The gentleman's question brought a question to my mind.

Assuming there were 14 million acre-feet of water in the river at Lee Ferry and that Mexico had called for a million acre-feet of water, that would be a call in the average year upon the river at Lee Ferry of approximately 8 million acre-feet of water. Now assuming that out of the 14 million acre-feet, the call there was 8 million, that leaves 6 million acre-feet for the upper basin, and the upper basin can only put to a beneficial consumptive use 4 million acre-feet. That leaves 2 million acre-feet of water. What is the status of that water? Is that surplus water under the compact?

Mr. DAWSON. If the gentleman will yield to me, you are talking about the time during the time the reservoir is being filled?

Mr. ASPINALL. I am talking about any time. My question simply goes this far: If there is that much in the river, does the lower basin have a right to call for its million acre-feet of that 2 million acre-feet of surplus water, and you can only use 1 million acre-feet to fill the upper basin storage facility? Or can you use all of it? What is your thinking on that?

Mr. LARSON. If that 2 million acre-feet is surplus water above the allocation of the two basins, then I assume it is water that has not been allocated yet.

Mr. ASPINALL. Does the mere fact that the upper basin is not able to use its entitlement under the compact cause the water to become surplus?

Mr. LARSON. No; it would be the upper basin's right to use the water when it had the facilities to do so. In the meantime it would be running down the river.

Mr. ASPINALL. Most certainly. That is where we find ourselves—the water is beyond the use of the upper basin at the present time.

Mr. LARSON. As it is today.

Mr. ASPINALL. And it is either going to be stored in a storage facility for the upper basin's use or it is going to be permitted to run down to the lower basin. I think we have to admit, if it is caught in upper basin storage, there is a doubt as to whether it can be used in this method of exchange, using it in the upper basin for the needs it might have at the particular time because the upper basin has water to replace for the use of the lower basin down below.

Now what is the status of the water? Because I can see a direct conflict here between the lower basin's position at the present time and the upper basin's position, and I think the gentleman from California is getting to that.

Mr. LARSON. That is a legal question, I think.

Mr. HOSMER. Mr. Chairman, I am going to bring that out with Mr. Bennett when I get to him.

Mr. ASPINALL. I just did not want to leave it that way. The way things are now it is up in the air.

Mr. HOSMER. I am setting the foundation for my questioning of Mr. Bennett.

Mr. Larson, I want to go back to one matter we talked about yesterday, and that was the amount of water needed to produce the firm power commitments at Hoover. Have you arrived at any figure yet as to what is the requirement?

Mr. LARSON. Are you speaking of the theoretical firm power at Hoover on which the power contracts are based?

Mr. HOSMER. That is right.

Mr. LARSON. They are all subject to availability water. I believe at the present time that requirement is around 10 million acre-feet.

Mr. HOSMER. In other words, the 10 million acre-feet does not pass through the generators at Hoover every year. Then the firm-power contract commitments are not met?

Mr. LARSON. It would be less than that amount of water at high stage of Hoover. It depends on how much water is in Lake Mead, the head for the powerplant.

Mr. HOSMER. I am going to refer you to a letter you wrote on October 10, 1951, to Mr. Samuel B. Morris, general manager and chief engineer, department of water and power in Los Angeles. It was your letter of transmittal of the material called Data From Glen Canyon Investigations by you, the Bureau of Reclamation, dated October 1951. In that letter you advised Mr. Morse: "We have not as yet concluded our studies with regard to the filling of Glen Canyon Reservoir and its effect on downstream powerplants."

That, of course, implies that you have had some kind of a study going on at some time prior to 1951 which was going on after that. Now have you completed that study?

Mr. LARSON. No, I do not think we have. We simply have realized from the stream records there is plenty of opportunity to fill Glen Canyon-Echo Park Reservoirs and meet the commitments to the lower basin under the compact.

Mr. HOSMER. And so you have disregarded this question of effect on downstream powerplants?

Mr. LARSON. No, we have not disregarded the effect. We have assumed that the plan of operation would fully comply with the provisions of the compact.

Mr. HOSMER. Let us put it this way then: You started on a study, and you apparently believed when you made this study that the question of power at Hoover would be relevant to the filling of Glen Canyon Reservoir. Now you have stated that you abandoned the study, at least did not complete it. So that, apparently, this question no longer enters into your calculations.

Mr. LARSON. That is not correct.

Mr. HOSMER. It is correct, if the statement you gave me in answer to the last question was true, which was, namely, that you were satisfied that there was enough water to meet the compact commitments.

Mr. LARSON. We are. But those studies, I think, referred more to coordinating with the lower basin, to try and work out a plan of coordinating the output of power and releases of water at Glen Canyon with Hoover, something I do not think we have since tried to pursue and go on with. We feel that this will be done if this project is authorized, then they will be coordinated; but we have not worked out those details because there are so many assumptions and changes, depending on what is authorized.

Mr. HOSMER. In other words, we are in the dark on this whol matter excepting only as to your opinion that the firm power commit ments to Hoover will not be impaired?

Mr. LARSON. Whatever those commitments are under the compact they will be met.

Mr. HOSMER. And since they need at Hoover 10 million acre-fee of water a year, you are going to be able to operate these reservoir up above so that they get 10 million acre-feet of water a year. I that right?

Mr. LARSON. No; that is a theoretical amount under the powe contracts.

Mr. HOSMER. That is what they need, and you say they are no going to interfere with the power at Hoover. Then, therefore, yo must be releasing at least the 10 million acre-feet a year.

Mr. LARSON. The reason I stated that was that these power con tracts are all subject to the compact. So we tie right back to fulfilling the commitments required by the Colorado River compact.

Mr. HOSMER. My understanding of your previous answer was that so far as you are concerned, you would satisfy the 7½ million acre feet minimum, and in addition to that whatever surpluses were re quired under 3 (d) and 3 (c), you were meeting the compact. So yo must feel, then, that the amount of surplus amounts to at least 2½ million, namely, 1 million 3 (d) water and a million and a half 3 (c) water. Is that right?

Mr. LARSON. Not necessarily, I do not believe.

Mr. HOSMER. Then your answers to my questions do not gibe, Mr Larson.

I will waive at that point, then, because I think you have ampl illustrated that there is a serious question as to your understanding of surplus and as to what amount of water should go down the rive in addition to the 7½ million acre-feet minimum over any period o 10 consecutive years, and that you have disregarded, since 1951, an worries with respect to keeping firm power commitments at Hoover

Now I will go to the geologists.

Mr. ASPINALL. I think you had better go to Mr. Bennett.

Mr. HOSMER. The geologists want to get back to Colorado and g to work, so I want to take them up now, and then I will get to Mr Bennett. I hope I can take an hour with the geologists, because I d not want to get started on Mr. Bennett and get a couple of question out of the way, and then give him a chance to do a little research.

Mr. Keener, I just want to ask you about your statement on page 2 the very bottom line, where you start out quoting excerpts from Pro fessor Berkey's memorandum with respect to the dam site at Gle Canyon. Do you recall that in your testimony?

Mr. KEENER. Yes, I do.

Mr. HOSMER. Now, the statements of Professor Berkey sound prett good, but I am afraid, maybe, that they have been taken out of contex

Mr. KEENER. I did not understand your statement.

Mr. HOSMER. Just a moment. Professor Berkey was in this are or in the employ of the Government for a period of a few days bac in 1947. I think it was from May 30 to June 4. He wrote a memo randum not only covering this point but some data at Coconino an at Davis Dam. Was not the purpose of the employment of Professo Berkey at this time to make an evaluation as between the mile 4 sit

and the mile 15 site, and not for the purpose of giving an opinion as to final construction of the dam at either site?

Mr. KEENER. The purpose of his trip at that time was to pick out a site for more thorough investigation of the foundation conditions. It had been more or less decided at the time that mile 4 and mile 15 were the two most favored sites, to the extent that I believe three holes had already been drilled at mile 4. But it was decided that rather than proceed further with the investigation at mile 4 it would be better from the configuration and from Dr. Berkey's opinion of mile 15 to proceed with the explorations at mile 15.

Mr. HOSMER. In other words, to further determine whether or not a dam could be built at this site?

Mr. KEENER. That is right, and the best site of those that had been considered before.

Mr. HOSMER. In fact, he further stated under his recommendations:

There are as yet no boring tests to determine the depth of the gorge or other side studies * * *."

Mr. KEENER. I imagine so. It is in there.

Mr. HOSMER. I am reading from the report. So that he had no benefit whatsoever in 1947 of the cores and so forth that were taken in 1949 and finally analyzed in SP-30 in 1951?

Mr. KEENER. That is correct.

Mr. HOSMER. It was purely a preliminary opinion based on what information was available at that time in 1947, and based upon his view of the canyon during the short period of time in which he was traveling to Coconino and Davis and elsewhere?

Mr. KEENER. That is correct. Dr. Berkey had looked over a good many dam sites before in his life, and if anything was particularly wrong in the surface geology, he certainly would have called attention to it.

Mr. HOSMER. I realize that, but I do not suppose even Dr. Berkey would go ahead and put a dam up on any site unless he had further additional information to that which he had at the time he rendered this memorandum to the Department and his subsequent paper.

Now this canyon is kind of a roughly U-shaped canyon, and when you get down to the water level you have the depth of the river, and going down further you reach a bunch of rocks that is not unbroken massive Navajo sandstone, it is cover rock—what is the technical term for that?

Mr. KEENER. I believe alluvium fill in the river, river fill.

Mr. HOSMER. Then you have to penetrate down through that until you get to the Navajo sandstone formation itself?

Mr. KEENER. Correct.

Mr. HOSMER. There were certain core tests made at mile 15 location and the cores were taken from a barge, I believe. Is that not right?

Mr. KEENER. From a barge?

Mr. HOSMER. Yes.

Mr. KEENER. I imagine so. They could have been taken from some of the holes at the site from 6-inch cores that I think were taken outside of the river section.

Mr. HOSMER. There are a number of cores that are underneath the water; are there not?

Mr. KEENER. Yes.

Mr. HOSMER. And they had to be drilled?

Mr. KEENER. Yes.

Mr. HOSMER. And one of them was drilled to a depth in excess of 300 feet?

Mr. KEENER. Correct.

Mr. HOSMER. So I would like you now to tell me how these holes underneath the river were drilled.

Mr. KEENER. They were drilled from a barge. I hope you understand, and I feel sure that you have not heretofore, from some of your remarks, that I am not a geologist. I am an engineer. I am a designing engineer.

Mr. HOSMER. Would Mr. Murdock like to answer? He may have more information. You talked about these things in your testimony.

Mr. KEENER. I did.

Mr. HOSMER. I am sorry. Let us let Mr. Murdock answer the question.

Mr. MURDOCK. They were drilled both from a barge and from the side by a common drill known as the diamond drill.

Mr. HOSMER. Is that a rotary drill?

Mr. MURDOCK. Yes, it turns; but it is distinguished from a rotary drill in that we use diamond bits, and you get a complete core. As you go down the diamond bit spins around and goes over the top of the rock, and picks the core up completely so that you get a complete sample of the rock you penetrate after you reach bedrock.

Mr. HOSMER. When you are drilling do you have a liner down? Do you push a liner down in and have your diamond drill inside the liner?

Mr. MURDOCK. You have to set your drill pipe through the river, then through the valley fill, through the sand and the gravel on top of the bedrock. You set a 3-inch pipe usually through that to the top of the bedrock. That keeps the river water out and the sand out and everything else out. Then you go down inside of that pipe with the diamond bit and get the complete core of the bedrock from there on down.

Mr. HOSMER. In other words, you go down and you take out these cores. I think they are 6-inch cores, are they not?

Mr. MURDOCK. The 25 drill holes we made first were what are known as Nx and Bx cores. They are small, about 2¾ inches. Then we went back later and took out 6-inch cores by a diamond drill, pictures of which are in the reports which were sent up here. These big cores were taken into the Denver laboratory and special tests——

Mr. HOSMER. We will get to them later. I am just trying to find out how you did the drilling. You did drill holes below the water of the river?

Mr. MURDOCK. That is right.

Mr. HOSMER. What that hole wet or dry while you were drilling?

Mr. MURDOCK. Well, your hole beneath the river is always wet. However, once you get to the bedrock you can seal off your casing and keep the river water out.

Mr. HOSMER. Do you keep putting your casing down?

Mr. MURDOCK. Yes.

Mr. HOSMER. You drilled some vertical holes over in drift No. 1, 1 at the inside of the drift and 1 at the mouth of the drift, and as you drilled those down you found that you reached the water table; did you not?

Mr. MURDOCK. That is correct.

Mr. HOSMER. Is not there a water table under the river, too?

Mr. MURDOCK. The level of the water table under the river is at the river surface.

Mr. HOSMER. In other words, the river spreads out underneath the ground through this Navaho formation; is that right?

Mr. MURDOCK. Commonly, right at the river surface and within a few feet of the river, the water table is the same height as the river, but, as you get back under the abutments, then you assume the ground water table of the surrounding area, and it slopes upward.

Mr. HOSMER. Do you know what the height of the ground water table was in relation to the river when the holes were drilled?

Mr. MURDOCK. Two feet higher at the end of drift No. 1 than at the river.

Mr. HOSMER. In the first hole inside the drift?

Mr. MURDOCK. One foot higher.

Mr. HOSMER. What is the difference between those two vertical holes; in other words, the length of the drift?

Mr. MURDOCK. I think 50 feet, as I remember. It is in the report here.

Mr. HOSMER. You mean the level goes up by 1 foot in a distance of 50 feet?

Mr. MURDOCK. No, it goes up 2 feet within a distance of 50 feet.

Mr. HOSMER. If you went on another 50 feet further into the bank of the river, would it go up another 2 feet?

As I recall, your men out there that took those readings said in both cases it was about a foot above the table of the river.

Mr. MURDOCK. I can find that in just a second.

Mr. HOSMER. They further concluded that the slope of the water table was very gentle.

Mr. MURDOCK. In general, the water surface in drill hole 26 is about 1 foot higher than the water surface, and drill hole 28 is about 2 feet higher, and the distance is about 50 feet from the mouth of the drift.

Mr. HOSMER. Do you have the portion of the report in which there was a conclusion about the slope of the water table?

Mr. MURDOCK. Page 3 of the Robinson and Jones report. Do you have that report?

Mr. HOSMER. I have it here somewhere. Just read out what is says about the conclusion about the slope of the water table.

Mr. MURDOCK (reading):

> The water table adjacent to the dam site appears to be contributing to the stream flow. The slope is fairly flat.

Mr. HOSMER. That amount of rise is a flat slope?

Mr. MURDOCK. Two feet in fifty is not especially flat.

Mr. HOSMER. It was my understanding that your contention is that the vertical hole at the inside of the drift consists of ground water from elsewhere than the river.

Mr. MURDOCK. That is right. It is higher than the river. It has to be, flowing toward the river. The direction of movement is from the abutment into the river.

Mr. HOSMER. Then there is a flow into the river all the time of this ground water from elsewhere?

Mr. MURDOCK. The movement of the ground water is into the river.

Mr. HOSMER. Do you have any idea of what the amount of the flow of ground water is?

Mr. MURDOCK. It is so slow we calculated it was 64 cubic feet per year.

Mr. HOSMER. That is the permeability rate, is it not, which is the rate of penetration of water through 1 cubic foot——

Mr. MURDOCK. Of rock.

Mr. HOSMER. Of rock in 1 year under a head of 1 cubic foot.

Mr. MURDOCK. Under a head of 1 foot.

Mr. HOSMER. One foot.

Mr. DAWSON. Will the gentleman yield there?

Mr. HOSMER. Yes.

Mr. DAWSON. What is the figure you say that might amount to for a year?

Mr. MURDOCK. We have a permeability rate of 64 feet per year, which is the amount they established by laboratory tests. That is relatively slow.

Mr. HOSMER. If you had a higher head, there would be more water go through?

Mr. MURDOCK. That is right. And if the distance is greater there would be less. It is directly proportionate to the head and inversely proportionate to the distance.

Mr. HOSMER. If you had a head of 700 feet and your distance was the same, your amount of flow would be 64 times 700, would it not?

Mr. MURDOCK. That is right, through 1 foot of rock.

Mr. HOSMER. And that is a total of of 44,800 cubic feet; is that right?

Mr. MURDOCK. Right—per year. If your multiplication is correct.

Mr. HOSMER. That is quite interesting, because you have, Mr. Murdock, in your statement, on page 3, at the top of the page, the conclusion that there would not be penetration of any type of solutions including water through that Navaho sandstone. Do you see that?

Mr. MURDOCK. Yes.

Mr. HOSMER. You did not mean that, did you?

Mr. MURDOCK. What I am referring to here is the rate of penetration. Even 64 feet per year might sound fast, but we pumped with 150 pounds per square inch pressure, and yet we could not make that water come out into a hole within a few feet of the hole we were pumping it into. You must remember a year is a long time.

Mr. HOSMER. Yes, I realize that, and I realize these figures are pretty big, too, because when we did that multiplication of 64 times 700 and came up with 44,800, we came up with a figure which is pretty close to being an acre-foot of water, because in an acre-foot of water there are 43,560 cubic feet of water.

Mr. MURDOCK. If you were to get the amount of water that would go around the dam, however, you will have to divide that figure by the length of the rock from where it goes into the rock to where it comes out. So that could well be a thousand feet.

Mr. HOSMER. I understand, and that also is determined by the amount of surface exposed to percolation, is it not?

Mr. MURDOCK. That is right.

Mr. HOSMER. And either you or Mr. Keener has concluded that the amount of water that would be lost around this dam is 10,200 acre-feet of water a year.

I will ask Mr. KEENER: Do you know what square footage of surface exposed to percolation was used in arriving at that annual figure?

Mr. KEENER. The quantity of water passing through the rock is based on a formula of the area which, of course, depends——

Mr. HOSMER. I am just asking you what the area was.

Mr. KEENER. What the area was?

Mr. HOSMER. Yes.

Mr. KEENER. Porosity is 18 percent. It would be 18 percent of any section you figured through.

Mr. HOSMER. I thought the porosity was 22 percent.

Mr. KEENER. Wait a minute; 22 percent is the average porosity. That is the figure we corrected. We have never presented that figure of 28 percent to the committee, so that was not an error as far as this committee was concerned. We corrected that.

Mr. HOSMER. I am not——

Mr. KEENER. We corrected that to 22 percent before we submitted that. That is based on laboratory tests.

Mr. HOSMER. You still have not answered my question as to how much of an area did you use in arriving at this 10,000 acre-feet-a-year-plus feature.

Mr. KEENER. That is an integration between the different values from the bottom of your reservoir to the top.

Mr. HOSMER. What is the total, Mr. Keener?

Mr. KEENER. I have not got it. That is quite a heavy mathematical calculation to make, an integration of all those heads in the areas.

Mr. HOSMER. Somebody made it. It is a figure sitting somewhere because you had to use it in order to make this calculation. All I am asking you is what it is. If you do not remember, say so. Do you remember?

Mr. KEENER. No; I do not remember what that was.

Mr. HOSMER. All right.

Now, Mr. Murdock, I think we have established that there is a penetration of some kind through these rocks.

Mr. MURDOCK. That is right.

Mr. HOSMER. And the amount of penetration depends, in one sense, on the amount of pressure that is behind the water?

Mr. MURDOCK. That is right.

Mr. HOSMER. And that there is ground-water drainage into the river on account of the water table?

Mr. MURDOCK. That is right.

Mr. HOSMER. Where does the water that drains into the river through this ground-water table come from?

Mr. MURDOCK. From rainfall back on the slopes away from the river.

Mr. HOSMER. In other words, the water goes down through the ground, seeps down and down, and eventually seeks its level down at the river?

Mr. MURDOCK. It falls onto the sandstone and slowly percolates into the sandstone until it reaches the water table, and then follows along into the river.

Mr. HOSMER. I am going to refer you to a publication put out by this committee last year, volume 4 of a series entitled "Physical and Economic Foundation of Natural Resources," this volume being entitled, "Subsurface Facilities of Water Management and Patterns of Supply—Type Area Studies."

On page 121 of that document—which, incidentally, was prepared by three men, J. W. Harshbarger, C. A. Repenning, and J. T. Callahan—do you know any of those people?

Mr. MURDOCK. No; I do not.

Mr. HOSMER. They are all members of the United States Geological Survey.

Now back on page 121, talking about this Navaho sandstone, the book says:

> One striking feature of this sandstone is its great permeability and a capacity to absorb immediately a substantial portion of a light precipitation. Evidence of this rapid absorption is the extremely small amount of runoff in the area of outcrops.

Further down it says:

> Undoubtedly the Navaho sandstone transmits water more freely than any other water bearer in this region.

Do you agree with that statement?

Mr. MURDOCK. I will agree with the first part, where it absorbs the water that falls on it. But I cannot disagree with the second section because I do not know the location.

Mr. HOSMER. At least water goes through this stuff, does it not?

Mr. MURDOCK. Water will not go through it rapidly. It will absorb a certain amount of water, but the openings in it are capillary in size, and that sucks water into the sandstone, but it cannot be forced through only very slowly.

Mr. HOSMER. We find, in this same publication to which I have referred you, the statement to the effect that at Tuba City—do you know where that is?

Mr. MURDOCK. Yes.

Mr. HOSMER. Two wells which were drilled into this Navaho sandstone formation together yielded about 75 gallons per minute of artesian flow. That seems to be a fairly good amount of water that goes through these sandstones, does it not?

Mr. MURDOCK. Seventy-five gallons per minute is a good well for culinary use, but you have to get well up to a thousand gallons a minute before it is considered a good well for irrigation purposes.

Mr. HOSMER. I understand that, but we still have water going through this, and what we mean by whether it goes through slowly or fast is what I am trying to get on the record.

There is another thing I would like to get on the record. This formation has been described as "massive," and I refer you now to a book by von Engeln and Caster, entitled "Geology," which says as follows on page 117:

> Where successive beds are from an inch to a foot thick, the sedimentary pile is referred to as thin beds. If the layers are over a foot thick, the term "massive bed" is used to describe the section.

Is that a correct statement?

Mr. MURDOCK. In general, yes.

Mr. HOSMER. Then, "massive" has nothing to do with strength; it is merely whether or not the beds are over a foot thick?

Mr. MURDOCK. Well, bedding planes, themselves, usually represent a weakness in engineering geology. So if you have bedding planes far apart, you usually have a better rock for construction purposes.

Mr. HOSMER. We are not talking about engineering purposes now, we are just talking about description of sedimentary rock. And if the formation is over a foot thick, it is termed a "massive formation"; is that not correct?

Mr. MURDOCK. Yes.

Mr. HOSMER. If it is less than a foot, it is termed a thin bed?

Mr. MURDOCK. That is that author's definition, and I see nothing especially wrong with it. I usually refer to beds over 10 feet thick as massive.

Mr. ASPINALL. Will the gentleman yield to me?

Mr. HOSMER. Yes.

Mr. ASPINALL. If it is 2,000 feet thick, it would be massive also, would it not?

Mr. MURDOCK. That is right.

Mr. HOSMER. "Massive" is a description and has nothing to do with strength?

Mr. MURDOCK. That is right.

Mr. HOSMER. Referring to SP-30, Mr. Murdock, that was prepared by Glen G. Baumer and J. A. Hansen. Do you know them? Do you know Baumer and Hansen?

Mr. MURDOCK. No; I do not.

Mr. HOSMER. They are the fellows that made the mistake about this 22 and 28 percent. There are some conclusions about that formation I want to see if you agree with.

One of the conclusions was, "Although weak in comparison to many foundations, the core from Glen Canyon Dam site exhibits remarkable uniform properties." Do you agree with that?

Mr. MURDOCK. I do.

Mr. HOSMER. It is relatively weak in comparison with many other formations?

Mr. MURDOCK. That is right.

Mr. HOSMER. And do you agree with this: That the formation can be described as brick, red, fine to medium grain, moderately hard, slightly friable, porous, and absorptive sandstone; do you agree with that?

Mr. MURDOCK. I did not use the term "porous," but the rest of those terms I agree with.

Mr. HOSMER. Do you agree it is absorptive?

Mr. MURDOCK. I do.

Mr. HOSMER. Porous. Porosity. Now that is an interesting one. You say it is 22 percent in connection with this rock?

Mr. MURDOCK. That is right.

Mr. HOSMER. Does that mean that in a given volume of Navaho sandstone that 22 percent of that volume consists of void space?

Mr. MURDOCK. That is right.

Mr. HOSMER. With further reference to the conclusions in SP-30, they say that:

> Specimens tested in the dry state indicate greater strength and a higher modulus of elasticity than those tested in a saturated condition.

Do you agree with that?

Mr. MURDOCK. I do.

Mr. HOSMER. And, of course, you agree with the conclusion that the porosity is 22 percent?

Mr. MURDOCK. Yes.

Mr. HOSMER. I want to go over now to table 14 in SP–30.

Mr. DAWSON. Will the gentlemen yield to me there?

Mr. HOSMER. Not for long.

Mr. DAWSON. I just want to inquire, as you made a reference to 28 percent mistake, would you care to clarify that?

Mr. HOSMER. It is already clarified on the record. They corrected their figure from 28 to 22.

Have you got table 14 in front of you?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. That table is of dry and saturated specific gravities in Glen Canyon sandstone taken from 6-inch diameter foundation cores. From the number of cores that were taken an average is arrived at.

Now it was found, according to your statement—and correct me if I am wrong—that this rock, dry, weighs 128½ pounds per cubic foot. Is that correct?

Mr. MURDOCK. That is right.

Mr. HOSMER. And wet, saturated, it weighs 141.2 pounds per cubic foot?

Mr. MURDOCK. That is right.

Mr. HOSMER. And that, therefore, when saturated it contains 12.7 gallons of water in a cubic foot?

Mr. MURDOCK. Pounds.

Mr. HOSMER. That is right, pounds.

Mr. MURDOCK. That is right.

Mr. HOSMER. Do you know what a gallon of water weighs in pounds?

Let me ask the question this way: Does about 8.3 pounds sound right to you?

Mr. MURDOCK. That is right.

Mr. HOSMER. So that you can get in a cubic foot of Navaho sandstone approximately a gallon and a half of water?

Mr. MURDOCK. That is right.

Mr. HOSMER. Here is another statement over on page 9 of SP–30, which is as follows:

> It will be noted that soaking accounts for approximately 75 percent of the total saturation, indicating numerous small voids and easy access of water into the material.

Do you agree with that?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. Over on the very last page of SP–30, in the appendix, designated as Roman numeral II, we find this statement:

> When immersed in water the specimens lose considerable strength.

There they were talking about specimens of the sandstone. Do you agree with that statement?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. Mr. Keener, you have spoken in your testimony to the effect that you could put a direct stress up to 4,400 pounds per square inch on one of these cores without a lateral load before it broke?

Mr. KEENER. That is right.

Mr. HOSMER. From what table in SP–30 does that figure come?

Mr. KEENER. What page?

Mr. HOSMER. That is page 6 of your statement, up at the top.

Mr. KEENER. That is an average of the first three figures in column——

Mr. HOSMER. The first three tables?

Mr. KEENER. Of table 6. We might just as well say it is an average of the 3 figures in columns 4 of tables 6, 7, and 9, because you add those 3 together and divide them by 3 and you get the average of 4,400.

Mr. HOSMER. That figure you have in your testimony is not in SP–30; is it?

Mr. KEENER. Is not what?

Mr. HOSMER. Is not in SP–30. It is derived from the table.

Mr. KEENER. It is derived from the tables in SP–30, from table 6, table 7, and table 9. In other words, it is an average where you consider hole cores that were drilled vertically vacuum saturated, and drilled horizontally vacuum saturated, and drilled horizontally oven-dried. That is an average. It is your low conditions. It is your smaller actual stresses, your compressive stresses.

Mr. HOSMER. Is not that of dry sandstone? Or is it wet sandstone?

Mr. KEENER. In table 7 it is dry. In table 6 it is saturated.

Mr. HOSMER. What is it in the other table?

Mr. KEENER. In the other table it is also saturated. So two-thirds of those are saturated specimens.

Mr. HOSMER. Now you have mentioned that there is going to be excess of 10,000 acre-feet of water flowing around under and——

Mr. KEENER. No, it was not excess.

Mr. HOSMER. The dam is going to sit on saturated rock; is it not?

Mr. KEENER. What I stated was not exceeding 10,000 acre-feet.

Mr. HOSMER. But you are going to set the dam on rock that will be saturated?

Mr. KEENER. Yes.

Mr. HOSMER. And, therefore, that 4,400 figure, which is an average of both dry and saturated, is not a good figure for comparison. Is that correct?

Mr. KEENER. It is a pretty good figure when you look at the comparison of those figures. You could leave out table, the result from table 7, which is an average of 4,970, and you have on saturated over on table 6, 5,180, and you get a higher compressive stress than you do with the former.

Mr. HOSMER. Where, then, do these people come to the conclusion that when immersed in water the specimens lose considerable strength?

Mr. MURDOCK. I think I can answer that. They are talking about a hand specimen in water, whereas in these tests they are testing it in a confined state—you do not lose appreciable strength in the confined state, as you can read in one of the conclusions.

Mr. HOSMER. Then that is a figure when there is not any lateral support, and it is a figure when you have a direct compression.

Now when the tests were taken and the compressions made, were they on the strata as it actually lies at the point which is tilted, or were they perpendicular with the stratification?

Mr. KEENER. It states at the top of the table under what conditions these tests were taken, and my statement was just a brief summary of

conditions that were averaged. If you want to go back to these tables from which my statement was derived, at the top of each table it states they were drilled horizontally, or they were drilled vertically. If you cannot use those figures I gave, you can take SP–30 and go through all the results. But I think in general I took practically the worst average conditions.

Mr. ASPINALL. Mr. Hosmer, would you yield for an off-the-record observation?

Mr. HOSMER. Yes.

(Discussion off the record.)

Mr. ASPINALL. Will the gentleman yield to me for a question of Mr. Larson?

Mr. HOSMER. Yes.

Mr. ASPINALL. Mr. Larson, do you have a similar statement to that which you made for the participating projects on what is known as the Animas-La Plata project?

Mr. LARSON. Yes.

Mr. ASPINALL. Will you bring that with you to the next committee meeting?

Mr. LARSON. I have a copy with me today.

Mr. ASPINALL. You have a copy with you today?

Mr. LARSON. Yes.

Mr. ASPINALL. I would ask unanimous consent that a statement on what is known as the Animas-La Plata project, which is similar to the statement made by the Commissioner on the other participating projects, be made a part of the record.

Mr. SAYLOR. Is it included in any bill before this committee?

Mr. ASPINALL. It is not. I just make it so it can be used for amendment, if necessary.

Mr. SAYLOR. Where is the project located?

Mr. ASPINALL. It is located on the boundary line between southwestern Colorado and northwestern New Mexico.

May I say to the gentleman that the cost-benefit ratio is perhaps much better than it is in some of the other projects that are in some of the bills.

Mr. SAYLOR. I have no objection, Mr. Chairman.

Mr. ASPINALL. Hearing no objection, will you deliver that statement to the counsel?

Mr. LARSON. Yes.

Mr. ASPINALL. We will be adjourned subject to the call of the Chair, but in no instance later than 9:30 Saturday morning.

(The document referred to above appears on p. 165.)

(Whereupon, at 3:50 p. m., the subcommittee recessed, to reconvene at the call of the Chair.)

COLORADO RIVER STORAGE PROJECT

FRIDAY, APRIL 22, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND
RECLAMATION OF THE COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to call, at 10 a. m., in room 112, Old House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for the further consideration of H. R. 3383 and similar bills having to do with the authorization of what is known as the upper Colorado River project.

At the time the committee adjourned its last session, the gentleman from California, Mr. Hosmer, was in control of the time. The Chair recognizes the gentleman from California, Mr. Hosmer.

QUESTION PERIOD OF J. NEIL MURDOCK, REGIONAL GEOLOGIST, BUREAU OF RECLAMATION; KENNETH B. KEENER, CHIEF, DESIGNING ENGINEER, BUREAU OF RECLAMATION; ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR; AND E. O. LARSON, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, ACCOMPANIED BY C. B. JACOBSON—Resumed

Mr. HOSMER. Mr. Murdock, we were talking about this 22 percent figure on porosity.

Now, I suppose there is a porosity rate for almost all rocks, either sedimentary or otherwise; is there not?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. And does that range from approximately 1 percent in fine grain granite to about 50 percent in clay?

Mr. MURDOCK. Those are pretty good figures, I think.

Mr. HOSMER. So this 22 percent figure is roughly in the middle of the range?

Mr. MURDOCK. That is right.

Mr. HOSMER. And we wish, Mr. Murdock, to distinguish from porosity, the permeability, which is the rate that a fluid will pass through a rock material; is that right?

Mr. MURDOCK. Porosity is the amount of voids in the rock, and it has nothing to do with the size of the voids; whereas permeability is the rate at which water will go through a rock.

Porosity is one of the factors that determine what the permeabilities will be. The size of the openings is very important in permeability.

Mr. HOSMER. The other day, you agreed that the structure of the sandstone lost some strength when it became saturated.

Can you explain why that would be brought about?

Mr. MURDOCK. Well, the water lubricates the individual sand grains, and that is one factor. It makes slipping between the grains easier.

Another reason is that the cementing material, when it is composed of clay particles, loosens the material slightly.

Mr. HOSMER. Does it dissolve the cement?

Mr. MURDOCK. No. Calcium carbonate, which is the cementing material in this rock, is not soluble in water.

Mr. HOSMER. Then the decrease in structural strength results solely from the lubrication of the grains of sand out of which this stone is composed?

Mr. MURDOCK. Principally, I would say; not solely.

Mr. HOSMER. What else, then?

Mr. MURDOCK. Well, as I say, there is a certain amount of clayey minerals besides calcium carbonate—say, 5 percent—and these are softened to some extent by the water. So I would say 95 percent of the effect of water on this rock is by lubrication.

Mr. HOSMER. Referring again to SP-30, I am going to read another statement and ask you whether or not you agree with it. The statement is found on page 2, and it says:

> When wetted, the surface becomes soft and can be rubbed off easily.

Is that a true and correct statement?

Mr. MURDOCK. That is true.

Mr. HOSMER. You agreed to some of the conclusions in our previous testimony that had been made in SP-30, and one of these conclusions was that the sandstone is slightly friable.

Now, what do you mean by that?

Mr. MURDOCK. It can be broken by the fingers.

Mr. HOSMER. I read a statement somewhere by one of the geologists that this friability of the rock was such that a person walking over it could be tracked, because his feet go into the rock. Is that right?

Mr. MURDOCK. No; as far as I know, it isn't.

Mr. HOSMER. Now, you disagreed with the conclusion that this rock was porous, and therefore you disagreed with the results of the engineers and chemists who wrote the report.

Mr. MURDOCK. Well, that is not entirely true.

I said that I had not used the term "porous." However, you would have to modify that to some extent. I would have to say it is moderately porous. It has 22 percent porosity. Therefore, it is in the middle of the range. So I would call it moderately porous.

Mr. HOSMER. Or would you feel that the term "average" would be better applied than "moderate."

Mr. MURDOCK. "Average" would be all right.

Mr. HOSMER. But you did not disagree with the description that it was absorptive sandstone?

Mr. MURDOCK. No.

Mr. HOSMER. Now, this formation at the mile 15 location, according to your knowledge, is how thick?

Mr. MURDOCK. Oh, it is approximately 1,100 feet thick in the vicinity of Glen Canyon, I would think. We cannot tell exactly, because part of it had been eroded.

Mr. HOSMER. When your bores went down pretty deep, how deep did they go?

Mr. MURDOCK. 340 feet below the river, as I remember it.

Mr. HOSMER. That is below the river surface, or below the gravel fill of the river, or below the sandstone?

Mr. MURDOCK. I think below the river surface, as I remember it. I can find that.

Mr. HOSMER. Was that M–15–16 that went 316 feet?

Mr. MURDOCK. What number did you give me there?

Mr. HOSMER. 15–16. Or 15–9. That went 394 feet.

Mr. MURDOCK. I think 394 feet would be the one that went the deepest.

Mr. HOSMER. And that is from the water level?

Mr. MURDOCK. Yes; from the river surface.

Mr. HOSMER. And then going up from the water level, how far does this formation extend on either side of mile 15?

Mr. MURDOCK. Slightly over 750 feet, I think. However, I will have to check that again.

Mr. HOSMER. If you cannot find it readily, we will just let it go. It is not too important.

Mr. MURDOCK. I think it is 750 feet.

Mr. HOSMER. Your 700-foot dam height is measured from where?

Mr. MURDOCK. From the bedrock.

I want to correct that statement of a minute ago: 750 feet from bedrock to the top of the wall is what I meant, not from the river surface. You would have to subtract 120 from 750, which would be 630 feet above river level, which will put you at the top of the abutments, at the mile 15 site.

Mr. HOSMER. Does the proposed dam at its top still go into the Navaho sandstone formation?

Mr. MURDOCK. It is entirely in Navaho sandstone.

Mr. HOSMER. And the Navaho sandstone continues on above that about how far?

Mr. MURDOCK. Well, if you go back from the river a way——

Mr. HOSMER. At the dam site.

Mr. MURDOCK. Right at the river, it doesn't go up more than just about 35 or 40 feet above our proposed dam.

Mr. HOSMER. Is that why you do not want to put the dam up to 735 feet?

Mr. MURDOCK. No.

Mr. HOSMER. What other formation do you get into when you get up above the Navaho sandstone? Do you have the Wingate?

Mr. MURDOCK. No; you would have to go back miles from the river to get out of the Navaho sandstone.

Mr. HOSMER. I am talking about the site at mile 15.

Mr. MURDOCK. The next formation above is the carmel formation.

Mr. HOSMER. What is that?

Mr. MURDOCK. Pink to red sandy shale, and buff sandstone.

Mr. HOSMER. What is the situation in this respect at the proposed location of the protective dam for Rainbow Arch?

Mr. MURDOCK. It would be the same situation. However, there is a great deal of Navaho sandstone above our dam at that point.

Mr. HOSMER. So you are in this Navaho formation at all times.

Mr. MURDOCK. That is right.

Mr. HOSMER. Now, I believe the proposed lake would extend about 190 miles up the Colorado River.

Mr. MURDOCK. Approximately that. River miles.

Mr. HOSMER. And how far up the other river?

Mr. MURDOCK. 61 miles, approximately.

Mr. HOSMER. Is that the San Juan River?

Mr. MURDOCK. The San Juan River.

Mr. HOSMER. During all this time, are you in the Navaho sandstone formation?

Mr. MURDOCK. No, sir.

Mr. HOSMER. What else do you get into?

Mr. MURDOCK. Well, you go up the Colorado River and you get into the older shales, Triassic shales, and into the limestones.

Mr. HOSMER. Is that the Kayenta formation?

Mr. MURDOCK. Yes; you get into the Kayenta formation and the Triassic formations, too.

Mr. HOSMER. What is the Kayenta formation?

Mr. MURDOCK. It is a shale and sandstone.

Mr. HOSMER. It is more permeable than the Navaho sandstone; is it?

Mr. MURDOCK. No. All the formations are more permeable in that area than the Navaho.

Mr. HOSMER. It is a less homogeneous formation than the Navaho; is it not?

Mr. MURDOCK. That is right.

Mr. HOSMER. It contains some sand and some gravel?

Mr. MURDOCK. Well, shale and sandstone.

Mr. HOSMER. What is the permeability of this formation?

Mr. MURDOCK. Very low. We did not make any tests on it. But it is very tight.

Mr. HOSMER. Do you have any figures whatsoever?

Mr. MURDOCK. No.

Mr. HOSMER. Do you have any figures for the Triassic?

Mr. MURDOCK. No laboratory figures, but shale formations are recognized as impermeable.

Mr. HOSMER. That is not altogether true, is it, Mr. Murdock?

Mr. MURDOCK. Well, you might find exceptions, but in the oil business they utilize this, because the shales are impermeable and they trap the oil in the sands.

Mr. HOSMER. That is true with a subsurface formation, but I am talking about a formation that is fairly close to the surface.

Mr. MURDOCK. Surface formation has nothing to do with the permeability of the shale. It breaks down into a clay, which again is impermeable.

Mr. HOSMER. Depending upon its extent of saturation at the time you measured it; is that correct?

Mr. MURDOCK. No; I don't think saturation has anything to do with permeability.

Mr. HOSMER. If you took this piece, broke it in two—and I have in my hand a sample of Navaho sandstone—and saturated it, and

then rubbed the pieces together, you would be able to rub off a good deal of material; would you not?

Mr. MURDOCK. That is true.

Mr. HOSMER. And the material that was rubbed off, if you dried it, would be the same as common sand; would it not?

Mr. MURDOCK. That is true.

Mr. HOSMER. When you put your tests down in these holes of water and solutions under pressure, is it not a fact that the holes were already wet before you put any solution in there under pressure?

Mr. MURDOCK. The river surface ones were wet, but the ones going upward into the abutments were dry.

Mr. HOSMER. Did you make any hole any greater distance away from the site of the river than the hole you made at the end of No. 1?

Mr. MURDOCK. No.

Mr. HOSMER. There you encountered groundwater, did you not?

Mr. MURDOCK. Yes.

Mr. HOSMER. And how did you seal off that groundwater from the hole in order to keep it dry while you made your test?

Mr. MURDOCK. That hole was made to observe the water table, and to make our tests we seal off 10 feet of hole and then pump into the sandstone to determine how much water we can pump into it.

Mr. HOSMER. Was your casing fit in all instances sufficiently tight to prevent the percolation of water down into the hole as you drilled deeper?

Mr. MURDOCK. To make that test, we have a rubber packer, and we expand that rubber packer.

Mr. HOSMER. I know. In the test. But I am talking about before you put that rubber packer down into the hole.

After you pull out your cores, then you have to put in this business to put the water under pressure.

Now, I am talking about what is in there in the meantime.

Mr. MURDOCK. The hole is full of water. You have to use water to drill with. The diamond bit would be burned up without circulation of free water in the hole.

Mr. HOSMER. Then in each case in which you put water in these holes under pressure, you already at that time had water in them, and they were wet. Is that not right?

Mr. MURDOCK. That is true.

Mr. HOSMER. And in connection with your hole, say that was 395 feet deep. You had water standing at a head of at least 395 feet at the time you added this other pressure; is that right?

Mr. MURDOCK. That is true.

Mr. HOSMER. And you put on a pressure of 50 pounds. You kept it for 20 minutes. Then you put on another 50 pounds, kept that for 20 minutes, then put on another 50 pounds, or a maximum of 150 pounds pressure, and took off the pressure in the same manner and for the same periods of time. Is that not right?

Mr. MURDOCK. Approximately.

Mr. HOSMER. So that the total time that you used in applying pressure would be 2 hours.

Mr. MURDOCK. That is right.

Mr. HOSMER. Now, as compared to the pressures taken in the 365-foot hole, what did the results show in connection with some of the 50-foot holes?

Mr. MURDOCK. Occasionally some of the holes showed more water loss. If there is any loss at all, you will get more loss with 150 pounds pressure than at 50 pounds. Sometimes you don't get any loss with 50 pounds, and you will get a slight loss with 150 pounds. But in most of the cases with these holes, we get no loss with either 50 pounds or 150 pounds pressure.

Mr. HOSMER. But you do not know whether or not that formation was already saturated; isn't that right?

Mr. MURDOCK. That hasn't anything to do with the water test.

Mr. HOSMER. Wasn't it all filled up with water when you commenced your test, and had been for some time?

Mr. MURDOCK. That is right. If there is any permeability in the sandstone and you add another 150 pounds pressure, you will push it through. If it isn't permeable, you won't.

Mr. HOSMER. In a period of 2 hours?

Mr. MURDOCK. Certainly. If you don't get any for 2 hours, you won't get any for 20 hours.

Mr. HOSMER. Do you know what you would have got if you had put on a pressure of 200 pounds per square inch?

Mr. MURDOCK. In some cases we probably would have got a little water into the sandstone with 200 pounds pressure where we were not able to get with 150.

Mr. HOSMER. And suppose you put on 250 pounds.

Mr. MURDOCK. Slightly more.

Mr. HOSMER. And if you had put on 300 pounds?

Mr. MURDOCK. Slightly more.

Mr. HOSMER. You don't know how much more?

Mr. MURDOCK. We can figure it out.

Mr. HOSMER. Figure it out from what?

Mr. MURDOCK. An hydraulic engineer, if shown the loss at 50 pounds, can figure what it will be for 350 pounds.

Mr. HOSMER. It rises directly proportional?

Mr. MURDOCK. That is right. If you have no loss, however, you have nothing to figure with.

Mr. HOSMER. Well, as a matter of fact, we did calculate that at the reservoir the pressure per square inch would be about 300 pounds, did we not, under the full head of the water behind the reservoir?

Mr. MURDOCK. That is assuming a 700 foot dam. However, we can only use 580 feet, because you will have a back pressure from the other side of the dam, which would balance that below the river surface.

Mr. HOSMER. At least there will be pressures in excess of that which you used for your testing.

Mr. MURDOCK. Yes, more than 150 pounds.

Mr. HOSMER. And I believe that we calculated out that through a block of this sandstone, a cubic foot in size, under a 700 foot head of water, you would have permeated through that in a year an acre-foot of water.

Was that not the conclusion we reached?

Mr. MURDOCK. Under 1 foot of distance.

Mr. HOSMER. Now, I was talking about your 700-foot recalculation. You would get an acre-foot of water through that in a year?

Mr. MURDOCK. Yes. We should use 580 feet if you wanted to determine what it would be through 1 foot, river level, at the dam.

Mr. HOSMER. Those drillholes are still at drift 1, are they not?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. And in some of the correspondence that you submitted to the committee, there is a statement that subsequent readings would be taken at that location from time to time as your people happened to be in there.

Have such subsequent readings been taken?

Mr. MURDOCK. I don't know that anyone has been in there in the last 6 months. I doubt if they have. They will be read whenever we resume our investigations at that site.

Mr. HOSMER. Do you know what the results of the readings were that were last taken?

Mr. MURDOCK. They showed 2 feet of difference in elevation between the end hole in the drift and the river surface.

Mr. HOSMER. And is that the same showing that was made when they were first taken in 1949?

Mr. MURDOCK. That is right.

Mr. HOSMER. Now, you mentioned that in these holes at the drifts you encountered ground water, and you mentioned that that ground water percolated from rainwater that had dropped on the surface elsewhere.

Mr. MURDOCK. That is right.

Mr. HOSMER. And where, roughly, does that water percolate, at mile 15?

Mr. MURDOCK. From the sandstone on both sides of the river, from back several miles, from each side of the river.

Mr. HOSMER. How far back from the river in this location does the Navaho sandstone formation extend?

Mr. MURDOCK. Approximately 15 miles to the west and probably 40 or 50 miles to the east.

Mr. HOSMER. Then this water might have percolated from any place in that area? Is that correct?

Mr. MURDOCK. That is right.

Mr. HOSMER. From 30 to 50 miles?

Mr. MURDOCK. Fifteen to fifty miles.

Mr. HOSMER. Fifteen to fifty miles.

Now I am going to refer you to a geologic map of the area and ask you what this map purports to represent.

Mr. MURDOCK. That map shows the formations involved at the dam site, which is all Navaho sandstone, with a few small areas of river sand and talus. It shows all the joints and one small fault, the location of the drill holes, and the outline of the dam.

Mr. HOSMER. It bears the legend, "United States Department of Interior, Bureau of Reclamation"?

Mr. MURDOCK. That is right.

Mr. HOSMER. Was that prepared in your office, except for the blue and red markings on the map?

Mr. MURDOCK. Yes, this was prepared in our Boulder City office.

Mr. HOSMER. Is it an accurate representation of what it purports to represent?

Mr. MURDOCK. I think it is.

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Mr. HOSMER. I ask unanimous consent, Mr. Chairman, that the map be included in the record at this point.

Mr. ASPINALL. Do you wish it in the record or in the file?

Mr. HOSMER. In the record.

Mr. DAWSON. How would you reproduce this in the record?

Mr. MCFARLAND (Sidney L. McFarland, professional staff member). We would have to get the original drawing from the region and somebody would have to put on these additional markings. Of course, it would not show up in the colors.

Mr. ASPINALL. Are you in a position to furnish us the original, Mr. Larson?

Mr. LARSON. Yes sir, I assume the tracing is in the Boulder City office of the Bureau of Reclamation.

Mr. ASPINALL. With the understanding that if it can be produced it will be admitted.

Mr. DAWSON. Mr. Chairman, reserving the right to object, and I may not object, it seems to me that we are going to an awful lot of work, here, and expense, to get this reproduced in the record.

If the gentleman could point out to us the real importance of this, I would feel better about not objecting. But I cannot see at this point where we are getting anywhere with this line of questioning. And if you could point out what this is going to do for your case——

Mr. HOSMER. Well, you are asking the taxpayers to put up half a billion dollars to put up a dam at this site, and I think the Congressmen ought to have an understanding of it, as to what can be gained, from this geologic map, before they decide they are going to authorize the expenditure of that amount of money.

And my questioning will cover some of that territory, and I think it would be very helpful to have the map in the record, for the purpose of permitting the testimony to be read with some degree of understanding.

Mr. DAWSON. Will the gentleman reserve his request until after you have finished with the map, so that we might see just what the importance is, before making your request?

Mr. HOSMER. If the gentleman so desires.

Mr. Murdock, do you know a geologist by the name of Carl O. Dunbar, who is or was professor of paleontology at the Yale University?

Mr. MURDOCK. No, I don't know him, personally.

Mr. HOSMER. I have a book called Historical Geology, that he wrote, and I would like to quote his description of Glen Canyon found in that book, and ask you if you agree with it.

The Glen Canyon group is composed almost entirely of fine-grained pure quartz sand of light gray or pink color. The bedding is generally obscure, and the sandstone appears exceptionally massive. It is everywhere a cliffmaker, outcropping in unscalable walls of commanding height. Near the middle of the group there is a zone of thick-bedded slabby sandstone which separates two massive formations, the Wingate sandstone below and the Navaho above. In the plateau region these normally outcrop in two colossal cliffs with a bench between. Our great areas, the Navaho and Wingate formations are a solidified dune sand in which the swinging curves of gigantic cross-bedding betray Eolian origin. Rainbow Natural Bridge is carved from this sandstone.

Do you accept that statement as an explanation of the origin of this sandstone?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. Then this area, at one time in the Jurassic period, was a great desert; is that right?

Mr. MURDOCK. Probably.

Mr. HOSMER. And there were vast dunes of sand in that desert that were subject to the mobility of the wind?

Mr. MURDOCK. True.

Mr. HOSMER. And as the wind took away a portion of a sand dune that had been laid down, and built up another one, it resulted in a subsequent cross-bedding of this whole formation?

Mr. MURDOCK. Right.

Mr. HOSMER. And some time later, that formation sank with reference to the surrounding area? Is that correct?

Mr. MURDOCK. It was covered over by later formations.

Mr. HOSMER. How were these later formations deposited?

Mr. MURDOCK. Some, the next series, were deposited by inflow of the sea over the area, and the San Rafael group were all of marine origin.

Mr. HOSMER. In other words, the overlaying formations were water deposited, whereas the Navaho formation was wind deposited; is that correct?

Mr. MURDOCK. That is right.

Mr. HOSMER. Would you turn to page 12 of this report, which is the 1949 report of the Bureau?

About the middle of the page there is a description. Does that description pretty well jibe with what you understand the condition to be?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. There is a statement in there that it is not strongly cemented, and pieces of core break easily under a very light hammer blow; is that a correct statement?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. There is a further statement:

> This sandstone is fairly porous and shows a high absorption when pieces of core are placed in water.

Is that a correct statement?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. Now, turning over to page 14. While I am looking for what I want to find on this page, would you explain, Mr. Keener, how this dam is to be anchored into the walls of the canyon at mile 15, if it is built?

Mr. KEENER. It is keyed into the canyon by going down the extra depth from the surface rock some distance on each side and some below.

Mr. HOSMER. Is it required to excavate into the canyon wall?

Mr. KEENER. Yes, sir. And with an arch dam, we like to make it on a surface of radial lines to get a shape to take care of the thrust.

Mr. HOSMER. Approximately how far would you excavate into the walls?

Mr. KEENER. I would say we go 40 or 50 feet.

I have a little profile of that, and I can show you just how far we did consider going.

Mr. HOSMER. You can just tell us, roughly.

Mr. KEENER. I would say 40 or 50 feet, at least.

Mr. HOSMER. And how would that excavation be made?

Mr. KEENER. It would be made by blasting and excavating. You could not make it direct with the shovel. You cannot excavate that

rock with a shovel. You have to use explosives. And then it is loaded into skips, probably, on a cableway and taken out of the canyon.

Mr. HOSMER. Would it be practicable at all to get into that rock without using explosives?

Mr. KEENER. I can't imagine it would; no. I can't think a steam shovel could excavate into that rock without explosives.

Mr. HOSMER. Now, there is a plan, I believe, to drill some tunnels at this point, too, is there not, in order to carry the water around the dam site, and then later for the power features?

Mr. KEENER. Yes.

Mr. HOSMER. Would you explain to the committee how those tunnels are to be dug?

Mr. KEENER. By using tunneling methods, they would start in at the portals, at the upstream and downstream, probably meeting in the center. And they would have a track there and go in with regular tunnel-excavating machines.

But before that, they would drill into the headings and put in explosives, and they would probably drill in from 10 to 30 or 40 feet, and weaken that rock by explosives. They would break it up and then haul it out.

Mr. HOSMER. And then, as you go further in, you use explosives to continually break up the rock until you get your tunnel dug?

Mr. KEENER. Yes.

Mr. HOSMER. Would there be any practical way of building that in this tunnel without the use of explosives?

Mr. KEENER. I don't believe there are any excavating machines that are strong enough, that are adequate to excavate without using explosives?

Mr. HOSMER. All right. Now, returning to Mr. Murdock: On page 14, there is a statement in the 1949 report:

> Some concern may be felt as to the strength of the Navaho sandstone, which is only moderately well cemented and somewhat friable.

Do you agree with that statement by the engineer geologist who prepared this report?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. So there is some concern, then, about the strength of this formation to hold a dam of 700-foot height?

Mr. MURDOCK. That is why we made those special tests, so that we would have a definite figure on what the strength was.

Mr. HOSMER. And you say now that this doubt is gone?

Mr. MURDOCK. I am in complete accord with all the Bureau geologists. Mr. Keener stated that the design engineers are satisfied that we can build the type of dam that we have proposed here safely and without any question.

Mr. HOSMER. I believe, however, there was a statement made that if this thing is authorized there will be a great deal more of geologic work done at the site before the final plans are made. Is that true?

Mr. MURDOCK. They will require some more definite information for design purposes. That is true.

Mr. HOSMER. In other words, you do not at this time have all the information you need.

Mr. MURDOCK. We never do at this stage of the game. We always have to go back and get additional information.

Mr. HOSMER. So there may be a possibility that such additional information might, in fact, show that this was not a suitable site for such a dam?

Mr. MURDOCK. I doubt that very much.

Mr. HOSMER. There is a possibility, however. You do not rule it out; do you?

Mr. MURDOCK. I personally do.

Mr. HOSMER. What if you should find at the base of the dam a serious faulting of some kind or other?

Mr. MURDOCK. Well, in that case we would move upstream a couple of hundred yards.

Mr. HOSMER. But that would be such a possibility as I have mentioned; would it not?

Mr. MURDOCK. Yes.

Mr. HOSMER. And there are other possibilities that might exist; are there not?

Mr. MURDOCK. I can't think of one.

Mr. HOSMER. Let's go over to page 18, and I will ask you about another statement, which is:

A Navaho sandstone forming the canyon walls at the site is not strongly cemented and would not make good quality riprap.

First, tell me if you agree with the statement.

Mr. MURDOCK. I do.

Mr. HOSMER. What is riprap?

Mr. MURDOCK. Riprap are blocks of rock that are placed in areas to protect the structure, to prevent wave action from washing away the structure. They are used on the upstream face of earth dams quite frequently. If you want to break up the wave action, use riprap.

Mr. HOSMER. Now directing your attention to the geologic map again and to drill hole 4: That went down 169 feet in to the sandstone. That is right near the arc of the dam. And to get to the sandstone which is penetrated, it had to go through 106 feet of river fill at that point; is that right?

Mr. MURDOCK. Where do you get that figure?

Mr. HOSMER. I will strike that question, so that we don't take any more time on it.

Now, in connection with hole No. 4, it was found that the sandstone at that point was weakly cemented; was it not?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. It was also found that it was weakly cemented at No. 19?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 13?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 20?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 25?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 17?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 14?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 6?

Mr. MURDOCK. Yes.

Mr. HOSMER. No. 23?
Mr. MURDOCK. Yes.
Mr. HOSMER. No. 22?
Mr. MURDOCK. Yes.
Mr. HOSMER. No. 21?
Mr. MURDOCK. Yes.
Mr. HOSMER. No. 24?
Mr. MURDOCK. Yes.
Mr. HOSMER. No. 10?
Mr. MURDOCK. Yes.
Mr. HOSMER. That is a total of 13 holes. How many holes were drilled all together?
Mr. MURDOCK. There were 25 holes drilled all together, and the rock was weakly cemented on all of them, but that does not prevent it from being strong enough to build a dam on.
Mr. HOSMER. This is a weakly cemented sand dune; is it not?
Mr. MURDOCK. A weakly cemented sandstone.
Mr. HOSMER. It was a sand dune before it became a sand stone?
Mr. MURDOCK. It was a sand dune before it became a sandstone. Shale was a mud puddle before it became shale, too.
Mr. HOSMER. And the fact that this sand dune became weakly cemented made it sandstone; is that right?
Mr. MURDOCK. When it became cemented, it became a sandstone.
Mr. HOSMER. But it is only weakly cemented; isn't it?
Mr. MURDOCK. That is true.
Mr. HOSMER. Now, I am going to ask you about another gentleman, named Herbert Ernest Gregory. Did you ever hear of him?
Mr. MURDOCK. Yes.
Mr. HOSMER. Who is he or was he?
Mr. MURDOCK. He was an eminent geologist with the United States Geological Survey.
Mr. HOSMER. He prepared a professional paper, entitled "Geology of the Navaho Country." Are you familiar with that publication?
Mr. MURDOCK. Yes; I have seen it.
Mr. HOSMER. I am going to refer you to a statement by Professor Gregory at page 59 of this document, which is as follows:

> The significant features of the Navaho sandstone are uniformity of grain, crossbedding, and red colors. Specimens taken from locations 200 miles apart are indistinguishable in the laboratory by texture or composition or color. Tangential crossbedding is persistent.

Do you agree with that statement?
Mr. MURDOCK. I do.
Mr. HOSMER. I refer you to another statement on page 59:

> The structure and composition of the rock suggest aridity and the uninterrupted control of the winds, and the live dunes now being formed on the floor of the Chinle Valley differ only in color from the frozen dunes displayed in the bordering rocks.

Do you agree with that?
Mr. MURDOCK. I do.
Mr. HOSMER. Now, you would not put a dam on these live dunes over in the Chinle Valley; would you?
Mr. MURDOCK. No.
Mr. HOSMER. You would put it on the weakly cemented dunes at mile 15?

Mr. MURDOCK. They were vastly different. The strength of this rock is entirely adequate to support the dam we are proposing to put on it.

Mr. HOSMER. Does water percolate pretty fast through sand, uncemented sand?

Mr. MURDOCK. You would have to qualify the size of the sand. Water percolates through coarse sand.

Mr. HOSMER. Let us assume that the size of the sand is the same as the size of the sand that has composed these Navaho sandstones.

Mr. MURDOCK. The water would not percolate fast through the type of sand that is in the Navaho sandstone.

Mr. HOSMER. Do you know what the permeability rate would be?

Mr. MURDOCK. No, but it would be slightly faster than it would be through this sandstone.

Mr. HOSMER. There is no doubt about the fact that it would get through, though, is there?

Mr. MURDOCK. No. Given a length of time, it would eventually get through.

Mr. HOSMER. I believe earlier you told me that the extension of the reservoir up the San Juan River was 15 miles. Is that not supposed to be 70 miles? Any one of you can answer that question.

Mr. KEENER. About 65 miles, I think.

Mr. MURDOCK. The San Juan River?

Mr. KEENER. Up to the San Juan River from the dam at Glen Canyon.

Mr. LARSON. 71 miles.

Mr. HOSMER. 71 miles. And how far up the Colorado River at this point would that reservoir go?

Mr. LARSON. 186 miles.

Mr. MURDOCK. Those are river-miles, however.

Mr. HOSMER. What is the difference?

Mr. MURDOCK. The river meanders around. If you take an airline distance, it would be much less.

Mr. HOSMER. I understand that. But is it not a fact that the stored water in the reservoir will meander around that same course?

Mr. MURDOCK. Well, it flows out on the shoreline. The shoreline of the reservoir would be much straighter than the meandering of the stream.

Mr. HOSMER. Well, at least we have got a total of 357 miles—correction, 257 miles—along which that reservoir is going to extend on both sides of this river. Is that correct?

Mr. MURDOCK. On both sides of the river. I think that is right.

Mr. HOSMER. And along these sides of the river, you have either got the Navaho sandstone or these other formations that you mentioned; is that right?

Mr. MURDOCK. There are several formations besides the Navaho.

Mr. HOSMER. I think we discussed that. It is going to be one or the other of them, is it not?

Mr. MURDOCK. It is going to be the Triassic, Paleozoic, or the San Rafael group.

Mr. HOSMER. I do not think we have discussed the San Rafael group. What is that?

Mr. MURDOCK. Those are the Summerville, Entrada, Carmel, and Morrison formations. They will be encountered in the reservoir area upstream and on the west side of the reservoir basin.

Mr. HOSMER. How far upstream will they be encountered?

Mr. MURDOCK. About 15 miles upstream.

Mr. HOSMER. This Navaho formation extends only 15 miles upstream?

Mr. MURDOCK. It extends upstream approximately 40 miles, but it isn't continuous at all places. The other formations dip down and raise up again.

Mr. HOSMER. Well, at least we have got all the way along walls which are going to support the storage reservoir, have we not?

Mr. MURDOCK. Yes, sir.

Mr. HOSMER. Now, I want to ask you this question. And we will assume that the thing extends for 250 miles instead of this 257 figure that I arrived at. And I presume that the average depth of the reservoir would be somewhere around 200 feet.

Mr. MURDOCK. Yes.

Mr. HOSMER. In other words for a distance of 250 miles, it would have an average of 200 feet of canyon wall exposed which the water would touch if it were stored.

Mr. MURDOCK. You are counting river-miles. That is true.

Mr. HOSMER. Now, if the water seeped outward half a mile from each side of the reservoir for an average distance of 200 feet into the exposed sidewalls, what would be the volume of sandstone that that would fill?

Mr. MURDOCK. Well, there again, you can't use river-miles for that kind of a computation. You have got to take linear miles. Because it would interfere with one another. If you went around the bend, you would have the same area taken twice.

Mr. HOSMER. Well, I understand that, too. And as you cover over these smaller flat areas, you would have penetration of water down into them, so you would have to add those as well as take it away somewhere else.

My point is that you would have a vast area into which water can seep from this reservoir. That is true?

Mr. MURDOCK. It would be a vast area, but it would not equal 200 feet for so many miles.

Mr. HOSMER. I have calculated this, that assuming you have 250 miles of canyon walls and an average depth of 200 feet, you would have a volume of around 32 million acre-feet of rock into which this water might go through the porous Navaho sandstone. That is a lot of water. I just point that out to you in connection with not the dam itself or its structural foundations but the problem of the reservoir after you have got the dam built.

And at this point, Mr. Chairman, I would like to renew my request to include the geologic map in the record.

Mr. ASPINALL. With the understanding that the color cannot be reproduced.

Unless there is objection, it is so ordered.

Hearing none, it is so ordered.

(The map referred to is herewith inserted.)

Mr. DAWSON. Would you yield to me for a question of Mr. Murdock at that point?

Once the sandstone was filled with water, permeated as you say, would it then be required to fill it again? Would it seep off to a farther distance than the 200 feet?

Mr. MURDOCK. No, sir. The water table slopes into the reservoir basin. And I have made some calculations on the amount of water that would seep into this Navajo formation, assuming a water table, with the data we have. I get a figure of 2 million acre-feet. This will be bank storage. The water goes into the sandstone as the reservoir fills up, and when the reservoir goes back down again, it will slowly come back again into the reservoir.

That kind of storage we consider our most efficient, because we have no evaporation on it. It goes back into the rock, and when your reservoir level falls down—which is when you need it the most—it will come back out of the rock into your reservoir.

Mr. HOSMER. In other words, that is just part of the storage reservoir, the holding of that water in the rock?

Mr. MURDOCK. That is extra storage. And 2 million acre-feet is the maximum. And that will take a period, we figure, of approaching a hundred years to complete and fill. So that annually it is insignificant.

It might be of interest to know that the bank storage at Lake Mead has been calculated at 3,200,000 acre-feet. So this is only two-thirds as much in this reservoir as we have down at Lake Mead.

Mr. HOSMER. You say that although this water percolates from 15 to 50 miles away from the river down to the river, you are going to have only some small amount of percolation back up into these walls?

Mr. MURDOCK. You asked me how far back this sandstone extends. You must remember that the rain falls on all the area. All the water has to do is go vertically downward to the water table. It does not have to go laterally that far.

Mr. HOSMER. When it reaches the water table, you told me there was a flow of these ground waters into the Colorado River.

Mr. MURDOCK. That is right.

Mr. HOSMER. So there is, in addition to a vertical movement, a horizontal movement, is there not?

Mr. MURDOCK. That is right.

Mr. HOSMER. And there is no reason, if it goes in one direction, that under other circumstances it might not flow in the other direction; is that not correct?

Mr. MURDOCK. You would have to show me there was an absence of water there. It can go one direction into the river, but it cannot go back the other way. When water runs in one direction, you cannot run it in the other direction, too.

Mr. HOSMER. So long as you have, in my understanding of physics, a greater pressure on one side than you have on the other, there will be a flow to the side of lesser pressure; is that not correct?

Mr. MURDOCK. That is true.

Mr. HOSMER. And if you put pressure of a greater amount than now exists in the lateral flow, you are going to reverse that flow; is that right?

Mr. MURDOCK. That is true.

Mr. HOSMER. Now we are getting some place.

Mr. ASPINALL. May the Chair inquire just how much longer you will take?

Mr. HOSMER. About 15 minutes longer; that is all.

Mr. Larson, would you review for the committee the location at which you are going to put this protective dam for Rainbow Bridge, in relation to Rainbow Bridge itself?

Mr. LARSON. The protective dam, if it is decided that it should be built, will be about 1 mile downstream from the Navaho Bridge.

Mr. HOSMER. One mile downstream from Rainbow?

Mr. LARSON. Yes; from Rainbow Bridge.

Mr. HOSMER. It would be about a mile away?

Mr. LARSON. That is right.

Mr. HOSMER. And you also say that there is going to have to be a tunnel on the other side of Rainbow Bridge.

How far on the other side of Rainbow Bridge would that be?

Mr. LARSON. That will be about 1 mile upstream from the bridge if it is decided that it should be constructed.

Mr. HOSMER. Now, in general, the construction of the dam at this point would be carried on in the same way as it would be carried on at mile 15; would it not?

Mr. LARSON. Well, yes, but it is a very much simpler structure.

Mr. HOSMER. But you would have to dig into the canyon walls for the anchorage and clean up the mess you made and then put in the dam; wouldn't you?

Mr. LARSON. Not to the same extent. It is much lower, only 210 feet high. It hasn't any spillways or outlet works and involves no danger of any kind.

Mr. HOSMER. Well, now, that is what I am getting into, Mr. Larson. Mr. Keener or somebody told me that this was Navaho sandstone. Then Mr. Keener testified that the only way you could get into it was to blast it, either when you are footing up a dam or when you are digging a tunnel.

Mr. LARSON. That is correct.

Mr. HOSMER. And here within a mile on either side of this fragile Rainbow Natural Bridge, you are going to be blowing off a lot of dynamite. And I am not convinced that you are not going to blow down the bridge in the process of trying to protect it.

Mr. LARSON. Well, the term of using dynamite is used very loosely. You can use large blasts, or just half a stick of dynamite and remove a little piece of rock at a time. Certainly every precaution would be used so as to not to disturb the bridge.

Mr. HOSMER. When you take all these precautions, they all cost money; do they not? And you told me you were going to put in a protective dam there just dirt cheap.

Mr. LARSON. I said maybe it would cost 1 or 2 million dollars. It is insignificant; that is, it is within the contingency factor that we have for the $421 million estimate for the Glen Canyon unit.

Mr. HOSMER. You have never even told this committee what your contingency factor amounts to; have you?

Mr. LARSON. I haven't it here but, as I recall, it is in excess of 15 percent. And that is a very, very large figure on $421 million.

Mr. HOSMER. I hope that the wilderness groups in this country can get more satisfaction from you gentlemen than I have with respect to your protection of this great scenic beauty in the area in which you are going to be blowing off your dynamite.

There is only one other angle that I want to discuss on that, and that is this: If you have seepage at mile 15, Glen Canyon, you are going to have seepage at this protective dam; are you not?

Mr. LARSON. There may be some.

Mr. HOSMER. Is that going to collect up in a pool behind there and back up under Rainbow Arch?

Mr. LARSON. No, sir; our plans there, if that is the case, would call for a pump to pump the water out of the pool over or through the protective dam into the reservoir.

Mr. HOSMER. You are going to have to pump a head of 250 feet of water; are you not?

Mr. LARSON. When the reservoir is full, yes.

Mr. HOSMER. You would have to pump it whether it was full or not, to get it over the top of the dam. You are not going to pump it through the dam; are you?

Mr. LARSON. Perhaps, but it appears there will be very little water to be pumped, because that is a dry creek. Only during certain times of the year is there any water, and if we had a catchment basin upstream and diverted the water through the tunnel during cloudbursts or something like that, the amount of water to be pumped would be insignificant for the whole project.

Mr. HOSMER. You understand, do you not, though, that your engineers in SP-30 have told us that if you go ahead and get that Rainbow Natural Bridge wet and soaked up with water, you are going to reduce its strength? And that might even pull the bridge down.

Mr. LARSON. The reservoir, as planned for the 700-foot Glen Canyon Dam, does not raise the reservoir water surface sufficiently to get up under the bridge.

Mr. HOSMER. It does if you do not pump it out over 200 feet; if you do not build the protective dams.

Mr. LARSON. The maximum water surface with 26 million acre-feet at Glen Canyon is still below the abutments of the Rainbow Bridge.

Mr. HOSMER. How far away from the abutments would it be, just roughly? You are going to have to take a dam 200 feet high a mile away from it in order to hold back the river. So that canyon must be pretty steep. It must travel 200 feet up in an awful hurry.

Mr. LARSON. It is a very steep canyon.

Mr. HOSMER. Would it be half a mile? Three-quarters of a mile?

Mr. LARSON. I can tell you in just a moment, Mr. Hosmer.

Mr. HOSMER. If you have difficulty, we will forget it.

We know it goes up there somewhere. If you people do not know where it goes, I think it just reflects the fact that you have not thought this thing out very far.

Mr. LARSON. Looking upstream, the left abutment of the dam is back from the narrow canyon, containing the water, about 1,200 feet, and on the right abutment, the right side of the canyon looking upstream, the abutment of the bridge is back a minimum of 200 or 250 feet.

Mr. HOSMER. Two hundred and fifty feet away.

Mr. LARSON. Yes, sir; and if the water from Glen Canyon at full capacity was allowed to back up that canyon, it still would not quite fill the canyon under the abutments of the bridge.

Mr. HOSMER. Then you you would have 250 feet of absorptive Navaho standstone between the water and this great natural scenic site.

Mr. LARSON. It is possible that the water table is already there under the abutments at some depth.

Mr. HOSMER. But you do not know.

Mr. LARSON. Mr. Murdock can answer that question.

Mr. MURDOCK. We do not know exactly what the water table is under the bridge.

Mr. HOSMER. I think that is all for the geologists.

I hope you have a pleasant trip back to Colorado.

Mr. DAWSON. According to the theory of physics that the gentleman from California mentioned, of the water going where the least pressure is, there would be a smaller pressure going from the 250 feet up to the base of the Rainbow Bridge than there would be down the other direction, would there not?

Mr. MURDOCK. There would be no chance of ground water percolation going up under the bridge if that barrier is built. Some water may appear in the canyon above the dam but a very small pump would take care of it.

Mr. DAWSON. That is all.

Mr. HOSMER. There is one other question I think we had better have Mr. Larson explain before he leaves.

Mr. Larson, I am going to refer to your report, on page 15, where you speak of the legal framework, about the third sentence down, talking about the power projects and others, and you say, "These would be constructed, operated, and maintained by the Bureau of Reclamation as far as water is concerned, would be operated in conformance with the Mexican Treaty, the Colorado River and upper Colorado River Basin compacts."

I want to ask you if it would also be operated in compliance with the Boulder Canyon Project Act, the Readjustment Act thereof, and any existing contractual obligations of the Government, which I think is what is required by the bill.

Mr. ASPINALL. If the contracts, Mr. Hosmer, are made in conformity with the acts which you have named.

Mr. LARSON. Only to the legal obligations, I assume.

Mr. HOSMER. Yes, the legal obligations. Is that right? You would operate them in that manner?

Mr. LARSON. Yes.

Mr. HOSMER. That is all I want.

Mr. ASPINALL. Mr. Larson, Mr. Murdock, and Mr. Keener, we are very appreciative that you have made yourselves available here for these rather full and inclusive hearings, and for your cooperation which you have shown to the committee at all times.

Thank you very much, and you are excused from any further hearings on this matter.

Mr. HOSMER. Mr. Bennett, I would like to start out by trying to clarify something here.

I think that as these hearings have been prolonged and as we keep talking about the upper basin and the upper-basin States, we have come to view this thing as a project that those States are doing.

Now, actually, this project is being proposed for construction by the United States Government, is it not?

Mr. BENNETT. That is correct, sir, with water users obligated to make repayment required under section 3 of the bill.

Mr. HOSMER. As a matter of fact, the United States Government would sell directly to water users; is that right? To irrigation districts?

Mr. BENNETT. That depends on your interpretation of reclamation law, Congressman, inasmuch as the bill distinctly contemplates, in section 4 and also in section 3, that water users will enter into repayment-type contracts rather than utility-type or service contracts.

Mr. HOSMER. But these water users are not other agencies of the Federal Government, but they are either local agencies or individuals; is that correct?

Mr. BENNETT. That is right. I only wish to be sure that we were not implying here that the Government was assuming a utility position in this project. It distinctly is not.

Mr. DAWSON. Is there any difference in the repayment procedure in this case than any other reclamation project?

Mr. BENNETT. Oh, yes, there is. In fact, the procedure is much tighter as spelled out in this bill than it is in the Central Valley project, because there it has been the practice to enter into section 9 (e) contracts, where the obligation assumed by the water users is a water service charge and not an amortization of the capital expense. Here the type of obligation which the water user must assume will be a repayment obligation, which will be based on an amortization of his share of the construction cost.

Mr. DAWSON. Then one of the contracting parties, at least, is the United States Government?

Mr. BENNETT. That is correct.

Mr. HOSMER. Mr. Chairman, before this piece of Navaho sandstone gets lost or thrown around here, I would like to ask that it be made a part of the file.

Mr. ASPINALL. We will keep it until it is destroyed by just natural processes.

Mr. HOSMER. When we speak of the compact and these other legal documents, I think what we are trying to do is to see who builds, manages, and operates this project, so as not to interfere with them; is that right?

Mr. BENNETT. I believe that is a fair statement, Congressman. That is right. Over the years a body of law has been established which is sometimes referred to as the law of the river, and I think the basic intent, as expressed in the bill, is that that law of the river shall be complied with.

Mr. HOSMER. At least, with respect to the Colorado River compact, which is an agreement between seven States, we are trying to fit this project in so as not to violate that compact.

Mr. BENNETT. That is correct, sir.

Mr. HOSMER. It is kind of a third party affair with respect to the Government.

Mr. BENNETT. I would not describe it quite that way in the case of this bill.

Mr. HOSMER. The United States Government is not one of the contracting parties?

Mr. BENNETT. Well, not a party to the compact itself. It was an interstate compact which was approved by the Congress.

Mr. HOSMER. Yes. That was a condition to its effectiveness, rather than making the Government actually a part of it; was it not?

Mr. BENNETT. Yes. The point I wanted to make was that the bill requires that this project be constructed and operated in accordance with reclamation law, except insofar as specific requirements are imposed.

Now, among the specific requirements imposed here is one requiring that the project shall be constructed, operated, and maintained in accordance with the compact.

Mr. HOSMER. Which actually, under contract law, the Government would be obliged to do anyway; would it not?

Mr. BENNETT. I think so, here, particularly in the light of section 8 of the 1902 Reclamation Project Act, which directs that officers and agents of the Government, in constructing, operating, and maintaining reclamation projects, shall comply with and conform to State law. So, in a way, under the proposed legislation the Federal Government is actually subordinated to the States' rights and States' position insofar as the Colorado River is concerned.

Mr. HOSMER. Perhaps I can get at the distinction that I would like to make this way. The Government made a treaty with Mexico with respect to this river, too. That was actually a contract with Mexico, in which the United States Government and the Mexican Government were the contracting parties.

Mr. BENNETT. That is correct.

Mr. HOSMER. And with respect to the compact, the United States is not a contracting party but must conduct its operations so as not to interfere with this agreement between the States.

Mr. BENNETT. Certainly this bill makes that very clear.

Mr. HOSMER. All right. Then, turning to the compact, and article III (a), which makes the 7½ million acre-feet apportionment to the respective basins, I will ask you: What is your understanding as to what was apportioned in that article?

Mr. BENNETT. Exclusive beneficial consumptive use of so much water to each basin.

Mr. HOSMER. Well, now, in your testimony last Monday, you left the impression, from the words you used, that there was being physically apportioned an amount of water rather than the beneficial consumptive use.

Mr. BENNETT. Well, that certainly was not intended. I think everyone interested in this subject has occasionally slipped into expressing article III (a) as an apportionment of physical water, whereas, in fact, article III (a) apportions beneficial consumptive uses in stated amounts.

Mr. HOSMER. Then I think we are agreed on that. We are agreed on that.

We are not talking about water in III (a) as such. We are talking about beneficial consumptive uses of the water.

Mr. BENNETT. That is correct.

Mr. HOSMER. Now, does this III (a), in your view, apply just to the waters in the main stream, or does it cover all the waters of the whole Colorado River system?

Mr. BENNETT. Congressman, I will put it this way. I have a personal opinion on that. However, I don't think that it would be particularly meaningful in the consideration of this bill for the reason

that, as you know, the question is very much in litigation between Arizona and California. Unless it has some direct relationship to this bill, I think it might be out of order for me to give you a personal opinion on that.

Mr. HOSMER. Well, I think it does have a relationship to this bill, and I would like to know what the view of the Department is.

Mr. BENNETT. I do not know the view of the Department. I said I can give you a personal opinion.

Mr. ASPINALL. Let the Chair interject. That is exactly what Mr. Bennett suggested. He is in no position at this time to give the view of the Department. His personal opinion, removed from his present responsibility, he will give to you if you wish it.

Mr. HOSMER. It was my understanding, Mr. Chairman, that the purpose of this questioning of the legal representatives of the Department was to ascertain the views of the Department with respect to this.

Mr. ASPINALL. The Chair must suggest to his colleague that anything that has to do with interpretation of the lawsuit that is now before the courts is not in issue at this time and will not be in order unless the Secretary himself wishes to come up here.

Mr. HOSMER. Now, let me say this, Mr. Chairman. I think we have had able and competent testimony before the committee that there are a number of issues which are before the Supreme Court which bear directly on this project, and the determination of those issues, in Arizona versus California, will have an effect on the way this project is operated and managed.

Mr. ASPINALL. The Chair will admit with his colleague that the opposition witnesses from California have brought that issue into the hearings. The Chair insists that no representative of the Department has brought that issue into these hearings; and that this witness of the Department does not have to answer that question.

Mr. HOSMER. I wish, for the record, Mr. Chairman, to state that I do not feel that under such a limitation I am being permitted to go into some matters which are very fundamental to this proposed project, and that for that reason I think we may not disclose in our hearings some elements which are highly important to a reasonable decision as to whether this particular project should or should not be authorized.

Mr. ASPINALL. For the benefit of the record, did your chairman deny to you the right to use all the time you wished, to examine the very able and effective witness, Mr. Ely, as he was before you, and as he made his presentation? Did not your chairman let you go to any extent that you wished in that respect?

Mr. HOSMER. That is correct. And he brought up one of the legal things that apparently this committee wishes to close its eyes to as being inexorably entwined in that whole issue.

Mr. ASPINALL. The record shows the position of the witness and the position of the cross-examination. The gentleman will proceed.

Mr. HOSMER. Well, Mr. Bennett, suppose you tell us what you mean by "beneficial consumptive use."

Mr. BENNETT. That term, so far as I know, has not been defined as used in this compact in any court adjudication. I can cite you, for example, to a statement made by Mr. Carpenter, Colorado's commissioner, in which he said that storing water for the generation of power

and any losses that were incident thereto, constituted beneficial consumptive use. Now, I am not taking that position.

What I am pointing out is that there are a variety of interpretations of the meaning of "beneficial consumptive use."

Mr. HOSMER. Well, what does the Department figure that it means?

Mr. BENNETT. So far as we have been able to determine from the project plans that were prepared by the regional office and approved by the Department, it would not be necessary to determine that question in all of its various ramifications if the project were built as proposed in H. R. 3383 and a number of these other bills, such as S. 500 which passed the Senate.

Mr. HOSMER. Well, now, Mr. Bennett, that is exactly what I am getting at. You have assumed that it does not make any difference.

Mr. BENNETT. I can explain why.

Mr. HOSMER. And I think we can find out that it does make some difference, if I am permitted to go ahead and question you. And so, suppose you answer the question as to what the Department feels that it means.

Mr. BENNETT. Well, I know that the Department believes that domestic and agricultural uses are manifestly beneficial consumptive uses. That much I know for certain.

Now, those terms "agricultural and domestic uses" are defined in the compact. We accept those as beneficial consumptive uses, certainly.

Mr. HOSMER. Is that what the Department understands it to mean, then?

Mr. BENNETT. We have not had occasion to rule on the question whether other uses also are included in those terms.

Mr. HOSMER. In other words, the Department then does not at this time know exactly what beneficial consumptive uses are?

Mr. BENNETT. We have not had occasion to rule on it. I am not meaning to imply that the interpretive material that is available to us in the reports of the negotiators to their various principals and to the Congress when this compact was ratified by the States and agreed to subsequently by Congress would not provide an ample base upon which to determine an adequate and supportable legal conclusion on the point.

Mr. HOSMER. Well, the term is defined in the Boulder Canyon Project Act, is it not?

Mr. BENNETT. As I recall, I believe it is.

Mr. HOSMER. And likewise in the treaty with Mexico, is it not, at least by inference?

Mr. BENNETT. That is correct.

Mr. HOSMER. And those definitions are substantially the same?

Mr. BENNETT. Substantially the same, yes.

Mr. HOSMER. And those, then, apply first to the lower basin and second to Mexico, which is also along the river.

So I would assume that it would be necessary for the same definitions to pertain in the upper basin as they do in these other two areas.

Mr. BENNETT. Oh, I think without doubt the definition "beneficial consumptice use" is the same in the lower basin and in the upper basin under the compact.

Mr. HOSMER. Then, so long as it has been defined in the treaty and in the Boulder Canyon Project Act, can we not say that that is what applies in the Colorado River compact?

Mr. BENNETT. I don't think that is a complete answer to the question. I pointed out that the commissioner for one State stated his opinion that generation of power was a beneficial consumptive use. Now, I am not taking that view, you understand. I am merely pointing out that the definitions in the Boulder Canyon Project Act and the Mexican Treaty, while they might be meaningful and might be very persuasive, are not necessarily conclusive on the question.

Mr. HOSMER. But did you not tell me that the definition had to be the same thoughout the basin, and it has been defined in two areas of the basin, and that leaves this third area? How do you reconcile what you have said with that?

Mr. BENNETT. I said that the use of the term "beneficial consumptive use" in the compact would have the same meaning anywhere in the basin, except possibly as to Mexico. Mexico has no rights under the compact, as you well realize.

Mr. HOSMER. I understand that.

There has been a definition of "beneficial consumptive use," which you say is substantially the same as found in the Boulder Canyon Project Act, and if you were to divide the river into three parts, you would divide it into upper basin, lower basin, and the Mexican portion.

And it was found that the definition was applicable in two of those parts.

And I am going to ascertain whether or not it is almost mandatory that it would be applicable in the third part.

Mr. BENNETT. I do not say that it is mandatory. I think it is very persuasive, Congressman.

Mr. HOSMER. Both the Mexican Treaty and the Boulder Canyon Act were made subsequent to the compact and based to some extent on the compact and probably what the people at those times understood the compact to mean; is that not right?

Mr. BENNETT. I think they would be persuasive, in fact. But in the end, the decision as to the interpretation of that phrase under the compact would rest with the courts, which would be the proper place to determine it.

Mr. HOSMER. Yes. I was not asking you what the court would define that to mean. Only what the Department would.

Mr. BENNETT. As I say, we have had no occasion to come to a final decision on that point.

Mr. HOSMER. And it is your opinion that this bill does not present any occasion on which you will have to come to a decision?

Mr. BENNETT. That is correct, sir.

Mr. HOSMER. I will delve into that a little bit more later, then.

Mr. BENNETT. I anticipated that, Congressman.

Mr. HOSMER. I would like now to find out as best I can an understanding of a highly nebulous concept, and that is the meaning of "apportion" as used in III (a), in connection with beneficial consumptive uses. I bring it up this way.

Seven and a half million acre-feet of water per annum is the proportion of the use of the upper basin. We call that III (a) water.

Now, does it become III (a) water when it is in the river, or does it become III (a) water at the time that it is brought to beneficial consumptive use?

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Mr. BENNETT. It is not too clear to me just what you mean. I would put it this way, Congressman, and maybe that will give you the picture that I have in my own mind. It is the beneficial consumptive use of the water which is apportioned. We both agreed on that.

Now, from that point on, III (a) is silent. And I would interpret III (a), in the absence of any other limitations in the compact, as meaning that either a lower basin State or an upper basin State could do whatever was reasonable, such as diverting into canals or into flumes or whatever might be a reasonable method of putting the water to beneficial consumptive use.

So I don't think that the water physically becomes what I would call III (a) water. We start from the premise that it is the beneficial consumptive use of the water which is apportioned.

Mr. HOSMER. Then it is just wet water until it is in some manner beneficially consumptively used.

Mr. BENNETT. Well, in general, I would say that is correct.

Mr. HOSMER. So that is a different concept than the straight quantity concept.

Mr. ASPINALL. Would my colleague yield there?

Mr. HOSMER. Yes.

Mr. ASPINALL. And belonging, as I understand it, to the States in which the water is present at the time of consideration of the question which you just asked?

Mr. HOSMER. Just a moment. I do not understand what you mean by "belonging."

Mr. ASPINALL. I mean it is the property of.

Mr. HOSMER. Are we getting over to a property right in this water now?

Mr. ASPINALL. You have brought up a very technical question here as to apportionment and as to who has control of the water and as to when it got into this and that status. And, as I understand the laws of the Wesern States, the property right is involved until it escapes from the State itself. And I just wished the committee to understand that if we want to follow this through in our argument, we get into some devious matters which are almost impossible of explaining.

Mr. HOSMER. I would just say to the chairman that to the extent to which the compact pertains, I believe we have lifted this out of the general so-called law of the river, which the chairman has been explaining.

Mr. ASPINALL. The gentleman's chairman was just saying that he does not follow through with the gentleman from California in that respect.

Mr. HOSMER. Well, then, let us say we are trying to determine where that certain place is. And my questions to Mr. Bennett are laying a foundation for that determination.

Well, at least we have got something here, Mr. Bennett, where we are applying the compact as a legal document to the water, which is a physical substance, I believe. Is that right?

Now I would like to get from you an understanding of how this beneficial consumptive use to which the upper basin is entitled is measured. Can you answer that?

Mr. BENNETT. I am very much aware of the fact that that matter is in issue between the States of Arizona and California in the lawsuit we mentioned before.

I would say this, however, that the witnesses for California brought out that the differences in measurement theory would involve no more than half a million acre-feet of water as between the upper and lower basins.

Mr. HOSMER. Yes, but, Mr. Bennett, I am asking you not what the difference is if we use different meanings, but I am asking you what the meaning is that you believe is correctly applicable to the measurement of beneficial consumptive use.

Mr. BENNETT. That matter is definitely in litigation, and I do not believe that it would be either appropriate, or necessary to a consideration of this bill. And I am not authorized to express an opinion.

Mr. ASPINALL. Let the chairman ask this: Is the gentleman in a position to answer the question?

Mr. BENNETT. I am not. I have a personal opinion, but that is not meaningful here.

Mr. HOSMER. Am I to understand, then, that the place of measurement of beneficial consumptive use has no bearing whatsoever on this legislation, except only insofar as possibly a half a million acre-feet of water a year would be concerned?

Mr. BENNETT. That was estimated by the California witnesses as being the possible effect as between the upper and the lower basins.

My answer on the point is that the total uses involved in the largest package before this committee would not push consumptive uses in the upper basin above 4.8 million acre-feet of water per year. Hence, it has not appeared necessary to resolve the question, and the Department has not done so.

Mr. HOSMER. Well, that may be true, excepting only for the fact that you are apparently in doubt as to what, in fact, is the definition of "beneficial consumptive use." And you hide behind the lawsuit now to avoid giving me an answer as to where whatever they are are to be measured.

Mr. BENNETT. Well, I am not hiding behind the lawsuit. I am trying to explain that I have not been authorized to express an opinion on that officially, for the reason that the Department has reviewed the matter and has come to the conclusion that it is not necessary to the resolution of the policy issues involved in the bills before this committee. That is all I am saying, Congressman.

Mr. HOSMER. Well, then, let us avoid the lawsuit and let me ask you this question. I believe, in general, there are two different ideas as to where beneficial consumptive use is measured, are there not?

Mr. BENNETT. That is correct, sir.

Mr. HOSMER. And would you explain what they are?

Mr. BENNETT. Well, one is known as the diversion-less-returns method, sometimes described as the place-of-use method of measurement. That calculates the amount of water diverted for the use, and it calculates the amount of water which returns to the stream after use. The difference is the amount of water consumptively used.

The other method is known as the depletion theory, and that one picks a point on the river and calculates the virgin flow at that point and measures the use in terms of the depletions at that given point on the river.

Mr. HOSMER. And in connection with the Colorado River, that point is Lee Ferry under that theory.

Mr. BENNETT. Under that theory, Lee Ferry is the point which is alleged to be the place of measurement for upper basin uses.

Mr. HOSMER. Now, I would assume, since the compact covers the whole river, that the definition of the term, whichever one of the two definitions you have given for measurement, would apply equally in both basins.

Mr. BENNETT. Under the compact, that would be my view, and I am sure it is the view of the Department, too. There are not two methods.

Mr. HOSMER. That is right. You would not use one in one basin and the other in the other basin.

Now, does not the Boulder Canyon Project Act and the Bureau's interpretation of it, and operations in the lower basin utilize the meaning that it is to be measured at the place of use, rather than downstream depletion?

Mr. BENNETT. That is my understanding, Congressman.

Mr. HOSMER. Is that not the same situation with respect to the Mexican Treaty?

Mr. BENNETT. I can't answer that, on the Mexican Treaty, Congressman. I don't have that in front of me.

Mr. HOSMER. Well, then, just with respect to the lower-basin operations, I suppose that would be in the same category as we discussed in connection with another definition. That would be of some persuasion in connection with an ultimate determination, the fact that it is already being used in one sense in the lower basin.

Mr. BENNETT. I think that is correct.

Mr. HOSMER. Now, Mr. Bennett, if the depletion theory is used, when you store water at Glen Canyon and Echo Park there is a depletion at Lee Ferry which is measurable by the amount of the storage, roughly.

Mr. BENNETT. Yes, that is correct.

Well, I would put it this way. The question there is: What year is the depletion chargeable to? That is the logical question that comes up. The evaporation, certainly, would be chargeable as of the year in which the evaporation took place. Now, there is certainly a question there.

Mr. HOSMER. Irrespective of which year you charge it to, I think Mr. Larson, in filling the reservoir the other day, in response to my question, spoke in terms of depletion at Lee Ferry.

Mr. BENNETT. I think so, because it was a ready measure under our presently known data about the water supply in the river.

Mr. HOSMER. That seems to be the attitude of the Bureau, as a matter of fact, is it not?

Mr. BENNETT. I don't believe that the Bureau has any particular attitude. It just so happens that the best available data on the water supply in the river is expressible in those terms. For convenience, as well as perhaps interpretive reasons, the parties to the Colorado River compact agreed among themselves that their apportionments to each other under the upper basin compact would be measured in terms of depletion at Lee Ferry.

Mr. HOSMER. Well, if we cannot get an answer as to what the Bureau thinks, I can at least ask you this question. It appears to be that which

one of the employes of the Bureau, namely, Mr. Larson, believes, does it not?

Mr. BENNETT. Well, the best way to handle that, Congressman, would be to ask him. I don't know.

Mr. HOSMER. I asked you the other day to listen to his testimony very carefully and to stop him if he was doing anything illegal. And what would be your conclusion, then, from what you heard him say?

Mr. BENNETT. I don't believe he was attempting to express any particular legal theory of measurement. He had data before him which expressed water availability in terms of Lee Ferry figures. It was a very ready handy measure of expression there.

Mr. HOSMER. There was danger to the lower basin, in that its extension brings on the idea that all the upper basin has to let down to the lower basin is the 3 (d) water. I wanted during our colloquy this morning and this afternoon to bring that out.

Mr. BENNETT. I think the figures Mr. Larson used in your hypothetical examples will establish that he did not follow any idea of a legal right one way or the other so far as release of water to the lower basin is concerned. I believe that he allowed more than 7½ million to go down in each case.

Mr. HOSMER. At least, in your opinion, he did nothing illegal during that hypothetical case, or anything which is contrary to the contract.

Mr. BENNETT. I could see nothing that caused me any difficulty, under present conditions of the river and in the light of present uses both in the lower basin and in the upper basin.

Mr. HOSMER. Now, Mr. Larson said he wanted to put that water in storage at Glen and Echo so that he could exchange it at some later time for water to be used upstream at that later time, did he not?

Mr. BENNETT. Yes. That is an accepted engineering technique in the West.

Mr. HOSMER. Now, in relation to beneficial consumptive use, can you tell me whether that water would be used in that manner in the year of storage, or the year that it is actually exchanged some time later?

Mr. BENNETT. Well, here again, from the point of view of the engineer, he is merely saying that he is storing water against future uses.

Mr. HOSMER. I am talking about now; the compact; and the words "beneficial consumptive use." And I am trying to find out with respect to this water that you are storing for exchange, whether it is beneficially consumptively used in the year that it is stored, or the year that it is exchanged.

Mr. BENNETT. I would say this: Just the mere storage of that water is not beneficial consumptive use, in my judgment. Just holding that water does not constitute beneficial consumptive use. In fact, the physical water involved at Glen Canyon, for example, except insofar as there are evaporation losses, would not be consumptively used in the upper basin. It will be consumptively used in the lower basin. We concede that, Congressman. There is no question about it.

Mr. HOSMER. Then, if you stored a million acre-feet of water in 1960, and exchanged it in 1995, 35 years later, you would be making your beneficial consumptive use in 1995 and not 1960.

Mr. BENNETT. The physical water which was in that reservoir would be used in 1995. And the upper basin at the same time would be con-

sumptively using the water which was taken from the headwaters of the stream in 1995.

Mr. HOSMER. That 3 million acre-feet—or is it 1 million acre-feet?—would be charged against the upper basin's 1995 use, since it is beneficial consumptive use

Mr. BENNETT. It is water which is stored. We started out by a complete agreement between us that the apportionments in 3 (a) are not apportionments of physical water. They are apportionments of consumptive use.

Mr. HOSMER. Yes.

Mr. BENNETT. We do not rely on the apportionments made in 3 (a) to find the authority to store water. Nor does the lower basin rely on article 3 (a) to store the water which is stored in Lake Mead.

Mr. HOSMER. Then while this water is in storage at Glen and Echo, it is not 3 (a) water.

Mr. BENNETT. No.

Well, let me say this: I don't like the expression "3 (a) water." That again implies the very proposition which we both agreed was not the case when we opened the examination this morning.

Mr. DAWSON. Will the gentleman yield to me?

Mr. HOSMER. Yes; I will yield.

Mr. DAWSON. Will the gentleman just define what he means by 3 (a) water?

Mr. HOSMER. I did not yield for a question. I will take the witness stand later if you want me to.

Mr. DAWSON. I just think it would be helpful in our examination if we could find what you are getting at here.

Mr. HOSMER. All I am trying to do is find out what the Bureau thinks that is going to manage and operate and build this thing. I am not going to manage, operate, or build it, Mr. Dawson, and when this legislation is disposed of, I hope to be able to go on to something else. So I doubt if my opinion would be worth a hoot and a holler.

I am quite perplexed, Mr. Bennett, as to what the status of this water is while it is in storage.

Mr. BENNETT. It is physical water, just like the physical water which in our opinion the upper basin must deliver to the lower basin, assuming the water is in the stream, under article 3 (d).

Mr. HOSMER. And what, then, is your theory as to the legality, the legal basis, for holding this water in storage?

Mr. BENNETT. That the compact, in the light of the testimony I gave the other day, clearly authorizes——

Mr. HOSMER. You are talking about reading all these things together?

Mr. BENNETT. Absolutely—clearly authorizes the States of the upper basin to store water reasonably required it to meet its commitments to the lower basin under article 3 (d). And that would even assume, Congressman, that article 3 (d) is a wet water commitment, as witnesses for California interests have assumed. We are not arguing that question.

Mr. HOSMER. All right, then; for what purposes, then, do you believe that the upper basin is legally entitled to store water?

Mr. BENNETT. To meet its commitment to the lower basin, to generate electricity, to store water, say, at Curecanti, for irrigation and domestic uses some time in the future. All these are the usual pur-

poses that underlie the storage of water and are based on the regulation of the flow.

Mr. HOSMER. When you said to permit meeting its uses to the lower basin, you were referring to future commitment?

Mr. BENNETT. Well, in general, that is the purpose of storing the water in relation to article 3 (d) of the compact. It is to store water in good years for the purpose of meeting that commitment in the low water years, and at the same time keep diverting water in the upper reaches of the stream for agricultural and domestic purposes in the upper basin under the 3 (a) apportionment to the upper basin.

Mr. HOSMER. This storage, then, bears no relation to any existing obligation? Current obligation, to the lower basin?

Mr. BENNETT. The legal obligation is always present. Article 3 (d) uses language which imposes that obligation at all times.

Mr. HOSMER. The obligation, however, is being met today and has been made, since the compact, without this storage.

Mr. BENNETT. Without looking at the figures, I would not be able to give you a completely accurate answer, but I understand it has been doing that. The lowest 10-year period for which we have data reflected a flow past Lee Ferry of over 100 million acre-feet.

Mr. HOSMER. And I believe your colleague from the Department also testified that your commitment could not be made without this storage even with the beneficial consumptive uses contemplated by the 11 participating projects.

Mr. BENNETT. If we assume that there would be no new private diversions, no increased uses under existing projects, and that the only additional uses on the stream were the 11 projects in the period with which we are dealing the storage might not be necessary to meet immediate commitments.

Mr. HOSMER. As a matter of fact, those are the assumptions which have been made in presenting this to the committee, are they not?

Mr. BENNETT. Not necessarily. The idea that has been expressed in connection with presenting this project to the committee was that the largest combination of projects proposed, when taken together with present and authorized uses, would total 4.8 million acre-feet of water.

Mr. HOSMER. I am talking about projects recommended, the 11 recommended.

Mr. BENNETT. The 11 recommended would involve a depletion of approximately 1 million acre-feet of water per year, if I remember correctly.

Mr. HOSMER. As I understood the testimony of the witnesses, this storage was not necessary either for meeting the commitments at present or for meeting the commitments when the 11 projects are built, but will be needed to meet the commitments at some future time when other and additional projects are built, making more consumptive uses.

Is my understanding correct, or incorrect?

Mr. BENNETT. I believe that would be correct under the Department's recommendations as submitted to the committee. I believe the estimate is that uses could go up to approximately 4.3 million acre-feet of water per year in the upper basin.

As I pointed out, the largest package proposed, which is embodied in S. 500, passed by the Senate the other day, would put upper basin uses, if all those designated projects were built, up to 4.8. So, under

the conditions of S. 500, there definitely would be an immediate storage requirement by the time the last project was constructed.

Mr. HOSMER. If you will listen to my questions a little more closely I think you can answer them a little more concisely, then we can get out of here.

Mr. ASPINALL. If the gentlemen will yield to the Chair, the hour is noon.

We shall recess until 2 p. m., at which time we will meet in the regular committee room, and the meetings will be extended to not later than 4 o'clock.

We are in recess.

(Whereupon, at 12:02 p. m., a recess was taken until 2 p. m.)

AFTERNOON SESSION

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for the further consideration of H. R. 3383 and related bills having to do with the upper Colorado River project authorization.

At the end of the session this morning the gentleman from California, Mr. Hosmer, had the time, and with the understanding that the afternoon session will be limited to the hour of 4 o'clock, the Chair recognizes the gentleman from California, Mr. Hosmer.

QUESTION PERIOD OF ELMER BENNETT, LEGISLATIVE COUNSEL, DEPARTMENT OF THE INTERIOR—Resumed

Mr. HOSMER. Thank you, Mr. Chairman.

Mr. Bennett, I think I would like to get through by 4 o'clock if we can, and if I explain to you what I am trying to do, perhaps it will enable us to cut this thing down a little bit.

Briefly, what I am doing is this: You have taken certain premises, I believe, from which you have drawn the conclusion that the water can be stored up there for later exchange and also, in an unrelated theory, that it can be stored for power purposes.

Mr. BENNETT. Yes.

Mr. HOSMER. What I am trying to do is examine these premises upon which you base your conclusion to see if they are premises that can correctly be used to draw such conclusions.

When we left this morning I was trying to get at the status of water stored in the power dam reservoirs. Is it my understanding that your concept of these waters is that they have no definition under the compact?

Mr. BENNETT. Yes; that just the mere storing of the water does not render it apportioned water in the sense of being chargeable to beneficial consumptive uses at the time the flow of the water is stopped.

Mr. HOSMER. It is water, then, that is not used beneficially and consumptively in the upper basin?

Mr. BENNETT. Correct, except that portion which is lost by evaporation, of course.

Mr. HOSMER. It is water, however, which depletes the flow of the river at Lee Ferry?

Mr. BENNETT. In the year in which it is stored; yes.

Mr. HOSMER. Then at some later year it is exchanged for water further upstream; is that right?

Mr. BENNETT. It has been so expressed. It is also water which is released in order to regulate the flow of the stream to meet article 3 (d) commitments.

Mr HOSMER. It is water, then, which in the upper basin never attains a status which is definable under the compact other than "surplus"?

Mr. BENNETT. I would not say that it is surplus in the sense that article 3 (c) of the compact uses the term. I do not believe that it is surplus water in the sense that article 3 (f) or (g) uses the term. It is water which simply never becomes apportioned water in the sense of consumptive use while it is being held back in the storage reservoirs.

Mr. HOSMER. Would you say that it is water that is being held there for a prospective use to meet the requirements of 3 (d)?

Mr. BENNETT. Correct, sir; and also the generation of power under article 4 (b) of the compact.

Mr. HOSMER. With respect to the lower basin, it is water that is being stored for prospective uses to meet the requirement of 3 (d). Now what is the requirement of 3 (d)?

Mr. BENNETT. That uses in the upper basin shall never deplete the flow of the stream at Lee Ferry below 75 million acre-feet in any successive 10-year period.

Mr. HOSMER. You do not concede this water that is held in storage is chargeable against the upper basin's 3 (a) water either in the year it is stored or the year that it is exchanged or any year in between?

Mr. BENNETT. No; except such waters as are lost by evaporation.

Mr. HOSMER. What would you define this water that was stored in 1941 according to Mr. Larson's hypothetical filling of the reservoir the other day in the sum of 6 million acre-feet?

Mr. BENNETT. Are you referring to the water which he said he would have stored?

Mr. HOSMER. Yes.

Mr. BENNETT. That water would be water which was being reasonably stored in the upper basin for the purpose of meeting the commitment over a long period of time under article 3 (d), and also for the generation of power.

Mr. HOSMER. Mr. Larson defined beneficial consumptive use in the upper basin in terms of depletion at Lee Ferry, and since this 6 million acre-feet does deplete the flow at Lee Ferry by that amount, how can his definition be square with the one that you have given?

Mr. BENNETT. I am sorry, sir. I did not quite follow that. Would you have it read back again?

Mr. HOSMER. Read the question, Mr. Reporter.

(The question was read by the reporter.)

Mr. BENNETT. The figures that he gave as depletion at Lee Ferry are under present conditions, as I recall it, which means you have no storage reservoirs comparable to the ones that are proposed in this bill at the present time. Hence his figures dealing with, say, 2½ million acre-feet of present and authorized uses in the upper basin, are measured by depletion. Mr. Larson conceded that in the course of his original testimony to the committee.

When he was using the term "depletion" the other day in connection with these figures, he was thinking in terms of depletion of the flow in the year in which he holds that water back.

Now the obligation under article 3 (d) is a 10-year commitment and not a commitment this year specifically, or next year specifically; it is a running commitment that applies to successive 10-year periods.

Mr. HOSMER. Then is not your position that so long as this 3 (d) commitment is met that all obligation of the upper basin to the lower are met?

Mr. BENNETT. Absolutely not. I am not taking any position on that score at the moment. I pointed out previously that the figures which Mr. Larson gave the other day in all cases left more than 8 million acre-feet of water a year rolling past Lee Ferry. He was not predicating that on any particular technical legal theory, he was just looking at what he thought would be a reasonable safety measure in determining how much from a given flow he could store and still be completely assured that all of the known demands for water in the lower basin could have been met.

Mr. HOSMER. But you see, my concern is with Mr. Larson's heart. Should he have a heart attack and die and somebody not quite as reasonable as he is get into the position of regulating the flow of the river, I want to make sure that this less reasonable gentleman will not in his arbitrary manner constrict the flow more than Mr. Larson would, and, specifically, down to the bare 3 (d) requirements. And to do that I have to find out what type of regulations they are really operating on.

Mr. BENNETT. My own comment on that is this: In our judgment section 12 of S. 500 as it passed the Senate the other day, with provision for an advisory committee and the litigation provision, gives ample protection to the lower basin States.

Dr. MILLER. Will the gentleman yield there?

Mr. HOSMER. After this comment. I have an extremely healthy respect for your legal ability and your opinion, Mr. Bennett.

Mr. BENNETT. Thank you.

Mr. HOSMER. However, I do not agree with that particular opinion. I now yield to the gentleman.

Dr. MILLER. I wanted to ask—after the demands of the upper basin are satisfied, which I understand would be around 4½ million acre-feet, and the demands of the lower basin would be satisfied with the 7½ million acre-feet, what happens to surplus water that may be available after the upper and lower basin have used what seems to be their allocation?

Mr. BENNETT. To begin with, if the water is reasonably needed to assure regulation of the flow to meet the commitment under article 3 (d), we are convinced that the water can be stored in the upper basin; that there is no running obligation in the compact anywhere which would deny the authority to do that. Likewise, we believe that, with the very large storage capacity available at Lake Mead, the fact that there are inflows between Lee Ferry and Hoover Dam, and the variations in the stream flow above Lee Ferry, the filling of these storage reservoirs can be accomplished without injury to anyone—and a coordinated operating procedure would be worked out with respect to the storage in Lake Mead and storage in Glen Canyon and Echo Park.

Dr. MILLER. Would the storage be for exchange of water or something of that type?

Mr. BENNETT. You are really not yet in the stage where the exchange idea is being applied. We are here concerned primarily with the management of these works in the filling stage.

Dr. MILLER. Let me ask then, as I did, I believe, of Mr. Dexheimer the other day—there is around 9 million acre-feet at Lake Mead for flood-control purposes. Could that then be transferred, perhaps up to the upper basin and make a different disposition of it?

Mr. BENNETT. I understand our engineers believe that, to some extent at least, the present flood-control space at Hoover could be offset by flood-control storage upstream.

Dr. MILLER. If that were done, it would be to some benefit, then, to the lower basin States?

Mr. BENNETT. We believe so, sir.

Dr. MILLER. May I ask one other question, Mr. Hosmer?

Mr. HOSMER. Yes.

Dr. MILLER. This is on a different idea, but it has not been explored. I hope it is before we are through. It opens up a whole new field that I am not going to get into at this time, but I want all of you to give it some thought, and if I am wrong in the question I ask or the conclusion—well, I have not reached a conclusion—but in the statement I am going to make, I would like to be corrected.

It seems to me that one of the big objections that have come from the lower basin States relative to the water that might or might not go down is concerned, at least indirectly, with the power that is produced out of Lake Mead which goes to southern California. Can you tell me what the rate is in the selling of that power out of Lake Mead?

Mr. BENNETT. I cannot. Maybe Mr. Larson can.

Dr. MILLER. Is it 2 mills or less? Can anyone here answer that question?

Mr. ASPINALL. The Chair would have to suggest it would take unanimous consent to get Mr. Larson back before the committee. It is all right with the Chair.

Dr. MILLER. I am just asking if someone can answer the question. If not, may I ask that it be answered?

Mr. HOSMER. May I do this, Dr. Miller? I see what you are after. For the purposes of your argument, let us stipulate that the average between the cost of the surplus power and the firm power is somewhere in the neighborhood of 3 mills.

Dr. MILLER. Of course, we speak about surplus power and firm power. I guess it is all firm power as it leaves Lake Mead and is sold. I am wondering if one of the problems in this whole field is not the fact that if we produce a tremendous amount of power out of the other facilities to be built, it might eventually upset the power situation in southern California.

I have been impressed with that because of the several letters I have received lately interested in the power situation, and I think it is a legitimate and proper concern. But I am wondering if the committee has overlooked the fact that in the building of the upper Colorado project, the storage of the water, and the producing of power, some of the concern might well have been because of what we will do with the power rate eventually when a new contract comes up at Lake

Mead for power to southern California—as to what might happen to it.

I leave that food for thought with you, and if I am wrong, someone can correct me.

Thank you, Mr. Hosmer.

Mr. ASPINALL. Will the gentleman yield to me there?

Mr. HOSMER. Yes.

Mr. ASPINALL. For an observation. We have enough in the record, as I remember the hearings, Dr. Miller, that when we get to writing up the bill we have the foundation for argument and discussion back and forth between the committee members.

(Discussion off the record.)

Mr. HOSMER. Dr. Miller, I would remind you that the Government is under solemn contracts of obligation until 1987 with respect to the power commitments at Hoover, and that also those commitments, although in part to California, 36 percent of them are to Arizona and Nevada. So there is not only California concerned here, but Arizona and Nevada, or at least they should be.

Mr. DAWSON. Will the gentleman yield to me?

Mr. HOSMER. We are trying to get through at 4 o'clock. I will yield.

Mr. DAWSON. Very briefly. Would the gentleman object to inserting in the record at this point the power rates for both the surplus power and the firm energy?

Mr. HOSMER. I think you will find that, Mr. Dawson, in the testimony of Samuel B. Morse, of Los Angeles Metropolitan Power Department.

Mr. DAWSON. If I recall his testimony, it was a little vague as to the surplus power.

Mr. HOSMER. I have no objection to your figuring it out and putting it in, but I am not going to do that.

Now, Mr. Bennett, getting back to this water you got behind Glen Canyon and Echo Dams. We will assume that you got storage in there in 1960 that is going to be used possibly for exchange purposes in 1995, 35 years later, and you tell me that that is water that is not beneficially consumptively used in the upper basin—water which can never be so used. It has some status we have not defined. You claim there is legal authority for so withholding.

Now looking at section 3 (e), which is the section that says:

> Neither the upper basin shall withhold nor the lower basin demand water which cannot be used reasonably for agricultural and domestic purposes—

Let us assume this situation: In 1980 the lower basin has an agricultural or domestic use over and above what water is flowing down the river. Could they in that instance demand the release of what water they needed for such purposes and have it released? Or would the use potentially 15 years later in the upper basin prevent it from being used?

Mr. BENNETT. I think that would depend entirely on all the facts that were present at that time.

Mr. HOSMER. Look at 3 (e).

Mr. BENNETT. If, for example, Lake Mead were practically empty at the time, I think you might get a different result than you would——

Mr. HOSMER. I have stated that the lower basin wants to use that for agricultural and domestic purposes.

Mr. BENNETT. Then we must assume Lake Mead is dry.

Mr. HOSMER. They have to have that for uses they have over and above the 7½ million acre-feet allocation.

Mr. BENNETT. And Lake Mead is dry at the time?

Mr. HOSMER. For some reason perhaps the water is not there, unless it is let down out of these storage reservoirs.

Mr. BENNETT. Under those circumstances, and assuming that the development in the upper basin had not proceeded fast enough so that——

Mr. HOSMER. I am saying that the water was held in storage and is not going to be used until 1995, and we are talking about the year 1980.

Mr. BENNETT. That is right. Now I am giving you the answer as I view it. If at that time the development in the upper basin is proceeding at a pace which would reasonably indicate that the water would be needed in 1995 in the upper basin, and the water that was being stored was reasonably related to the projected probable needs of the upper basin in 1995, I am convinced it could be stored as against appropriations over and above compact apportionments to the lower basin.

Mr. HOSMER. In other words, you are contending that possible future uses in the upper basin have a priority over present needs of the lower basin?

Mr. BENNETT. This is on the assumption that these needs in the upper basin will be within the compact apportionment of consumptive uses to the upper basin.

Dr. MILLER. Will the gentleman yield?

Mr. HOSMER. Yes.

Dr. MILLER. Certainly you are not trying to get the witness to say they are not entitled to at least 7½ million or 75 million acre-feet over a period of 10 years; are you?

Mr. HOSMER. The upper basin?

Dr. MILLER. The lower basin. You will get that regardless.

Mr. HOSMER. I am talking about a present need in the lower basin for agricultural uses which is in excess of the 7½ million 3 (a) apportionment.

Dr. MILLER. As I remember the testimony, it shows rather definitely they would never be using over 4½ million acre-feet.

Mr. HOSMER. Dr. Miller, this is a hypothetical question upon which I am trying to determine some legal theories and is not based on actual fact.

Dr. MILLER. It is a really hypothetical question, I might say.

Mr. HOSMER. I am trying to find out the priority between a present need in excess of 7½ million acre-feet in the lower basin for then agricultural uses as against the storage of that water at Glen Canyon for an anticipated future use for exchange purposes.

Mr. BENNETT. For uses within the upper basin apportionment, as I understand it.

Mr. HOSMER. And my assumption is it never will be beneficially used in the upper basin. My understanding of your answer is that, notwithstanding, that water can be withheld and maintained against the demands of the lower basin.

Mr. BENNETT. That is right, based upon the assumption that the amount of water which is being held in those storage reservoirs is related reasonably to the probable requirements at a future, reasonable time in the future. Now 15 years in the history of this stream is a reasonable time, as I view it. Others might differ. The question of what is reasonable is a question of fact, as you know, Congressman.

Mr. HOSMER. That is it. It leaves the whole thing wide open, and that is just exactly where we, down in California, do not want it left, because the only one that can determine this question of reasonableness is the Supreme Court of the United States, and we are having enough trouble with one lawsuit and do not want another if we can avoid it. And it looks like we are running definitely into it.

Now you have told me you can hold that water up there. Is it not a fact that in the testimony that you gave the committee on your own initiative the other day you made reference to certain statements that were made by former President Hoover?

Mr. BENNETT. That is correct.

Mr. HOSMER. In response to questions by Senator Hayden and others. And I believe that you relied upon some of those statements by Mr. Hoover.

Mr. BENNETT. That was part of the statement I made.

Mr. HOSMER. In supporting your legal theory. Now I know you must have an answer, but I would like to know what it is, and that is: In the light of Mr. Hoover's answer to Senator Hayden's question No. 20, how do you square that with the answer to the previous question? And I am going to read what President Hoover said.

> The compact provides that no water is to be withheld above what cannot be used for purposes of agriculture. The lower basin will, therefore, receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes.

Mr. BENNETT. I believe it must be read in relation to the direct question which was put to him with respect to his interpretation of article 3 (e), and that is the portion of the Hayden questions and answers which I pointed to the other day.

I might also point out that water to be stored in the upper basin is not to be stored there forever. No one is asserting the right to hold water indefinitely until finally it physically can be used in the upper basin. That would be an aribitrary withholding.

If you read this second statement that you point to of former President Hoover in the light of the comment I have just given you, you will see it squares quite reasonably with the direct answer which Mr. Hoover gave to the meaning of article 3 (e) at a prior point in the Hayden exchange.

Mr. HOSMER. I have tried to do that, but I cannot, and the only conclusion that I can draw is that your interpretation of 3 (e) is that, inasmuch as the lower basin cannot demand the release of water, it constitutes an authority for the upper basin to withhold. Is that your belief?

Mr. BENNETT. No. I think the basic question is whether there is a reasonable basis for storing the amount of water which is being stored under any given set of facts.

In the management of nearly all water-shortage projects you have to have an operating plan, and that operating plan has to take into account the water consumption and the water-supply picture of the

stream. So far as we in the Department are concerned, we believe quite definitely that the operating principles of this project will be based on consultation with all affected parties, including those in California. There is no intention to do otherwise to my knowledge.

Mr. HOSMER. In other words, you want to read the document as a whole, and in reading it as a whole, you completely disregard these phrases "per annum" that appear in these various things and over some unspecified period of time average out.

Mr. BENNETT. I would say that is not a correct statement of the view I have taken at all. We began with the premise that article 3 (a) apportioned beneficial consumptive uses. That is where the words "per annum" enter into the picture. We have not gone into the question, actually, of the amount of water which the upper basin is entitled to use under its apportionment, for example. Now there you might run into the question whether per annum means a speed limit, as Mr. Ely puts it, or whether it is an annual average.

For the purposes of this bill, the Department has taken the position that it was not necessary to determine that question since the largest package proposed would not put the consumptive uses in the upper basin above 4.8 million acre-feet per year, assuming every unit and every participating project in that package is some day consummated in the form of actual beneficial uses.

Mr. HOSMER. Are you familiar with House Document 364 of the 83d Congress?

Mr. BENNETT. Yes.

Mr. HOSMER. That document, the way I read it, in its exposition of the Bureau's plans and proposals is almost wholly based on this averaging concept, and it totally disregards the per annum specifications in the compact.

Mr. BENNETT. Even if that were true, there is not a bill pending before this committee which would put the future beneficial consumptive uses in the upper basin anywhere near the conceded apportionment to the upper basin, even under California's theory.

Mr. HOSMER. Is it not true that the upper basin contemplated the fact that it might well not be able to make beneficial consumptive use of all the water which it was apportioned?

Mr. BENNETT. I think there are many people in the upper basin who believe, from the viewpoint of the total water availability in the stream, it may never be possible to use the full apportionment mentioned in 3 (a) because of the commitment to the lower basin in article 3 (d), for example.

Mr. HOSMER. Is not that the general belief?

Mr. BENNETT. That is not the general belief, but there are many very substantial people in the upper basin who do believe that.

Mr. HOSMER. If that is not the general belief, why did these 4 States, when they entered into the upper Colorado River Basin compact of their own, write a specific provision in that compact, article 4, that set out procedures whereby they should ration themselves if they had to do so in order to meet the Colorado River compact commitments?

Mr. BENNETT. I think the reasons for that are subject to a number of interpretations. I can give you one which I believe is equally fair and reasonable.

The assumption would be that the upper basin eventually wishes to develop its apportionment to the maximum. If they do so there may be some projects which would never have an assured water supply in every year; there might be some years in which there would be shortages. In order to provide a method of equitably administering the waters apportioned to the upper basin, article 4 of the upper basin compact attempts to set out the criteria under which water might be cut off from certain projects in order to meet the commitments of the upper basin, or to reapportion the available water within the upper basin, assuming there was adequate storage in these regulating reservoirs to take care of the commitment to the lower basin.

Mr. HOSMER. I think they pretty clearly had in mind the necessity of that provision when they wrote it in article 4 of the upper basin compact.

As I understand it, these storage projects, then, are to ameliorate this difference in consumptive uses between wet and dry years so that they can average a consumptive use of 7½ million acre-feet a year.

Mr. BENNETT. That is not exactly the way I would state the matter, but the idea is to meet all the commitments that are implied and expressed in the compact to the lower basin from storage so as to make possible the development of the upper basin's apportionment to the maximum that that can be done consistently with the provisions of the compact.

Mr. HOSMER. And are you going to withhold some water from the lower basin to do it?

Mr. BENNETT. Yes. It is a matter of storing waters which eventually will go on down to the lower basin. It is a regulation of the flow of the stream.

Mr. HOSMER. And this, despite the fact that President Hoover said that all the waters in the river that were not specifically beneficially consumptively used would flow downstream?

Mr. BENNETT. I would immediately answer with the other statement of Mr. Hoover that article 3 (e) bans only arbitrary and unreasonable withholding of water, that the storage of water in order to regulate the flow and make possible meeting the commitment to the lower basin in article 3 (d) and the satisfaction of the apportionment to the lower basin, would be completely reasonable and certainly not an arbitrary withholding of water from the lower basin use.

Mr. HOSMER. And despite the fact that the compact was written in terms of year by year by the use of "per annum," you are applying some other type of a time concept to the project in question?

Mr. BENNETT. I do not believe that in any way I have indicated that if the actual uses in the lower basin were within the apportionment, and if they required 7½ million each year, that the upper basin could withhold water so as to provide less than 7½ million for present use in the lower basin. I have not said that at all.

Mr. HOSMER. Then let us get above that 7½ million figure and consider the lower basin's 3 (b) entitlement. Do you think that the lower basin could demand water out of storage to make use of under its 3 (b) rights?

Mr. BENNETT. As you know, there is quite a difference of opinion between Arizona and California on the meaning of article 3 (b). That is basic to the present litigation.

Mr. HOSMER. And it comes into consideration in our bill here, too, does it not?

Mr. BENNETT. No——

Mr. HOSMER. I just asked you——

Mr. BENNETT. I would put it this way——

Mr. HOSMER. You are just about to answer me a question with respect to 3 (b).

Mr. BENNETT. Yes, I am willing to answer a question even though it is involved in *Arizona* v. *California* litigation.

Mr. HOSMER. Because I am making this point: It has been apparent throughout the questioning so far that there are a number of legal issues in dispute in Arizona versus California which are dead set in the center of this upper basin storage project and its relation to the lower basin.

Mr. BENNETT. Of course, that is somewhat argumentative. I would not concede that because, as Mr. Ely says, approximately 2 million acre-feet are all that are involved in the issues before the Supreme Court, as between the two basins.

Mr. HOSMER. Let us get back to the 3 (b) entitlement and see what you think about the lower basin being able to demand release of water out of storage so they can make their 3 (b) uses. Do you think they can do it?

Mr. BENNETT. I would put it this way, Congressman: Let us take, for the sake of our discussion, California's theory of 3 (b). If you do that, then the total beneficial consumptive uses apportioned to the lower basin would be the uses on the Gila and the uses on the Virgin, plus the uses on the main stem.

Mr. HOSMER. Well, California has already lost that, we will say. So it means something else in addition is going to have to come down the river. What is your answer then?

Mr. BENNETT. If Arizona wins her contention, then the uses on the Gila and the uses——

Mr. HOSMER. Excuse me. I meant Arizona had lost.

Mr. BENNETT. All right. Under those circumstances, then the uses on the Gila are chargeable to the total of 7½ million acre-feet of water.

Mr. HOSMER. 3 (a) water?

Mr. BENNETT. Yes.

Mr. HOSMER. Now we are talking about 3 (b) water.

Mr. BENNETT. We believe that the apportionment to the lower basin and the additional million under article 3 (b) would be water to which the lower basin would be entitled on a par with the 7½ million acre-feet apportioned to the upper basin. In other words——

Mr. HOSMER. A short answer to my question would be, then, that if California wins that issue in the suit, this 3 (b) water for the lower basin use would have priority over your withholding for storage for later exchange in the upper basin. Is that correct?

Mr. BENNETT. Assuming that you had beneficial and consumptive use for that water, I believe that is so.

Mr. HOSMER. But your further position is that, even though we have beneficial consumptive uses for that water, in addition to that, that in such event the upper basin would take priority?

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Mr. BENNETT. I did not say the upper basin would take priority; I said the upper basin would have the right to store that water if such storage were reasonably related to the probable requirements of apportioned consumptive uses in the upper basin.

Mr. HOSMER. Let us put it this way then: That the upper basin's reasonably anticipated future uses for exchange purposes would take priority over the lower basin's presently needed uses for agricultural water in excess of 3 (a) and 3 (b).

Mr. BENNETT. So long as those reasonably anticipated needs in the upper basin were within the upper basin's apportionment, the answer is "Yes."

Mr. HOSMER. Do you know of any way that the reasonableness of these needs could be finally and conclusively ascertained other than by a legal decree?

Mr. BENNETT. Of course; by mutual agreement between the parties.

Mr. HOSMER. Failing the mutual agreement between the parties?

Mr. BENNETT. Then litigation would be the proper method of determining it.

Mr. HOSMER. I presume then that this legislation logically should include provision for such litigation.

Mr. BENNETT. Article 12 of S. 500 does, sir.

Mr. HOSMER. I do not think we have it on this side, do we?

Mr. BENNETT. It seems to me at least one bill over on the House side has that provision, Congressman.

Mr. HOSMER. Well, we will try to get it in.

This is an interesting point, Mr. Bennett. Let us say in the year 1960 the lower basin has used only 6½ million acre-feet of its 3 (a) entitlement; in the year 1961 it uses its entire 3 (a) entitlement; and in the year 1962 it uses its entire 3 (a) entitlement. But it wants more. Can it in 1962 demand release of water from storage upstream in the amount of a million acre-feet for use in 1962 in addition to its 7½ million because of the fact that in 1960 it only used 6½ million under 3 (a)?

Mr. BENNETT. I think not. I might use article 3 (e) to justify my position in that regard.

Mr. HOSMER. I think that is just a little turnaround. You say the upper basin can use it for some years ahead. Now I am trying to find out why the lower basin cannot use it to make up what it did not use some years prior.

Mr. BENNETT. One of the compact purposes is to provide a regulation of the flow of the stream, and, pursuant to that end, article 3 (d) imposes a specific obligation on the upper basin. Storage of water to make possible the meeting of that obligation is a reasonable inference from the basic provisions of the compact in this regard—articles 3 (a), 3 (b), 3 (d), and 3 (e). All four of those, we believe, should be read together.

Mr. HOSMER. I am not entirely satisfied with that assumption, for this reason: You assume that that 3 (d) requirement is 75 million acre-feet in any 10-year period, or an average of 7½ million acre-feet a year during any 10 consecutive years. Now apparently, in response to some of my previous questions you indicated that other water must flow down the river by way of 3 (b) and 3 (c) water. Is that right?

Mr. BENNETT. Well, 3 (c), of course, is that portion of the compact dealing with the Mexican burden, and so far as that is concerned we

have not dealt with that situation. All that I did do was to point out that in Mr. Larson's answers to your questions several days ago the minimum amount that would be allowed to pass Lee Ferry would have been 8.3 million acre-feet of water.

You may relate that to 6½ million present and authorized uses in Arizona and California from the main stem today and a million and a half for Mexico. This is not a concession that these are legal obligations; this is a matter of what he actually was doing the other day. That 8 million acre-feet of water adequately covered not only the present and the authorized uses in Arizona and California below Hoover Dam from the main stem, but it also included an ample amount of water over and above that to supply the full Mexican need, irrespective of return flows or inflows into the river below Glen Canyon, or any other possible method of meeting those obligations. He was demonstrating that, given the set of water availability figures with which you were working, that it would be very easy to meet all needs of California and Arizona, and that would be our intention and our purpose.

Mr. HOSMER. We apparently are talking about two different things at this point, Mr. Bennett. What you are talking about is wet water, and I am talking about the status of water. Can I fairly conclude from your remarks that, if the lower basin total uses of 3 (a) and 3 (b) water amounted to 6½ million acre-feet, the flow of the river in that year were 7½ million acre-feet, that the extra million would then assume the status of water which is subject to the 3 (c) requirements?

Mr. BENNETT. Well, if it were released, assuming there was no water in Hoover.

Mr. HOSMER. Assume it has passed the international boundary.

Mr. BENNETT. I think so. I think that is a fair response.

Mr. HOSMER. Would not water which is likewise not used in the upper basin withheld in storage be subject to the 3 (c) requirements?

Mr. BENNETT. Well, the burden under article 3 (c) is quite clear, at least it seems so to me, that any water in the stream which is over and above the consumptive uses referred to in articles 3 (a) and 3 (b) would be subject to call for the Mexican burden.

Mr. HOSMER. And so that water stored, being not subject to consumptive use in the upper basin, would be available to be put under 3 (c)?

Mr. BENNETT. Yes, but we have allowed no credit here for the water which flows into the stream below Glen Canyon, nor have we allowed any credit for return flows which might reach the international boundary from natural uses in the lower basin.

Mr. HOSMER. I think that is inherent in the hypothetical question that I gave you.

Mr. BENNETT. Water that is stored in Lake Mead presumably would be subject to a similar call.

Mr. HOSMER. That is right. I think you touched on it a little while ago, but you have indicated that this storage in Lake Mead which is dedicated to flood control, I think in the amount of 9½ million acre-feet, might under certain circumstances have to be assumed upstream if these projects were built, or during the filling stages at least, if there would be inadequate water at Lake Mead to meet the firm power commitments under the Government contracts. Is that right?

Mr. BENNETT. No. Actually I do not quite follow that question for this reason: You referred first to the 9½ million acre-feet of capacity for flood-control purposes at Lake Mead.

Mr. HOSMER. Yes.

Mr. BENNETT. Now that is at the top of the dam.

Mr. HOSMER. That is water you may have to spill to generate surplus power but which, if you could have held, you might have been able to use it for firm power at some later time.

Mr. BENNETT. If we assume that there were spills involved in using that flood-control space, yes. Actually, as I understand it, if Glen Canyon were built, a good portion of that flood-control space at Hoover could be used for storage of water, thus improving the head at Hoover Dam, and perhaps getting peaking power which would be of great value in the lower basin.

Mr. HOSMER. As a matter of fact, though, the Government is obliged under its contracts to produce enough water for a certain amount of firm power, and if, without transferring some flood control storage up to its works farther north on the river, it could not meet that firm head, it probably would have to transfer that storage upstream so it could meet the firm commitments, would it not?

Mr. BENNETT. Of course you are not using that 9½ million acre-feet of water for storage space unless you have Lake Mead at a very high level to begin with. I do not see the relationship of the use of the flood-control space for storage to a low water supply at Lake Mead. It obviously cannot be used for flood control unless the capacity below is filled up to the top.

Mr. HOSMER. Let us say you have got the thing filled up within a half-million acre-feet at the top, and you are coming pretty close to the new wet cycle, and you are bringing these projects into the State upstream where they can be used for storage. So that, rather than spill the water out of Lake Mead in order to anticipate a rainy season that is coming up, you would not spill it and hold the water upstream at your new storage capacity.

Mr. BENNETT. I do not think that is contemplated. The idea would be to allow a safety margin, I am sure, at Hoover for flood-control storage that might be required from flood between Glen Canyon and Hoover Dam.

Now, presumably as of now——

Mr. HOSMER. You have got on an annual average 20,000 acre-feet coming in the river between these 2 points. That is about all you are talking about there.

Mr. BENNETT. If that were the case, there would be practically no need for flood-control storage after Glen Canyon is closed, if you had a series of years where no more water than that was coming in below Glen Canyon.

Mr. HOSMER. Let us put this thing another way then and see if we can get at the opposite angle. You have built your dams upstream and you are filling them. As a matter of fact, you have got to proceed to fill them to get the power so the whole project upstream can pay out, and that is the reason why you are doing it.

Mr. BENNETT. Of course——

Mr. HOSMER. Wait a minute. I have not finished. In the process, now, you actually find that the firm power commitments at Hoover

Dam cannot be met. Then what would be incumbent upon the Government to do?

Mr. BENNETT. My best answer to that is that it would depend entirely upon the interpretation of section 10 of the 1941 power contracts, and with your permission I would like to read the first subsection of that section into the record at this point.

Mr. HOSMER. Yes, go ahead.

Mr. BENNETT. This appears on page A-372 of House Document 717 of the 80th Congress, 2d session. The language quoted is from the power contract with the Metropolitan Water District of Los Angeles.

10 (a) Subject to the statutory requirement that Boulder Dam and the reservoir created thereby shall be used: First, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and satisfaction of perfected rights mentioned in section 6 of the project act; and third, for power; and

(2) The further statutory requirement that this contract is made upon the express condition and with the express covenant that the rights of the district, as a contractor for electrical energy, to the use of the waters of the Colorado River or its tributaries, shall be subject to and controlled by the Colorado River compact; the United States will deliver to the district energy in the manner required by this contract, in the quantity to which the district is entitled hereunder, and in accordance with the district's load requirements.

In other words, the commitment of the Government is subject to these two provisions which I just read into the record.

Mr. HOSMER. That is exactly the situation I am getting at. And here you have the Metropolitan—what is the correct name?

Mr. BENNETT. This is the Metropolitan Water District of Los Angeles.

Mr. HOSMER. You have the Metropolitan Water District of Los Angeles up pounding on the Bureau of Reclamation door, holding that contract in their hand and saying, "Now, look. You people are not delivering this water, and you are not delivering it because in your operations of this whole thing you are not complying with the compact. If you were complying with the compact this water would be down here for the production of power purposes."

Mr. BENNETT. I would put it the other way, Congressman, and say the reason that the power might not be there is because the Government was complying with the compact and was operating these plans in accordance with the rights of the upper basin as a subordinate agency of the upper basin for this purpose.

Mr. HOSMER. Wait a minute. You are not operating this thing as an agent of anybody; you are operating this thing as the United States Government, are you not?

Mr. BENNETT. No. The water rights will be acquired in accordance with State law by the very provisions of the bill pending before this committee.

Mr. HOSMER. All right. Nevertheless, under the circumstances I have related, the Metropolitan Water District is in at your door saying you are doing something that you cannot do under the compact, to stop it, and start obeying the compact. You have a legal dispute, have you not?

Mr. BENNETT. I would agree with that 100 percent, Congressman. You very well might have a legal dispute. I think that Mr. Larson——

Mr. HOSMER. What I am getting at, since there might well be a

legal dispute with the Metropolitan Water District in connection with this, would it not also seem that the Metropolitan Water District should be able to get into court and we should make provisions in this bill whereby it can?

Mr. BENNETT. I would not agree to that necessarily. It seems to me that the rights under this compact are rights which are inherent in the States, and if the State of California believes that the rights which the Los Angeles Metropolitan Water District holds under the State of California to the use of the water, which is made subject to the compact by this very language, the question of appropriate action would in the end depend upon the State of California, and the State of California would be the proper party in the action.

Mr. HOSMER. We are clouding up the issue again, because the contract is not with the State of California, it is with the Metropolitan Water District. In addition to that, we started out this morning's discussion with a clarification of what the status of the Government is in this thing and decided that it was the actor, the party, and it was attempting to so conduct itself as not to violate the provisions of this compact. That is what we are writing into the law. And if the Government, notwithstanding the provisions of the law, does in fact operate in violation of the compact, then there is a direct effect upon an agency with which it has a contract, namely, the metropolitan water district, and therefore I believe the metropolitan water district is entitled to have the matter litigated.

Mr. BENNETT. Let us put it this way: The Metropolitan Water District, assuming the Federal Government were violating the terms of the contract, does have a remedy as far as that is concerned. That is the remedy of going into the Court of Claims or the district court of the United States under existing laws and suing for damages. There may not be complete and total relief. But our system of law is not based on complete and total relief at all times.

Section 12 of the Senate bill would provide an ample opportunity for the State of California to raise the question whether the operations of the project, of the upper Colorado project, were being conducted in accordance with the compact; and if the Los Angeles Metropolitan Water District, in presenting its witnesses and all, could establish in that action brought by the State of California that the operations were not in accordance with the compact, then, presumably, the reduction in power under your hypothesis also would be subject to relief at the instance of the State of California. Of course, that is all with reference——

Mr. HOSMER. But not the metropolitan water district——

Mr. BENNETT. To section 12 of the Senate bill.

Mr. HOSMER. Mr. Bennett, I understand well the general principles that you have enunciated, and then I understand that our system does not set up complete and total relief. But here we have a specific instance which we can anticipate, and is it not a fair, equitable and reasonable thing to do to at this point set up provisions so that there can be complete and total relief?

Mr. BENNETT. The question of compliance with the compact, in our judgment, is one which immediately brings to bear the possible conflicting interests of all parties in the State.

Mr. HOSMER. At this point, I am only interested in the Government complying with its contract with the metropolitan water district. And if, for whatever reason, it does not comply with that contract, then the metropolitan water district ought to be able to come in and have its rights litigated to a point of complete and total relief without undue harassment.

Mr. BENNETT. If the issue is one of compliance with the contract and the Boulder Canyon Project Act, it is an issue which, by its very nature, involves the whole complex of rights under the State of California, and it does not seem desirable to the Department to open the way to, let us say, one party in the State of California without opening it to all. If you do that, you open the way to harassment and to repeated litigation.

Mr. HOSMER. What do you mean "to all"? You are only opening it to people who have specific contracts with the Government. I can visualize the same situation with the Arizona Power Authority or any of the other contractors at Lake Mead; is that not true? That is not "all." That is a very limited group of people.

Mr. BENNETT. They are entitled to financial relief under our present laws. If the question is one of compact rights, in the view of the Department it should be a matter for the State to litigate. I might point out it seems quite appropriate to us that an action to be brought in the Supreme Court, in order to secure expedition, most properly should be brought by a State and not by some small unit within that State or some private party within that State or some public agency within that State, even if Congress constitutionally could extend the Supreme Court's original jurisdiction.

Mr. HOSMER. Are you not kind of mixing up what the others are? These are local governmental groups, and under our vertical division of power they are one of the lower elements of government and are not actually agencies of the States; they are separate and definite governmental groups of their own.

Mr. BENNETT. I appreciate that, but their rights to the use of the water under the compact are contingent entirely upon the apportionment of the water to the State.

Mr. HOSMER. But I can certainly see where the Metropolitan Water District would have a justiciable issue where, in the same circumstances, the State of California itself would not have one and, therefore, not be able to get into court. What you have proposed does not handle that contingency.

Mr. SISK. Will the gentleman yield there?

Mr. HOSMER. I want to hear Mr. Bennett right now, and then I will.

Mr. BENNETT. There is a line of cases which I would be happy to submit to you, Congressman Hosmer, and to the committee, which establishes clearly that insofar as interstate streams are concerned the States act as parens patriae for one or more of the bodies that make up the State, and also act in a quasi-sovereign capacity, because the States have the authority to determine how their apportionment of stream water shall be used within their boundaries.

Mr. HOSMER. But this has already been decided by the State when it made whatever arrangement it did with the Metropolitan Water District; is that not true?

Mr. BENNETT. Would you repeat that?

Mr. HOSMER. Read it back, Mr. Reporter.

(The record was read by the reporter.)

Mr. BENNETT. That is certainly true. The important aspect of it is that the State itself is the one to whom the waters are apportioned.

Mr. HOSMER. And it, in turn, apportions it to somebody else—individuals, private, governmental, or whatsoever; is that right?

Mr. BENNETT. That is true, but I do not believe that a single municipality is in a position to represent itself adequately and at the same time represent all the factors that go into a State's willingness or unwillingness to litigate its apportionments and its rights under an interstate compact.

Mr. HOSMER. If the principles of what you have just said are true, certainly it is applicable to bringing the other States of the upper basin into this suit of Arizona versus California.

I will yield now to my colleague from California.

Mr. SISK. I just wanted to ask the gentleman from California whether or not you felt that an agency in the State such as the Metropolitan Water District might suffer what would amount to violation of a contract; that whether or not you felt that the State of California would neglect to take proper steps with relationship to a State compact, which the Colorado compact is. In other words, is it your stand that they possibly would not step in to protect some particular municipal district?

Mr. HOSMER. My answer to the first part of your question is "no"; the second part "yes"; the third part "yes."

Now I hope, Mr. Bennett, that will be an example to you in answering my questions.

Mr. Bennett, did you ever define for me what was meant by the use of the term "per annum" in 3 (a) and 3 (b)?

Mr. BENNETT. No, I did not. And, frankly, I am not in a position to endeavor to do that. We in the Department have seen no need to attempt to struggle with that so long as the bill authorized by the Congress did not push upper basin uses beyond the figures contemplated by the bills that are pending before the Congress.

Mr. HOSMER. Mr. Bennett, the dictionary says it means "by the year." Do you disagree with that meaning?

Mr. BENNETT. I agree that is the dictionary meaning, yes.

Mr. HOSMER. You do not agree it is the meaning of the compact?

Mr. BENNETT. As I say, I am not in a position to give an answer to that question. So far as I know, the Department has never had occasion yet to resolve the question or to submit it to the Solicitor for an opinion.

Mr. HOSMER. At this point, then, we can conclude that we are not going to find out what the Bureau regards it to mean?

Mr. BENNETT. No; all I can do is point to the fact——

Mr. HOSMER. You might, incidentally, point to the fact that it is in dispute in Arizona versus California and decline to comment on those grounds.

Mr. BENNETT. I agree it is in dispute between Arizona and California, so the Department has had several good reasons for not examining that question.

Mr. HOSMER. And you realize, do you not, that some of my questions with respect to these premises of yours resolve around the meaning of that?

Mr. BENNETT. I would not say so.

Mr. HOSMER. Well, I think the record will reflect that either it does or it does not.

Mr. BENNETT. I think the answer to that, Congressman, is that we do not rely on any particular definition of the 7.5 million acre-feet of consumptive uses that are apportioned in 3 (a) for the purpose of considering this bill. We never have. Inasmuch as no bill that is under consideration proposes to push the uses anywhere near 7.5 million acre-feet of water, it cannot thereby raise the question of average uses verusu annual uses.

Mr. HOSMER. That may be true, but a reading of the Bureau's statement which has been printed as House Document No. 364 certainly reflects a little bit to the contrary, in my belief.

Now let us get on here. Section 3 (a) says the apportionment shall include all water necessary to supply "any rights which may now exist." Do you conceive that to mean the Indian rights in both basins?

Mr. BENNETT. There again, we have not reached a decision on the relationship of Indian rights to the compact. We have believed that it was not necessary in order to deal with the questions presented by this legislation, in view of the cushion between the projected uses in the upper basin and the apportionment, and that that cushion was adequate to take care of all contingencies.

Mr. HOSMER. You recognize, however, that the United States has intervened in Arizona versus California and claimed some 1.7 million acre-feet of water for Indian uses in the lower basin, about a million in the upper?

Mr. BENNETT. The 1,700,000 acre-feet are described in that petition as being diversions, Congressman, without reference either to the depletion theory of measurement of actual consumptive uses, or diversions minus returns method of consumptive uses. So the figure is very misleading.

Mr. HOSMER. I think you raised a number of reasons back a month or so ago when you were testifying that it would not amount to very much, but you did not conclude exactly how much it would amount to.

Mr. BENNETT. I might say it is under very intensive study at the——

Mr. HOSMER. I imagine the Walker River case decision would have some bearing on this. Are you familiar with that?

Mr. BENNETT. No; I am not.

Mr. HOSMER. That was a circuit-court case where it says Indian demands cannot be unlimited; we will take how much property they got now and say there is some amount of water in relation to that.

In regard to existing rights, would you care to comment or whether or not the claims of Arizona on the Gila River we were talking about earlier are in that category?

Mr. BENNETT. As you well know, and I do, too, Arizona contends that all but some 800,000 acre-feet—I believe that is the figure—of uses on the Gila River are excluded from the apportionment of uses to the lower basin; and I am not in a position to state any opinion on that point. Again, we do not believe that that affects any of the policy considerations which led the Department to recommend this project.

Mr. HOSMER. What I am getting at, Mr. Bennett, is a lot of these things that do not involve policy do involve the actual operations of a project after it is done.

Mr. BENNETT. Not if the cushion is large enough.

Mr. HOSMER. And we are concerned with them from that standpoint.

Mr. BENNETT. Not if the cushion is large enough, Congressman.

Mr. HOSMER. No; but you do not know what the Supreme Court is going to say any more than I do, and, therefore, there is a contingency that a careful lawyer like yourself, I am sure, would always have in mind in advising his client.

Mr. BENNETT. I might point out, though, that the principal spokesman for the southern California group opposing this legislation has used the figure of approximately 2 million acre-feet of water as being the amount of water involved in the issues which, in his opinion, affect the rights between the upper basin and the lower basin.

Mr. HOSMER. And you feel that is about right?

Mr. BENNETT. I do not know. I am willing to accept his figure, since he is opposing the legislation, for the purpose of this discussion.

Mr. HOSMER. Approximately 2 million acre-feet a year?

Mr. BENNETT. Yes.

Mr. HOSMER. By the year or over some average?

Mr. BENNETT. I might answer this way, Congressman: When he uses the figure "2 million acre-feet of water" I do not know what point he starts from. That 2 million may be based on claims to the use of some water which is surplus to article 3 (a) and 3 (b), which would mean that he starts from a claim of, say, 9 million acre-feet of water. I do not know. That figure was never brought out in the course of his testimony. And if it were 9 million and a million and a half of that were surplus water, then the upper basin residual consumptive uses could rise as high as 7 million acre-feet of water. Yet none of these bills go above 4.8.

Mr. HOSMER. That is on your theory, but we disposed of quite a few million acre-feet of water in a 10-year period that at least depleted the flow at Lee Ferry a great deal more than 4.8 million acre-feet. That is water that is not going down the river because it is being put in storage. I do not like to compare apples and oranges here. I would not mind comparing 2 oranges or 2 apples, but I want to compare the same thing.

With respect to the lower basin 3 (d) water, now, do you consider that million acre-feet of use a use by the year or an average use over some period of years?

Mr. BENNETT. So far as we are concerned in the operation of this project, it is definitely our intention to see to it that present uses in the lower basin for domestic and agricultural purposes will be satisfied up to a figure of 8½ million. That would not necessarily mean that 8½ million acre-feet of water would pass Lee Ferry, because, even under Arizona's theory, there is at least an amount of 800,000 acre-feet of water that will be chargeable to the lower basin, as I understand it, by virtue of the Gila River uses.

Mr. HOSMER. You are not following my example that I gave when I answered Mr. Sisk very well.

Mr. BENNETT. His questions, I think, were a little bit easier to answer than questions directed to the compact. The compact is not an easy document to discuss, as you know yourself, Congressman.

(Discussion off the record.)

Mr. DAWSON. Will the gentleman yield?

Mr. HOSMER. I will.

Mr. DAWSON. Mr. Chairman, in view of the inquiry made by the gentleman from Nebraska, Mr. Miller, as to the amount of power charges down at Hoover Dam, I would ask unanimous consent to have the Department furnish to us, if they have that material available, the power figures, that is, the cost of the power to the power contractors in the lower basin. Do you have that material, Mr. Bennett?

Mr. BENNETT. I am sure the Bureau can provide those figures, and we will try to get them up right away.

Mr. ASPINALL. If the gentleman from California will yield to me?

Mr. HOSMER. Yes.

Mr. ASPINALL. As I understand, that is under existing contracts?

Mr. DAWSON. That is right.

Mr. ASPINALL. Unless there is objection, it is so ordered, and the request is made of the Department.

(The information referred to follows:)

The rates for electric energy generated at the Hoover powerplant, as computed in the "Determination of energy rates" effective June 1, 1954, are:

	Mills
Firm energy	**1.325**
Secondary energy	**.443**

Mr. DAWSON. Mr. Chairman, I would also ask unanimous consent at this point there be inserted in the record the colloquy that took place in the Senate between Mr. Tillman, representing the Metropolitan Water District, and Senator Watkins, on pages 455 and 456 of the Senate hearings on S. 500. It is very short, and I might read it, if there is no objection. It gives these power rates.

Mr. ASPINALL. If they are short, I think the gentleman from California would rather have you read them rather than be made an insertion at this point.

Mr. DAWSON. I will be glad to read them, the questions and answers there.

Mr. HOSMER. What page?

Mr. DAWSON. 455, near the bottom of the page.

Senator WATKINS. Mr. Chairman——

Mr. HOSMER. Wait a minute now. Does the colloquy mean anything other than what the charges for this power are?

Mr. DAWSON. No; that is right.

Mr. HOSMER. You have already asked for that.

Mr. DAWSON. I think this would serve to amplify the figure, too, because it does have an admission in there from the Metropolitan Water District as to what they are paying for the power.

Mr. HOSMER. Do you want to put this in instead of the other?

Mr. DAWSON. I would like them both in.

Mr. HOSMER. I have no objection to that, Mr. Chairman. May the record show at this point that out of the power revenues that are earned at Hoover from the sale of power to consumers in the lower basin there is a half a million dollars a year which is paid to the upper basin?

Mr. ASPINALL. Of course, that is common knowledge of everybody along the river, and the record will show it.

Without objection, the two requests are granted, and it is so ordered.

Mr. DAWSON. Do I have the right to read it into the record at this point?

Mr. ASPINALL. There is no need to read it into the record now.

(The colloquy referred to is as follows:)

Senator WATKINS. Mr. Chairman, I note that the price of 2 mills was mentioned. Is that for the firm power?

Mr. TILLMAN. Yes, sir.

Senator WATKINS. And the 1 mill is for the secondary power?

Mr. TILLMAN. Both are approximations, of course. And they vary, Senator, from year to year, for this reason: The charge is divided, in effect, into 2 pieces, 1 of which is the so-called falling water charge, and the other of which is a charge in effect for the generation, the depreciation on the generators to make the power, replacements, operation, and maintenance, or things of that sort.

Now, as to the price per kilowatt-hour, obviously, since the plants are installed, they have the same replacement cost every year whether we generate a lot of power or a little. So the price goes up and down as total generation goes up and down, and this is by far the worst year of generation in the history of the project. Therefore, the cost per kilowatt-hour this year is, I suppose, without having checked it, but it must be, the greatest in the history of the project proportionately.

This year—I have that here, if you would care to get it literally—the falling water charge is 1.325 mills. That is for firm energy.

Senator WATKINS. What is it for the secondary?

Mr. TILLMAN. It is 0.443 mill.

Senator WATKINS. Less than a half mill.

Mr. TILLMAN. Forty-four one-hundredths of a mill.

Senator WATKINS. And that secondary power that you get at that rate will be gone if and when this upper-basin project is completed?

Mr. TILLMAN. I am coming to that point in a moment.

Senator WATKINS. Is that not right? I am coming to it right now.

Mr. TILLMAN. We think no. We think we will prevent that.

Senator WATKINS. You think you are going to prevent that?

Mr. TILLMAN. Yes.

Senator WATKINS. I am assuming now that if it is constructed there will be no longer the water belonging to the upper basin, due to its passing through the turbines, the generators, at Boulder.

Mr. TILLMAN. Senator, there is no question of a situation of water belonging to the upper basin, or anything else. Water is allocated to a basin. And we have a contract, bear in mind, Senator, a firm, solid contract, with the United States of America. And it is the effect, the impact of this proposal, which concerns us.

Senator WATKINS. You think this is going to be violated?

Mr. TILLMAN. Well, I have some comments on it in the course of this paper.

Senator WATKINS. If we violate your contract, you can step into the Court of Claims. But you cannot take away other people's rights.

Mr. TILLMAN. No, sir, Senator; and I hope other people will not take away our rights or attempt to.

Senator WATKINS. I can readily understand that if you are buying power at less than 2 mills for firm power, and you are buying it for less than a half a mill for the secondary power, you would not be interested in seeing anything built upstream where you wanted to get your power for which you had to pay 6 mills.

Mr. ASPINALL. The gentleman from California will continue.

Mr. HOSMER. Mr. Bennett, so I will have it clear in my mind, you concede that the compact does require the flow of water past Lee Ferry in addition to the 3 (d) commitment?

Mr. BENNETT. Yes. I do not contend that all of the rights of the lower basin States under the compact are satisfied merely because the upper basin meets its commitment under article 3 (d). That is a 10-year average to begin with.

Mr. HOSMER. Oh, this average comes in.

Mr. BENNETT. I mean article 3 (d) is a 10-year average.

Mr. HOSMER. Yes.

Mr. BENNETT. We do not contend that 10-year average adequately meets any commitment other than the article 3 (d) commitment itself.

Mr. HOSMER. Yes; and article 3 (d) speaks of "flow of the river," does it not?

Mr. BENNETT. Yes; it is a wet-water commitment in our judgment.

Mr. HOSMER. It might not quite be that. Let us leave it at "flow of the river," because article 3 (e) talks about water, and I think we are talking about wet water in that. And article 3 (a) talks about "beneficial consumptive use." I merely bring that out because I want our people, in complying with your request, to read these three articles together to understand that each article is not talking about the same thing.

Mr. BENNETT. I thing that is so, but to avoid a hypertechnical discussion, I accepted the use of the term "wet water commitment" in describing article 3 (d), because those very terms have been used by the principal spokesmen for the southern California opposition to this legislation.

Mr. HOSMER. Possibly so.

Again I want to get back to your theory on this power, withholding of water for storage for pure power purposes. As I understand it, you contend that without violating the compact water may be stored in the upper basin solely for power generation, even though it may not be used for agricultural or domestic purposes in the upper basin, just so long as it is not needed for agricultural or domestic purposes in the lower basin?

Mr. BENNETT. That is correct, sir.

Mr. HOSMER. Apparently, then, the compact does not cover this matter of power uses, excepting only to make them subordinate to the agricultural and domestic uses, as it does in 3 (e).

Mr. BENNETT. I think that is correct, with this possible modification: That it appears to us that the regulation of the flow to make possible the commitment under article 3 (d) and at the same time the probable reasonable uses for domestic and agricultural purposes in the upper basin takes preference over power uses anywhere on the stream. I do not want to mislead you on that point, Congressman. That is why I bring that out.

Mr. HOSMER. I will admit that this storage has some elements of that and has other elements of power. But you have made the flat statement that you can store for power, period, and that is what I am getting at now.

Mr. BENNETT. Certainly, under the terms of the bill that is the case.

Mr. HOSMER. And further, I think that that leads us to the conclusion that when we get into this power versus power field as between the upper and lower basin we are out of the compact and over into the field of pure law, whatever it may be.

Mr. BENNETT. I think that is entirely possible, Congressman, assuming that the storage for power purposes in the upper basin is solely for power purposes, and that the competing demand below would be storage——

Mr. HOSMER. I am talking about a situation where we merely have power versus power.

Mr. BENNETT. That is correct, and no other factors involved.

Mr. HOSMER. What is your understanding of the law that pertains to power versus power?

Mr. BENNETT. Under those circumstances, my opinion, which has not been checked at the Department, would be that the doctrine of priority of time under Nebraska versus Wyoming would be the governing rule, assuming that the whole question was outside of the compact.

Mr. HOSMER. I ask unanimous consent at this point in the record to insert a memorandum relating to the development of hydroelectric power being a beneficial use to which appropriated rights may attach. It is a short memorandum of legal authority.

Mr. ASPINALL. Who is the author of it?

Mr. HOSMER. I had it prepared by one of my assistants.

Mr. ASPINALL. You assume the authorship?

Mr. HOSMER. Yes.

Mr. ASPINALL. Unless there is objection, it is so ordered.

Mr. DAWSON. Mr. Chairman, reserving the right to object. I wish you would look at it. It is just a citation of leading cases and no comments. We are not here to try a lawsuit.

Mr. ASPINALL. If the gentleman is willing to assume the authorship of it, I think he has the right to put it in the record for what it is worth.

(The document referred to follows:)

DEVELOPMENT OF HYDROELECTRIC POWER IS A BENEFICIAL USE TO WHICH A VALID APPROPRIATIVE RIGHT MAY ATTACH

CITATION OF AUTHORITIES

Hutchins, Selected Problems in the Law of Water Rights in the West, Misc. Publication No. 418, Department of Agriculture (1942):

"The usual purposes for which rights to the use of water may be acquired are mining, manufacturing and industrial uses generally, *development of hydroelectric power*, propagation of fish, irrigation, stock-watering, municipal, and domestic uses" (p. 314). [Emphasis supplied.]

"An appropriative right to water in a watercourse * * * is a right to the use of water. This may be a non-consumptive use, as for the development of hydroelectric energy, or it may be a consumptive use, as in case of crop irrigation" (p. 414).

"There have been many cases involving the maintenance of an appropriative right as against the operation of upstream structures subsequently installed, where these later structures were concerned with the use of water, that is, with the exercise of a water right. Dams for the storage (retention) of water and diversion structures are in this group. To the extent that such a structure effects a withdrawal of water from the watercourse, either for direct use or for storage in a reservoir elsewhere, or an impounding of water in a channel reservoir, during the times such water is required to satisfy valid, prior downstream claims to its use, it constitutes an exercise of a subordinate water claim which is *enjoinable* in the event of material injury. The law is well settled to this effect" (p. 414). [Emphasis supplied.]

Cascade Town Co. v. *Empire Water & Power Co.* (181 Fed. 1011 (C. C. D. Col. 1910)):

Dictum: The impounding of water for the purpose of generating electricity to be sold as a commodity constituted a valid appropriation under the constitution and laws of the State of Colorado, as they have been construed by the court of last resort in Colorado. (This dictum appears in 181 Fed. at 1016.) The federal court cited two Colorado cases as authority for this dictum: *Lamborn* v. *Bell* (18 Colo. 346, 32 Pac. 989), *Sternberger* v. *Seaton M. Co.* (45 Colo. 401, 102 Pac. 168).

Thompson Co. v. *Pennebaker* (173 Fed. 849 (9th Cir. 1909)):

The Washington statute in question authorized the appropriation of water for irrigation, mining, or manufacturing purposes. An appropriation was made for one of these purposes, but the water so appropriated was subsequently used for the development and maintenance of an electric power plant.

Held: Once the appropriation had been made for a purpose strictly within the statute, the water could be applied to any beneficial use. The development and maintenance of an electric power plant is clearly a beneficial use. Therefore, the appropriative right continues to be valid.

Mr. HOSMER. Now, Mr. Bennett, we have laid a foundation. Let us pick it up from there.

We established the fact that the Government was managing and operating this project so as not to violate the compact, and the fact is admitted, I believe, that the Government must respect these contractual obligations between the States in the compacts.

Mr. BENNETT. Under the provisions of this bill that is certainly true.

Mr. HOSMER. The Government, then, in building and operating this project would not be executing or implementing the compact in any way, but merely carrying on the Government's operations in such a manner so as not to interfere with it.

Mr. BENNETT. I think that is definitely contemplated. I might go one step further and say that under the provisions of this bill I believe that the operations——

Mr. HOSMER. It is required to do it, is it not?

Mr. BENNETT (continuing). Of the Federal Government in all cases must be traceable to rights of the States under the pertinent compacts. That is going one step beyond. It is not, in my opinion at least, merely a matter of saying that the Congress has directed that these plants be operated consistently with these compacts. It goes beyond that; the reclamation laws are brought in directly, and the water rights in all cases would be subject to section 8 of the Reclamation Act, which directs the Department to comply with State law in these matters.

Mr. HOSMER. In other words, the Government is going to do this thing so it does not foul up the compact or run afoul of other laws or rights or anything like that?

Mr. BENNETT. Yes.

Mr. HOSMER. You want to get a nice clean operation?

Mr. BENNETT. That is correct.

Mr. HOSMER. All right. That is a little bit different, however, than the Government's obligation under the Mexico Treaty, which is a contractual obligation to another contracting party. Right?

Mr. BENNETT. That is correct.

Mr. HOSMER. If the Government is bound in its operation of this project not to breach its contract with Mexico, you would say, would you not, that it was also bound not to breach its contractual relation with any other contracting party, specifically, for instance, the Metropolitan Water District of Los Angeles?

Mr. BENNETT. Of course, the Government has an obligation to carry out whatever contractual commitments it has entered into with private persons or municipalities or anyone else, but the legal consequences of a contract relationship of that kind frequently are much different from what they are when you get into the field of international treaties, Congressman.

Mr. HOSMER. At any rate, the Government cannot, any more than I, breach a contract without suffering the consequences, can they?

Mr. BENNETT. That is true. However, it is clothed with certain protections that neither you nor I would have.

Mr. HOSMER. And we are supposed to carry out the provisions of whatever we contract for in a contract?

Mr. BENNETT. That is correct, sir.

Mr. HOSMER. That brings up this point: Briefly, it is true that the upper basin States themselves, or any one of them, might, if permitted by the compact, legally do things that would make it impossible for the Government to perform its obligation down at Hoover, whereas the Government itself could not put itself out of a position to perform at Hoover by its own acts.

Mr. BENNETT. That is entirely possible. However, I might say that that requires a number of qualifications. To begin with, the Government under this bill is coming in to do certain development work. That development work is being done by virtue of apportionment and compact rights which have been worked out between the States involved, and the Government comes in with its rights as the United States, to some degree at least, subordinated to the rights of the States wherein these operations will be taking place.

Now, that being the case, I believe that the Government is in no different position from the States so far as anything the Government might do in connection with the upper Colorado development which was consistent with the compact and in accordance with law.

Mr. HOSMER. What I am getting at specifically is this: Assuming the theory that you have placed before the committee, to the effect that water can be stored for power and for future exchange purposes by the upper basin, might not the Government in its operations yet be inhibited from so doing if, in so doing, it causes or places itself in a position not to be able to carry out the Hoover contracts?

Mr. BENNETT. I do not agree with that theory and its relationship to the bills before the Congress and the contemplated project.

Mr. HOSMER. I said "if." What I am getting at is, the Government as the contracting party cannot voluntarily place itself out of a position to be able to perform its contract.

Mr. BENNETT. If the contract itself expressly states that the rights to the use of water of the power user are subject to the provisions of the compact, and then the United States proceeds to upstream development which is consistent with that compact, the United States is, in my judgment, in no different position from you or from me or from the State of Colorado or the State of Utah if they were to do that development.

Mr. HOSMER. What I am getting at is, even if it obeys every letter and word of the compact, whatever it is, it is still not entitled to put itself out of a position to comply with some contracts that it has already executed.

Mr. BENNETT. There may be some autorities to that effect. However, I believe under the terms of article 10 that contingency is adequately covered by contractual arrangement between the power contractors and the United States.

Mr. HOSMER. That is just the matter that is in dispute. You are talking about article 10 of what?

Mr. BENNETT. Section 10, I should say, of the power contract.

Mr. HOSMER. Section 10 of the power contract.

Mr. BENNETT. Yes.

Mr. HOSMER. And I am trying to get back to this original simplified concept we had to begin with that the Government is operating and managing and building this thing, and not any State or States in the upper basin, as such, and that it is trying to operate this thing in accordance with the compact. What I am trying to get from you, a further statement, is that it should carry on its operations in accordance with the commitments it has already made otherwise, irrespective of the compact.

Mr. BENNETT. There are two aspects of your questioning in this regard: The first is the question of what the United States would intend to do if this project is authorized and is constructed. In that regard, so far as the present Department of the Interior is concerned, it is our intention to make every effort to satisfy the commitments of these contracts without reference to the escape clause of section 10.

Now when you get to the legal question, whether the United States is legally obligated to do so by virtue of subsection a (2) of section 10 of that contract, I do not agree with you. The language itself says:

> The contract is made upon the express condition and with the express covenant that the rights of the district as a contractor for electrical energy shall be subject to and controlled by the Colorado River compact.

In my judgment that language permits the United States as well as anyone else to do anything on that river which is consistent with that compact.

Mr. HOSMER. Even if what the United States does puts the United States in a position where it cannot perform contracts that had already been assigned and executed and it is bound to until 1987?

Mr. BENNETT. This is a condition subsequent imposed upon this contract and agreed to mutually by the power contractors and the United Sates. In my judgment, so long as the United States is complying with the provisions of that condition subsequent, there would not be recourse.

Now again I state the fact——

Mr. HOSMER. I think you have a very interesting theory there—that it is a condition subsequent—but I am inclined not to agree with you.

Mr. BENNETT. I assumed that.

Mr. HOSMER. It is something that, if we had a law case on it would be right smack in point; would it not?

Mr. BENNETT. Absolutely. There is no doubt about it.

Mr. HOSMER. And that is why I continue to say that the metropolitan water district and other contractors ought to be able to come in and litigate those things which so vitally affect their operations and their rights and, in like token, affect some 6 million southern Californians, for whom I have some responsibility, and which is reflected in the power rates they pay over the area.

Mr. BENNETT. They do have recourse to the courts for the purpose of suing for damages.

Mr. HOSMER. That is not a totally satisfactory method. You did indicate that if they do come in they are litigating things which affect some of the other States, and that is important, but if they came in on

just this condition subsequent, they would not be litigating a matter which affected anybody else. And certainly the State of California and the State of Arizona and the State of Nevada could not come in and sue and bring up that issue. So if you do not give them a chance to get into court reasonably, they are not going to have that thing decided, are they?

Mr. BENNETT. I have two answers to that, if I might.

Mr. HOSMER. I am surprised that you have only got two. You must be getting tired.

Mr. BENNETT. The first one is this: The language of that condition subsequent, about which we are talking, is such as to throw the entire compact into issue. We do not believe that could be adequately done by one party claiming interests and rights under the compact through the State of California.

Now, secondly, on the same score, I am firmly convinced, whether you are or not, Congressman, that if the Los Angeles Metropolitan Water District litigated on a question of damages, and succeeded in getting a judgment, the State of California would not be remiss and certainly would not hesitate to bring an action which would open up the whole question of compliance with the compact.

Now the district is in an ample position under present law to litigate the issue with respect to damages. If she succeeded, I am convinced that the State of California would not be long behind in bringing an action to resolve the operation from an overall State point of view.

Mr. HOSMER. Is that both your answers?

Mr. BENNETT. Yes; two of them.

Mr. HOSMER. I had an answer to one of them, but I have forgotten what it was right now.

We will turn to another subject, and I am just about through.

When Senator Kuchel questioned you over in the Senate side, you were reluctant to give a definition of "surplus."

Mr. BENNETT. I am still reluctant to give a definition of "surplus."

Mr. HOSMER. You are still reluctant. That is one of those matters involved in the lawsuit, is it not?

Mr. BENNETT. Yes.

Mr. HOSMER. Let me ask you just this about it: Would not the method of measuring beneficial consumptive use that we were throwing around a little bit earlier have an effect upon the amount of surplus?

Mr. BENNETT. Under ordinary circumstances, I should think so. In fact, those of us who have given any study to that question are convinced that the method of measurement of use in the end may be more beneficial to the upper basin if the California view prevails.

Mr. HOSMER. That is quite admitted.

Mr. BENNETT. So the question distinctly has an effect on the rights of the upper basin, but it does not, in our judgment, affect the wisdom of the policy involved in the legislation before this committee.

Mr. HOSMER. Mr. Bennett, I have not asked you about policy, I have been asking you about points of law.

Mr. BENNETT. That is why we have not resolved these questions, though, unless they were necessary to determine a proper policy position on this legislation. That is why I am not equipped to answer some of your questions.

Mr. HOSMER. It is my contention that they are necessary because you have asked us to take certain specified articles of the compact and read them together and come to the same conclusions that you have come to respecting them. When you get into those provisions and try to find out what they mean you run smack into the problem of definitions and other things that I have asked about this afternoon.

Mr. BENNETT. Where the legal question is material to the legislation in question, we have taken a consistent view that we will give you our best judgment on the question. Now where those questions are in litigation and we believed that the record established that the issue was unimportant in its relationships to the amount of use contemplated by this bill, then the question has not been studied and analyzed, and we have not reached conclusions with respect to those particular issues.

Mr. HOSMER. And the only difference in my position is that I believe that some of those answers are fundamental to the theory which underlies the Bureau's proposal.

There is only one other thing I want to ask you about, and that is article 13 of the compact.

Mr. BENNETT. Is that the definition section?

Mr. HOSMER. That is the one that states in part "present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact."

Mr. BENNETT. I am sorry. I think you said "13." You mean article 8.

Mr. HOSMER. Excuse me. I meant article 8.

Mr. BENNETT. I was looking for 13 here.

Mr. HOSMER. In connection with that portion of the compact, I want to know whether the Bureau conceives of this to apply to the quality of the water as well as to the quantity of the water.

Mr. BENNETT. There again we have a question which the Department has not attempted to determine. It has looked at the available information with respect to quality of water as it might be affected by the proposals pending before the Congress, reached the conclusion that the effects would not be such as to create any problems so long as the increased uses in the upper basin were not going beyond the proposals that were pending before the Congress.

Mr. HOSMER. You are talking about quantity, and I am talking about quality.

Mr. BENNETT. No.

Mr. HOSMER. No?

Mr. BENNETT. What I am saying is that the Department rested upon the available information and reached the conclusion that the quality would not be adversely affected by the uses in the upper basin contemplated by any of these proposals pending before the Congress. That being the case, the Department has seen no reason to reach a conclusion on the legal issues.

Mr. HOSMER. Bearing the testimony in the hearings last year in mind, when Mr. Dexheimer said that he recognized no obligation on the part of the Department with respect to quality of water.

Mr. BENNETT. That question has been reviewed in the Department and the conclusion I mentioned has been reached, and that has occured since that statement.

Mr. HOSMER. Mr. Dexheimer's statement then has been superseded by what you have stated, which is to the effect that at the present time the Bureau has no opinion on it?

Mr. BENNETT. I would not speak for the Bureau exactly in this instance. The matter was reviewed in the Department, and the conclusion is that the uses contemplated in the bills pending before the Congress would not be such as to affect the quality of the water in any way which would be deleterious to the lower basin rights.

Mr. HOSMER. But the contention of others outside of the Bureau is that the quality might be so affected.

Mr. BENNETT. I appreciate we have an issue of fact, sir.

Mr. HOSMER. I want to know, if they are right, whether or not the Bureau recognizes a responsibility for the quality of water in the lower basin in the management and operation and the design of its projects.

Mr. BENNETT. On that score, we resolved the matter as an issue of fact. We have taken a position, and that position has been stated to the committee.

Mr. HOSMER. And what is that position?

Mr. BENNETT. That the uses contemplated in the bills pending before the Congress would not adversely affect the quality of the water in the lower basin so as to raise an issue of law as to whether there are any legal rights to a given quality of water so far as salinity is concerned.

Mr. HOSMER. In other words, so far as the Bureau is concerned, the Congress is to remain in doubt as to what its attitude would be relating to article 8?

Mr. BENNETT. No.

Mr. HOSMER. In connection with quality.

Mr. BENNETT. We have presented our factual judgment in the matter and are standing on it.

Mr. HOSMER. I understand that. As I understand, too, Mr. Bennett, the Bureau has been wrong in its conclusions before, and it might be wrong in this instance. And in view of the deterioration of the quality of the water, we want to know whether that water is protected as to quality by this language about present perfected rights.

Mr. BENNETT. I might point out, Congressman, that the bills before the Congress and the plans of the Bureau contemplate a 20-year development period here. This development is not to take place overnight. The result is that it will be a more or less gradual development with ample opportunity on all sides, the lower basin interests as well as upper basin interests, to watch and to observe quality conditions and other factors that may present problems in the operation of this project.

Mr. HOSMER. And I further recognize that this project is talked of in terms of lasting for 200 years, which is a period involving 50 Presidential administrations, and you and I will certainly not be here at the end of 200 years or 100 years, or a much shorter period than that. So we are trying to find out what is going to happen over this whole period in the near future and in the distant future, and you leave me completely in doubt as to the quality problem.

I have one more minute, but I think I am finished.

Mr. ASPINALL. Will you yield to the chairman at this place?

Mr. HOSMER. Yes.

Mr. ASPINALL. Section 14 of H. R. 3383 endeavors to satisfy the gentleman from California and those who are associated with him in their feeling about the quality of water.

Mr. HOSMER. Yes, I recognize that section exists, but I do not think it means anything.

Before we close, I wish to thank Mr. Bennett very much for his patience, and I want to congratulate him on the fine way he handled himself.

Mr. BENNETT. Thank you.

Mr. ASPINALL. May the Chair say he is very appreciative of the way both of you gentlemen handled yourselves as to the points, not only of interest but of vast importance in this legislation.

(Discussion off the record.)

Mr. ASPINALL. At this time the Chair declares the hearings, as such, on the upper Colorado——

Mr. HOSMER. Before you do that, there is a general permission for the members to make a statement in the record?

Mr. ASPINALL. That is right.

Mr. HOSMER. How much longer do we have?

Mr. ASPINALL. The Chair would request all statements to be in by next Tuesday evening.

Mr. HOSMER. Right.

Mr. ASPINALL. With that understanding, the hearings as such on this legislation are declared closed. The committee will be in adjournment on this particular legislation subject to the call of the Chair for the writing up of the bill.

(Whereupon, at 4:03 p. m., the subcommittee adjourned to reconvene at the call of the Chair.)

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SUBCOMMITTEE ON IRRIGATION AND RECLAMATION

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS HOUSE OF REPRESENTATIVES

EIGHTY-FOURTH CONGRESS

FIRST SESSION

ON

H. R. 270, H. R. 2836, H. R. 3383, H. R. 3384, and H. R. 4488

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COLORADO RIVER STORAGE PROJECT

FRIDAY, MARCH 11, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:35 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will now be in session for the further consideration of the bills having to do with the authorization of the upper Colorado River project program.

At this time I would like to ask unanimous consent of the committee that the hearings which are to follow later in further questioning of the Bureau of Reclamation Commissioner and his staff will be allowed to be printed at this place in the record or following their testimony which has been given heretofore. Is there any objection?

Hearing none, it is so ordered.

Today has been set aside to hear the witnesses from Colorado who are listed as proponents of the legislation.

I have received a memorial from the State of Colorado which is authenticated by the officers of the State legislature, said memorial being known as senate joint memorial No. 8, stating the position of the Colorado Legislature upon the legislation. I can advise the committee it is favorable to the program.

Is there any object to having this made a part of the record at this point?

Hearing none, it is so ordered.

Mr. CHENOWETH. Will the gentleman yield?

Mr. ASPINALL. Certainly.

Mr. CHENOWETH. I would like to state that I also received a copy of the same memorial, and I would like to join with the chairman in presenting it for the record.

Mr. ASPINALL. I thank the gentleman very much.

(The document referred to follows:)

SENATE JOINT MEMORIAL NO. 8

(By Senators Mowbray, Bennett, Bentley, Bishop, Bledsoe, Brotzman, Brown, Carlson, Cheever, Chrysler, Culig, Danks, DeBerard, Dunklee, Elliff, Gill, Gobble, Ham, Hocker, Johnson, Knous, Locke, Miller, Molholm, Nicholson, Pomponio, Rogers, Shults, Skiffington, Strain, Sullivan, Taylor, Veltri, Weinland, and Wilson; and Representative Conklin.)

MEMORIALIZING THE CONGRESS OF THE UNITED STATES TO ENACT LEGISLATION FOR THE DEVELOPMENT OF THE UPPER COLORADO RIVER BASIN

Whereas legislation has been introduced in Congress to authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects; and

Whereas, the importance of high river storage must be recognized and given immediate priority as to order of authorization, appropriation, and construction; and

Whereas the stream regulation, water supply, and resulting electrical energy will be of great importance in developing the natural resources of the State of Colorado, as well as enhancing the recreational facilities and the continued growth of population; and

Whereas, the development of the natural resources within the basin of the Colorado River will promote the welfare and national defense of the United States; and

Whereas, the States of the Upper Colorado River Basin under the Colorado River Compact of 1922 are required to deliver to the lower basin a specified amount of water which cannot be assured without holdover storage; and

Whereas, the Upper Colorado River Commission, the Colorado State Conservation Board, and the Colorado River Conservation District have unanimously approved and recommended the authorization of the following projects:

Curecanti
Echo Park
Pine River extension
Silt
Parshall
Rabbit Ear
Woody Creek
Bluestone
Tomichi Creek
Ohio Creek
Bostwick Park
Dallas Creek
Dolores
Florida
Juniper
Paonia (including the Minnesota unit)
Smith Fork
Troublesome
Eagle Divide
West Divide
Battlement Mesa
East River
Fruitland Mesa
Grand Mesa
Savory-Pot Hook
Fruitgrowers extension

Now, therefore, be it

Resolved by the Senate of the Fortieth General Assembly of the State of Colorado, the House of Representatives concurring herein:

That the Congress of the United States be, and hereby is, memorialized to enact legislation authorizing the upper Colorado River storage project and participating projects including all of the projects herein set forth; and be it further

Resolved, that copies of this memorial be forwarded to the President of the Senate, and Speaker of the House of Representatives of the Congress of the United States and to each member of Congress from this State.

STEPHEN M. MERJICHOLS,
President of the Senate.
MILDRED H. CRESWELL,
Secretary of the Senate.
DAVID A. HAMIL,
Speaker of the House of Representatives.
LEE MATTIS,
Chief Clerk of the House of Representatives.

Mr. ASPINALL. This morning's representatives of Colorado who will appear are Messrs. Crawford, Hughes, Smith, Jex, Barnard, Merriell, Newton, Culverwell, and Robert Delaney.

The Chair would ask unanimous consent that we listen to the presentation of each one of these witnesses, that at the end of the presentation of the evidence which each wishes to give, we then ask all of them to take their place before the witness table and be questioned in a group. Is there any objection?

Hearing none, it is so ordered.

Mr. DAWSON. Might I inquire, is there any time limitation on the time each witness shall take?

Mr. ASPINALL. That was the next unanimous-consent request that I was going to make of the committee. I make the unanimous request that before the questioning starts we divide the time which is left up until the hour of approximately 12:30 by the number of those who are present, committee members and Members of Congress, and those interested in this legislation, and that we give to each member present at that time his proportionate amount of time. Then, if there is any time left over when we get through with the questioning, we will come back to those who gain the recognition of the Chair. Is there any objection?

Hearing none, it is so ordered.

At this time I shall call Ivan Crawford, director of the Colorado Water Conservation Board, the official organization of the State of Colorado. Mr. Crawford has been in this work a long time, and the record of last year shows his qualifications. We need not repeat them now.

It is nice to have you with us this morning, Mr. Crawford, and you may proceed.

STATEMENT OF IVAN C. CRAWFORD, DIRECTOR, COLORADO WATER CONSERVATION BOARD

Mr. CRAWFORD. Mr. Chairman and members of the committee, I should like to submit for the record a resolution stating the position of the board with regard to the Colorado River storage project as adopted on January 14, 1935. You will find this on page 308 of last year's hearings.

Three changes have been made in the recommendations of the board since that date and these are shown in an excerpt from the minutes of the board meeting of February 4, 1955, which I would also like to file for the record.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

(The documents referred to are as follows:)

EXTRACTS FROM THE MINUTES OF THE COLORADO WATER CONSERVATION BOARD MEETING OF FEBRUARY 4, 1955

* * * * * * *

"Mr. PUGHE. I move that we include the 18 projects listed in the suggestions by the Governor, including Battlement Mesa.

"The motion was seconded by Mr. Dille, and upon vote being taken, the motion carried unanimously.

"Mr. PUGHE. I move that the Juniper unit be substituted for Cross Mountain in the present bill.

"The motion was seconded by Mr. Kelly, and upon vote being taken, the motion carried unanimously.

"Mr. MOSES. I move that we approve the Curecanti unit as revised as an initial project.

"The motion was seconded by Mr. Dille, and upon vote being taken, the motion carried unanimously."

* * * * * * *

I certify that the above is a true copy of extracts from the minutes of the Colorado Water Conservation Board meeting February 4, 1955.

IVAN C. CRAWFORD, *Director.*

The 18 projects referred to are Fruitgrowers Extension, Tomichi Creek, East River, Ohio Creek, Fruitland Mesa, Bostwick Park, Grand Mesa, Dallas Creek, Parshall, Troublesome, Rabbit Ear, Eagle Divide, Woody Creek, West Divide, Bluestone unit, Battlement Mesa, Dolores, and Savery-Pot Hook.

IVAN C. CRAWFORD, *Director.*

EXTRACT FROM MINUTES OF MEETING OF COLORADO WATER CONSERVATION BOARD, JANUARY 14, 1954

* * * * * * *

Whereas the Colorado Water Conservation Board has given consideration to the report of the Secretary of the Interior, dated December 22, 1950, on the Colorado River storage project and participating projects, and to the supplemental report, dated December 10, 1953, of the Secretary of the Interior on the same subject; and

Whereas the board, in an endeavor to ascertain the attitude of all interested areas and citizens of the State of Colorado in regard to the position which Colorado should take on such reports, did at its February 17, 1953, meeting create the Colorado conference committee to study the use of Colorado River water in Colorado and particularly the proposed transmountain diversion by Denver from the Blue River; and

Whereas such reports have been made and the conference committee has reported to the board; and

Whereas in a further effort to reconcile conflicting views as to the use of Colorado River water without the natural basin in Colorado the board did on December 30, 1953, appoint a mediation committee, which has this day reported that it could come to no agreement: Now, therefore, be it

Resolved by the Colorado Water Conservation Board, the official State agency which is charged by law with the duty and responsibility of promoting the conservation of the waters of the State of Colorado in order to secure the greatest utilization of such waters and the utmost prevention of floods, That—

1. It is the position of the State of Colorado that all waters of the Colorado River system available for use in the State of Colorado under the various instruments constituting the law of the river shall be put to beneficial consumptive use in Colorado as expeditiously as orderly economic development will permit.

2. Because of Lee Ferry delivery obligations imposed by the Colorado River compact of 1922, substantial quantities of regulatory holdover storage must be provided in the upper basin if that basin is to be able to put to beneficial consumptive use its allotted share of Colorado River water.

3. The Colorado River storage project will provide such necessary storage and is essential to the full economic development of the water resources of the upper basin.

4. The plan of the Colorado River storage project to finance the construction of the necessary holdover reservoirs through the revenues derived from the sale of power generated at hydroelectric plants and to utilize a portion of such revenues to assist in the financing of so-called participating projects which meet certain fixed criteria is approved.

5. In connection with the Glen Canyon Reservoir, Colorado directs attention to the fact that this reservoir, which is located but a short distance above Lee Ferry, will yield substantial benefits to the lower basin, one of the most important of which is the detention of silt and the resulting prolongation in the useful life of Lake Mead. The official representatives of Colorado should strive to obtain some recognition by the lower basin of these benefits and, if possible, a sharing by the lower basin of such matters as reservoir losses.

6. The Echo Park unit is a desirable feature which has the full support of Colorado.

7. Authorizing legislation should contain appropriate provisions for the recapture for use within the upper basin of power generated by the Colorado River storage project when and if any of such power is sold or transmitted for use within the lower basin.

8. Specific provision should be made in authorizing legislation to assure that no rights vest in the use of water for power generation in units of the project which will prevent or handicap the beneficial consumptive use upstream of the waters of the Colorado River system to whch any upper basin State is entitled.

9. Colorado has no objections to the report of the Secretary of the Interior on participating projects except that Colorado urges that further study be given to

the La Plata and San Miguel projects, which are urgently needed, in order to develop, if possible, a feasible plan therefor and except as hereinafter noted.

10. The report and the supplemental report of the Secretary of the Interior practically ignores any development of Colorado River system water in Colorado. For this reason, Colorado cannot accept the report and supplemental report as now submited. As conditions precedent to Colorado approval of the report, provisions must be made therein, or in the authorizing legislation, which will assure the following water development in Colorado:

(*a*) The Cross Mountain unit must be included within the initial authorization for construction as of part of the first phase of the project.

(*b*) There is no doubt that further consumptive use of water in Colorado is directly dependent upon high upstream storage. To provide therefor there must be included in the initial authorization aproximately 3 million acre-feet of total new storage on the Colorado River and its tributaries above Grand Junction, Colo., a substantial portion of which shall be located on the upper reaches of the Gunnison River. The known reservoir sites which might accomplish this objective are Curecanti on the Gunnison and DeBeque on the Colorado River. Additional investigations may disclose other sites. There is little doubt but that the stated amount of storage will be needed. The Secretary of the Interior is urged to expedite the investigation and study of projects which will furnish the requested storage.

11. Denver, the capital city of Colorado, desires to divert water from the Blue River, a tributary of the Colorado River, for municipal and industrial uses in the metropolitan Denver area. The rights of Denver to take and divert such water are alleged to be in conflict with rights for the use of water stored in Green Mountain Reservoir and taken through the Green Mountain powerplant for the generation of power. Green Mountain Dam, Reservoir, and powerplant constitutes a unit of the Colorado-Big Thompson project of the United States Bureau of Reclamation.

The controversy over the relative rights of Denver and the Green Mountain project are in litigation in a lawsuit now pending in the Supreme Court of the State of Colorado and in another lawsuit now pending in the United States District Court for the District of Colorado.

It would be improper for this board to attempt to invade the province of the courts or to influence the pending litigation. The board has no intention of doing either. The feasibility of the proposed Denver-Blue River diversion depends, among other things, on the outcome of this litigation, or on some alternative thereto which satisfactorily protects the Colorado-Big Thompson project.

Upon the condition that the legal availability of a reasonable quantity of water for the Denver-Blue River diversion be established, either by litigation or some other arrangement, and the condition that such project be otherwise feasible, the board approves the Denver-Blue River project for inclusion as a participating project in the authorization of the Colorado River storage project or for such other Federal legislative or administrative action as may be requested by Denver.

12. The board recommends that Denver and the representatives of the west slope in Colorado make every effort to arrive at a harmonious solution of the unfortunate transmountain diversion controversy which for years has created dissension in Colorado. The board pledges that it and its staff will be ready to assist in the amicable settlement of this prolonged conflict.

13. The director of the board and the Colorado member of the Upper Colorado River Commission are directed to do all things necessary and proper to effectuate this resolution.

14. Copies of this resolution shall be forthwith transmitted to the Governor of Colorado and to the Members of the Colorado congressional delegation.

* * * * * * *

I certify that the above is a true copy of a resolution passed by the Colorado Water Conservation Board on January 14, 1954, as shown in the minutes of the board meeting for that date.

IVAN C. CRAWFORD, *Director.*

Mr. CRAWFORD. May I state that these three changes consist of the following:

(1) The addition of 18 participating projects; (2) the substitution of Juniper project for Cross Mountain project; and (3) the approval of a revised version of the Curecanti project.

Mr. ASPINALL. Do you have anything additional?

Mr. CRAWFORD. Nothing additional.

Mr. ASPINALL. Thank you very much, Mr. Crawford. You will be seated in the audience, if you please, and wait until we have the examination of the witnesses.

The next witness appearing on behalf of Colorado is the Honorable Dan H. Hughes, judge of the district court of Colorado, with residence at Montrose, Colo. May the record show that these men appearing from Colorado are all personal friends of the Colorado delegation. I think that is a fact. [Laughter.]

Judge Hughes has long been interested in water matters and has taken a lead in Colorado water matters. Judge, will you proceed, please.

STATEMENT OF HON. DAN H. HUGHES, JUDGE OF DISTRICT COURT OF COLORADO

Mr. HUGHES. Mr. Chairman and members of the committee, I certainly want to express the appreciation of all of us men from the western slope for the courteous treatment we have received here, I could almost say through the years when we have been coming back on these several bills.

Mr. ASPINALL. We are glad to have you here again.

Judge HUGHES. I am Dan H. Hughes of Montrose, Colo. I have lived in Montrose since 1904. I started the practice of law in 1911 and have continued in the law as attorney or district judge to the present time. I have operated irrigated farms and livestock in Montrose, Gunnison, and San Miguel Counties since 1916.

I am or have been a member of the following water boards: Colorado Water Conservation Board, 1948 to 1952; Uncompahgre Valley Water Users Association and the Colorado River Water Conservation Board at the present time.

The reason for holdover reservoirs is to reserve as large a percentage of the Colorado River water as possible for beneficial use. Small upstream reservoirs and distribution canals are the works which actually put water to a consumptive use. These are referred to in the several bills as participating projects. Holdover reservoirs are in deep canyons from which water cannot be drawn for consumptive use and constitute no part of our irrigation systems.

We are, therefore, vitally concerned with the authorization and construction of the participating projects for Colorado as included in H. R. 3384 introduced by Congressman Aspinall. It is these participating projects that are of paramount interest to the western slope of Colorado. Without depreciating holdover reservoirs it is still a statement of fact that upstream small reservoirs, which will make water available to us for consumptive use, are of far more importance than simply storing the water in a deep canyon where it cannot be made available for consumptive use.

Wherever water is available and the land is sufficiently level, agricultural production in western Colorado is equal to that of any part of the Union.

We have a wealth of minerals. The largest deposit is our oil shale; next comes coal. At present, and first in importance, is uranium ore. We also have iron, copper, lead, zinc, tungsten, and other minerals too numerous to mention.

Our population—I mean on the western slope—is growing by leaps and bounds. Uranium mining, more intensive farming, and recently, a large number of people who feel that in view of the threat of atomic bombs this is the safest place in the Nation to live, account for this increase in population.

When commercial plants for the treatment of oil shale are constructed, and the present opinion is this will be in the immediate future, our population increase will be manyfold.

The limiting factor in the development of western Colorado is water. We are already scraping the bottom of the barrel. The time is upon us when reservoir construction must start for a twofold purpose—holdover storage, and upstream reservoirs to make water available for our thirsty lands, industries, and cities.

Our present irrigation projects, private and Federal, have tapped the streams where the water could be made available for irrigation with the least expenditure. However, even early projects were found to seriously need storage reservoirs as a part thereof. To illustrate, the Uncompahgre project started at the turn of the century and completed in 1909 was constructed on the theory that storage was not necessary. During the years we found that without storage we were in constant danger of a shortage of water and the loss of crops. Based on many years' experience, the Taylor Park Reservoir was constructed in the late 1930's and in each of the last 2 years alone its benefit to our project has been in excess of the total cost of construction.

We have reached the stage when no major project can be approached without including in its plan the storing of water during the spring runoff for later use in the season when the natural flow of the stream has reached the minimum. This is the purpose of the small reservoirs included in the participating projects which we are seeking to have included as a part of the overall upper Colorado River storage program.

Let us take the situation of these projects which would be located in Gunnison County. Water from these reservoirs would first irrigate Gunnison County land. They would return immediately to the Gunnison River. Water from this river is taken through the Gunnison tunnel to the Uncompahgre project to irrigate Montrose County land. These waters return to the Uncompahgre River and are used on Delta County land. The return water again goes to the river and is available for the Redlands project in Mesa County. This illustrates how water from one reservoir can be applied again and again on our land.

It is a fair statement that for every foot of stored water in an upstream reservoir there would be available a minimum of 2 feet of water for irrigation.

It is our feeling that the present bill should make provision for the small upstream reservoir and the necessary works to make the waters stored therein available for irrigation. Unless this is done only one-half of the problem will be planned and provided for, and certainly the full problem should be included in the present bill and the subject treated as a whole and not piecemeal. Frankly, we have been and are of the opinion that until quite recently the officials of the Bureau of Reclamation have been so engrossed with their large downstream holdover reservoirs and powerplants that they have seriously neglected plans to make the water involved available for consumptive use. This is particularly true on the western slope of Colorado. We feel now

is the time when we must insist upon the full plans being incorporated into the present bill.

We believe that officials of the Bureau of Reclamation will admit that interested parties on the western slope have urged for many years that complete and detailed surveys be made so that water in question can be made available for consumptive use. To put it mildly, we have fought with the Salt Lake office of the Bureau, which has jurisdiction over our region, since at least 1940 in an effort to have surveys made and plans prepared on the projects which are now proposed by our Governor, the Honorable Edwin C. Johnson, and our Representative, the Honorable Wayne C. Aspinall. Some of the proposed projects have been completely surveyed, some only by reconnaissance, as we understand. From data it now has, the Bureau of Reclamation can give, and it is my understanding has given, the approximate cost of these proposed projects and the results compare very favorably with other proposed participating projects.

This area of the western slope contains the main source of uranium-bearing ore. It contains tremendous oil-shale deposits which must soon begin to furnish a major portion of our oil. It has an empire of untouched land, which with water, will produce as abundantly as any land in the United States. Our coal reserves are greater than any other known reserves in the United States. We are so located that we should not be included in the first target for atomic bombs. Inevitably we must prepare for a tremendous increase in population to make these oil reserves available, and possibly furnish homes for people of other sections in the event of atomic-bomb attacks.

Our best thinkers today and for many years past have advocated a decentralization of our population and dispersal of our industries. The Department of Agriculture tells us to prepare for some 200 million people by possibly 1970. In the face of these facts, we urge it is not wise to let our water go to waste; that on the other hand, for the good of our country as a whole, waters in question should be made available for consumptive use in the greatest amounts possible.

Thank you.

Mr. ASPINALL. Thank you very much, Judge Hughes.

The next witness is Silmon Smith, a long-time attorney in Grand Junction, Colo., interested for years in water matters, also a leader in water deliberations and decisions in Colorado, also a practicing fellow attorney of mine from our own bar.

Mr. Smith, it is nice to have you with us.

STATEMENT OF SILMON SMITH, GRAND JUNCTION, COLO.

Mr. SMITH. My name is Silmon Smith. I am an attorney with office at Grand Junction, Colo. It was my privilege to serve for about 11 years from 1937 through 1948 as a member of the Colorado Water Conservation Board. I have with me Clifford Jex, an engineer in private practice in Grand Junction, Colo. Mr. Jex and I are here representing western Colorado.

Over 70 percent of water of this great river system, tributary to Lee Ferry, originates in western Colorado. This is over four times the amount of water contributed to the river system by any other State of the upper basin.

From the water originating in western Colorado must come most of the water to supply the lower basin under the provision of the 1922 compact, and the water for the United Mexican States under the treaty of 1944.

On the basis of water furnished, western Colorado should be considered as a 70-percent stockholder, with the three other upper basin States, of this water resource. In the past we have endeavored to cooperate with our neighbors in the development of the use of this water, and as evidenced by the 1922 compact, 1944 treaty, and 1948 upper basin compact, we have been more than generous, to the point where it is now apparent that there does not remain sufficient water to develop the known resources of western Colorado.

Western Colorado was settled from 40 to 60 years later than other sections of Colorado and the surrounding States. We now find ourselves in violent competition with our neighbors to the east, west, north, and south over water which originates in western Colorado.

We recognize that the rights to the use of Colorado River water by each of the basin States and Republic of Mexico have been settled by compacts and treaty. We trust that the intent of those drawing the compacts and the treaty will prevail in the use of the water of this river system.

The application of the terms of the compacts and the treaty to the records of flow of the river shows that the State of Colorado will never, as a State, have a right to the use of more than about 2,800,000 acre-feet. This is only 25 percent of the watershed yield of western Colorado. Compilations of the present and the committee uses within the State indicate that about two-thirds of this supply has already been appropriated, leaving a quantity of about 1 million acre-feet for all time future expansion of the entire State of Colorado. This is one-eleventh of the total supply of the water which originates in western Colorado.

Partial and incomplete studies of the irrigation potential, coupled with preliminary study of the probable industrial water requirement of such nationally recognized resources of western Colorado as the oil shale and uranium deposits, show that full development of the area would require considerably more water than the total remaining available for use by the State of Colorado from the Colorado River. This entirely ignores the fact that the Bureau of Mines has reported that for the hydrogenation of our coal deposits it will require 1 million acre-feet of water.

We point out that we are seriously omitted in H. R. 3383, compared with the development of other States in the basin. Beyond question the principle that the reasonable and economic water-use requirement of the area of the origin of water should be given first consideration in the use of water has been overlooked.

The following figures give the relative water contribution in percent, the water allocated by compact to each of the four upper basin States in percent, the proposed irrigation development based on cost under H. R. 3383 and H. R. 3384.

First, Colorado contributes 70.1 percent of the water at Lee Ferry. Under the compact it is given 51.75 percent. Under H. R. 3383, the cost of the proposed development is 3.9 percent. Under H. R. 3384, it is 26.2 percent.

Mr. SAYLOR. Mr. Chairman.

Mr. ASPINALL. Just a moment. The gentleman from Pennsylvania.

Mr. SAYLOR. I do not wish to interrupt Mr. Smith in his presentation, but the water compact division percent pertaining to which compact, sir?

Mr. SMITH. 1948. That is the upper-basin compact.

Mr. SAYLOR. The upper-basin compact?

Mr. SMITH. Yes. Excuse me.

New Mexico, on the other hand, contributes to the flow at Lee Ferry 1.6 percent. Under the compact of 1948 she was granted 11.25 percent. Under H. R. 3383 her development cost is a percentage of 53.8, and under H. R. 3384 it is 38.6.

Utah contributes——

Mr. ASPINALL. Just a moment. The gentleman from California, Mr. Hosmer.

Mr. HOSMER. Is that proposed development percent a percent of water or a percent of money?

Mr. SMITH. Money.

Mr. HOSMER. Thank you.

Mr. SMITH. Utah contributes 16.4 percent, was granted under the 1948 compact 23 percent. Under H. R. 3383 her cost of irrigation development is 36.9, and under H. R. 3384, 27.2.

Wyoming contributes 11 percent, was granted 14 percent by the 1948 compact. Under H. R. 3383 she receives 5.4 percent, and under H. R. 3384, 8 percent.

Arizona contributes approximately 0.9 percent.

We of western Colorado have difficulty recognizing the development proposal before the committee as a basin development. It appears to us the plan is designed primarily for development outside the basin by the transmountain diversion of water. Based on the cost of participating projects under H. R. 3383, as allocated to irrigation, 56.2 percent of project expenditures for irrigation will be used on transmountain diversion projects. We very seriously question the soundness and the economic justification of such a large portion of this development going for transmountain diversion projects.

Over a long period of years the Bureau of Reclamation has conducted investigation studies on potential projects for the inbasin use and the transmountain diversion use of the water. We now have reports on 35 projects or units of projects dealing with the use of the water of this river system in the 4 upper basin States. Five of the reports relate to projects for the transmountain diversion of water and 30 reports relate to inbasin use of water. These reports show that the cost of irrigation per acre of new land or new land equivalent in the basin is on the order of from one-third to one-half the cost of irrigation per acre of land outside the basin.

The consumptive use of water, as reported by the Bureau of Reclamation for the New Mexico projects as listed in H. R. 3383 and H. R. 3384, if added to the present existing uses by that State appear to us to exceed a safe estimate of the water New Mexico is likely to receive from the Colorado River under compacts. We urge that the committee give this matter very careful attention. It would be most unfortunate to authorize the construction of costly works on which an adequate water right is not assured.

It should be remembered that western Colorado is a relatively young area. Its undeveloped resources in oil shale, uranium and coal ad-

mittedly exceed the resources of the famed Ruhr Valley. It is rich in the production of the most vital resource, water, but most of that water has already been allocated to other areas less fortunately endowed. We look to the Congress of the United States for the benefit of the entire Nation, to protect our use of the small remaining portion of the water for the development of the favored area in which it originates.

Thank you.

Mr. ASPINALL. Thank you, Mr. Smith.

The next witness from Colorado is John Barnard, an attorney interested in water matters and formerly appearing before this committee. We are glad to have you with us, Mr. Barnard.

STATEMENT OF JOHN B. BARNARD, GRANBY, COLO.

Mr. BARNARD. Mr. Chairman, I have prepared a somewhat more extended statement than I propose to present orally to the committee.

Mr. ASPINALL. Is there any objection to the introduction of the statement and then permitting Mr. Barnard to speak extemporaneously at this time?

Hearing no objection, it is so ordered.

(The statement referred to follows:)

STATEMENT OF JOHN B. BARNARD OF GRANBY, COLO.

My name is John B. Barnard of Granby, Grand County, Colo. I have practiced law since 1920 to the present time, and in addition thereto have owned and operated an irrigated ranch in Grand County, since 1921. I am attorney for the Middle Park Water Conservancy District, comprising the area embraced within the geographical limits of Grand and Summit Counties, Colo., at the headwaters of the Colorado River and one of its principal tributaries, the Blue River.

As has been or will be explained by other witnesses, the holdover storage reservoirs, which form a part of the Colorado River storage project, will make available to the four upper basin States a portion of the water of the river which is apportioned to these States by the 1922 compact, and divided among them by the 1948 compact, which could not, otherwise, be put to use by them. The headwater diversion, storage and distribution systems, which are the participating projects, will enable these four States to put to use the Colorado River water which will be made available to them by the operation of the large reservoirs. Both the large dams and the smaller units are necessary if the end result is to be accomplished—the development of the immense area of the west which is the upper Colorado River Basin. Neither will be sufficient to that end without the other. Together they comprehend and represent a program of progress and development which has been the very essence of American history, from colonial days to now. Ultimate defeat of the project would mark the end of that program, so far as the upper Colorado Basin is concerned.

Is there economic and historical justification for this project? First let us consider the economic phase, which inevitably prompts the question: What will be the cost to the United States—to the taxpayers who will foot the bill? I do not mean the total investment by the Government in the project; I mean the amount which we taxpayers will pay for it, which will not be repaid to the Treasury.

Detailed figures are not available to us at this time, relating to the storage project as comprehended in H. R. 3384 or any of the bills presently before the House or Senate; but we do have at hand the figures which are applicable to the bill introduced in the House of Representatives of the 83d Congress, 2d session, which included 4 storage project units and 16 participating projects. For the purposes of this discussion, which properly should be termed a consideration of policies and principles, those figures will suffice. Already they have been presented to and considered by you; and I wish merely to reanalyze and to reappraise them.

The total estimated cost of construction was $1,518,096,000. Of this total, the sum of $712,762,000 was allocated to power purposes, all reimbursable with interest, $100,874,000 to municipal water purposes, all reimbursable with interest, $691,245,600 to irrigation, all reimbursable without interest, and $7,714,700 to flood control recreational development, Forest Service resource development, etc., all nonreimbursable. From these figures emerges the conclusion that the actual cost to the taxpayers would be $7,714,700 plus interest on the unpaid balance of the sum of $691,245,600 allocated to irrigation, as that amount is expended and during the period of its repayment.

A moment ago I said that authorization of this project will carry forward the historical program of progress and development which has become an accepted part of the policies and traditions which have made America great. Are there other similar programs, involving the expenditure of substantial amounts of the taxpayers' money, with which to make pertinent comparison? Yes. I refer, specifically, to the civil works activities of the United States Corps of Engineers. The progress of our Nation has always demanded and still demands that flood-control works be constructed, for the protection of human lives as well as property, and that commercial intercourse be facilitated, between and among States and with foreign nations, by dredging otherwise nonnavigable streams and by harbor improvements. Congress has long recognized the necessity for those works, has repeatedly authorized projects directed to that end, and has consistently appropriated taxpayers' money for their construction. But when we propose national progress by means of the storage, distribution and beneficial use of water for irrigation and other purposes, we are met with the contention that the cost to the taxpayers is too great to be considered.

The justification for the expenditure of Federal funds in the planning and construction of civil works by the Army engineers is found in the fact that the cost of such works is beyond the ability of private capital to meet, plus the fact that the national economy requires that the projects be constructed. Without them, the affected areas and communities find themselves unable to carry on their agricultural and industrial activities with efficiency. Quite possibly we can say that the underlying theory of these works is that what is good for the economy and way of life of the people of New Jersey, for example, is good for America. We simply ask that that same theory be applied to the project we here propose.

The Colorado River storage project will primarily benefit four States, Colorado, Wyoming, Utah and New Mexico. To appraise and measure the economic justification for the expenditure of the amount of Federal funds required to produce that benefit, let us compare the cost thereof with the cost of civil works projects in four eastern States, chosen at random, Pennsylvania, New Jersey, Maryland and Massachusetts.

These are the figures showing the expenditure of Federal funds made in the construction of works involved in flood prevention and river and harbor improvement in those States, made available to us by the Corps of Engineers, each amount representing the cost to the United States and not including contributions from local interests:

Pennsylvania, 1948 to 1954, inclusive	$354,749,000
New Jersey, 1824 to 1954, inclusive	131,544,000
Maryland, 1824 to 1954, inclusive	66,111,000
Massachusetts, 1824 to 1954, inclusive	109,365,000
Total	661,769,000

It will, of course, be noted that, in the case of Pennsylvania, expenditures for the years 1824 through 1947 were not supplied us and are omitted from the above tabulation. We are informed that no part of the total has been or will be repaid to the Federal Government.

The above total is, then, to be compared with the sum of $7,714,000, that being the non-reimbursable investment of the United States in the 1954 version of the Colorado River Storage Project. I did not calculate the interest on the money allocated to irrigation, in the storage project, as the same is advanced, nor upon the expenditures made by the United States for the above civil works activities. The two amounts are closely comparable, $691,245,600 for irrigation, and $661,769,000 for civil works. The interest charge to be added to the latter would be far greater than that involved in the former, the obvious reason being that, upon the portion of the investment of Federal funds allocated to irrigation in connection with the storage project, interest charges would end with repayment,

whereas computation of interest on civil works investment must be a continuing process forever.

What, I ask you in all sincerity, is the fundamental distinction to be drawn between the construction of dams, levees and other works to prevent water from spreading over land, thus rendering the affected lands unproductive, and building dams and canals to cause water to spread over lands, thus rendering them productive? Is there any reason why the one endeavor should be approached from the standpoint of an indulgent and generous father, and the other should be viewed through the cold, unsympathetic eyes of a money lender?

There is opposition to this project. It was expected. We do not disregard it nor do we minimize it. We do not question, much less impugn, the integrity or sincerity of those whose views do not coincide with ours. We respect their opinions, even though we disagree with them. They and the whole people of the United States are entitled to know why we say, as we do with appropriate emphasis, that they are wrong.

Withholding approval of the Colorado River storage project would be tantamount to characterizing the vast area of the West which it would serve as economically or otherwise unfit for agricultural or industrial development. That portion of our Nation would forever be inhabited by the fortunate few whose hardy pioneer ancestors foresaw the necessity for early appropriation of water for various human uses, and made such appropriations; by the little towns which serve that few; by tourists who want to take a fleeting look at the grandeurs of nature; by the people who gain a meager and precarious livelihood. from catering to the unpredictable needs and demands of the tourists; and by coyotes and jackrabbits.

Many reasons are advanced for withholding such approval. Many more undoubtedly will be conceived and voiced. Time obviously will not permit us to answer them all. The fact that we do not attempt to do so is not to be taken as an admission that there are no adequate answers, merely that time will not permit us to voice them.

Among others it is the freely expressed opinion that America now produces a surplus of everything that will be produced in this area. This contention is based upon the premise that three-fourths of the world's population is forever doomed to semi or complete starvation, while the other one-fourth produces more than it needs. We cannot accept that premise as a postulate. We believe that our leaders, working as they are now laboring, with the leaders of other free nations, will, without recourse to armed conflict, and in the not too far distant future, rid the body of the world of the cancer of communistic dictatorship which places a higher value on sustenance for the dogs of war than food for human beings. We have such faith in our Nation's present and future leaders that we look forward to the day when our food products will find their way to foreign markets now closed to them, with utmost confidence that that day will come.

On the same subject, it occurs to us that those who oppose the authorization of this project for the reason that we now have enough of everything anyway, subscribe to the proposition that America's production capacity should remain static while her population and consequent demands on that production are increasing by leaps and bounds. Should we follow the policy of restricting our production of food stuffs, for example, to present demands, the time will inevitably come, and that soon, when the expanding demands of an increasing population will face America with the emergency problem of increasing that production. Our proposal is that production be permitted to keep pace with the demands made upon it. What is sufficient for our needs today may be only half enough 25 years from now. We cannot close our eyes to the welfare of our children and our children's children, with safety to them or the future generations of our country.

Let us then reexamine our Nation's history and seek therein our answer to the question now before your committee and our Congress, and to the objections now made to this proposal of ours. History is written and learned in order that, in the future, we may avoid mistakes made in the past, however honest those mistakes were, and that we may follow through such plans, programs, and policies as have pointed to ultimate success, happiness, welfare. Neither the mistakes nor the successes which our history reveals to us can, with safety, be ignored.

Our Nation was young when President Thomas Jefferson proposed and insisted upon the Louisiana Purchase. This brought into early being America's program of progress and development. There was violent opposition to the Louisiana Purchase, voiced by sincere, well-meaning men of substance and stature. They said, as is now said, "We have no need for this area. We already produce more

than our people can consume. Why add territory to that we already have, at the cost of overburdened taxpayers?"

So intense was the opposition that the Massachusetts legislative assembly, seeing its young people leaving the Commonwealth to seek new horizons in the West, adopted a resolution denouncing the President's proposal, and proclaiming that, if Jefferson succeeded in his mad plan, Massachusetts would no longer be bound to adhere to the Union. Today, the people of Louisiana, Arkansas, Missouri, Kansas, Texas, Colorado live and prosper, and, if they have reason to think about it, bless the President who conceived and fought for, and the Congress which authorized the Louisiana Purchase.

After the Mexican conflict in 1848 came the Treaty of Guadalupe Hidalgo and the Mexican Cession. With acquisition of the area encompassed within the boundaries of that cession, the problem of developing the water resources of the Colorado River became important. That development has progressed until today, by means of Lake Meade, the All-American Canal and other works, the southern part of California is now putting to commendable and beneficial use practically all of the water apportioned to that State by the 1922 compact. We want to develop the rest of it: and we confess to an utter inability to understand why California should now say that, although she has been the beneficiary of the expenditure of tremendous amounts of Federal funds in developing her economy by means of Colorado River water, we in the upper basin, which is a part of the same acquisition by the United States which brought California into the Union, should be forever barred from developing our country.

The acquisition and development of the Territory included in the cession were opposed in the Halls of Congress and elsewhere. The opposition found typical vocal expression in the words of a great American, which words I desire to quote as I found them in a work on America's possessions by Murat Halstead, published in 1899:

"I say, sir, that, according to conscientious conviction, we are now fixing on the Constitution of the United States and its frame of government, a monstrosity, a disfiguration, an enormity."

Again this same statesman said: "On other occasions in debate here I have expressed my determination to vote for no acquisition or cession or annexation North or South, East or West. My opinion has been that we have territory enough, and that we should follow the spartan maxim, "Improve, adorn what you have"; Seek no further * * * There may be in California, and no doubt there are, some tracts of valuable land, but it is not so in New Mexico * * * There are some strips of tillable land on the borders of the rivers, but the rivers themselves dry up before midsummer is gone. All that the people can do in that region is to raise some little articles, some little wheat for their tortillas, and that by irrigation;"

The great American who made those statements was Daniel Webster, than whom no more able, honest, and conscientious man ever served in the United States Senate.

Of this policy of Webster, the Honorable James R. Mann, later a Member of Congress from the State of Illinois, wrote:

"The Senator from Massachusetts has been reversed by history. He did not see aright the signs of the times as to expansion. *If Daniel Webster were now alive, he would be the last man in the Republic to admit that this country could afford to lose a single foot of the territory embraced in the Cession from Mexico in 1848.* He would be quick to admit that the acquisition of that Territory has done much to cement the Union into closer unity; has done much to knit more tightly the bonds which hold our country together; that the sunny land on the other side of the Rocky Mountains, which was so far away in 1848, and which, through the genius of our citizenship, has been brought into close and quick touch with the rest of the Union, has made our whole country feel that distance no longer separates the utmost parts from quick communication with the Central Government, which responds constantly to every feeling of danger or joy, of poverty or prosperity, in every part of our domain." [Italics mine.]

Webster, despite the honesty of his motives and the sincerity of his purpose, was proved wrong by history. Had he prevailed and accomplished the withholding of congressional approval from the acquisition of the Mexican Cession, southern California, which now opposes the development of our portion of the Territory included therein by the construction of this project, would no doubt have flourished; but it would have been under a different flag than ours, and at the cost of a government other than ours.

Southern California now objects to the Colorado River project, saying that its construction and operation would infringe upon her use of Colorado River water. At the time the legislature of California approved the 1922 compact, the legislators knew, and the representatives of southern California knew, that the apportionment to the upper basin States of a theoretical one-half of the Colorado River water would inevitably be followed by the beneficial use of that water in those States. The time for southern California to have objected to any development except her own, as she does now, was when the compact was signed, and not now when we in the upper basin States are attempting to do exactly what southern California has already done, by exactly the same means and in exactly the same manner she accomplished hers. Southern California's position on this project is comparable to that of a senior appropriator on a stream who perfects his own rights, and then seeks to prevent another from making an appropriation from the same source, saying, "I do not know how or when or in what manner you may do it, but some day you may infringe upon my rights. I may some day want to use the whole stream, and if I do, that should be my right and privilege. Your rights to use water which some day I may want to use myself, although I do not know when or why or by what means, and although the law which I helped frame specifically denies me that right, should be denied you forever."

Again, following the War Between the States, Secretary of State William H. Seward proposed to purchase Alaska Territory from Russia. This proposal was bitterly opposed. Men termed the plan "Seward's Folly." Congressmen who considered the land barren and worthless argued that the cost of Alaska and its consequent development should not be imposed upon the already overburdened taxpayers. Today, when our lookouts scan the Northern skies alert for air attack from over the top of the world, they and we realize the importance of Alaska to our very existence. They and we shudder when we contemplate our strategic position if Alaska were still in unfriendly hands. Are there those among us now who would term Alaska "Seward's Folly"?

Is there not a lesson to be learned from Alaska, when we know that within the boundaries of the Upper Colorado River Basin lie one of the world's greatest known stores of uranium, and one of the world's largest deposits and reserves of oil, both vital to our defense and fully available only if the water of the Colorado River be developed?

Again I say, the lessons of history are not to be read and then ignored or disregarded. America's history is one of forward-looking progress. Such progress has been resisted; but those who advocated a policy of development of the resources of our great land have always prevailed. Because that has been true, we now may enjoy our way of life, and look forward to a fuller life for those who will follow us.

If the time shall ever come when new horizons do not beckon us, when we see no need for further progress or development, when we, as we are, and not as we could be, consider ourselves entirely self-sufficient, then will American stagnate and wither and die as a great nation.

Mr. BARNARD. At this time I should like to summarize and give to the committee orally a brief synopsis of that statement, Mr. Chairman.

My name is John B. Barnard of Granby, Grand County, Colo. I have practiced law since 1920 to the present time, and in addition thereto have owned and operated an irrigated ranch in Grand County, since 1921. I am attorney for the Middle Park Water Conservancy District, comprising the area embraced within the geographical limits of Grand and Summit Counties, Colo., at the headwaters of the Colorado River and one of its principal tributaries, the Blue River.

We are here urging the authorization by the Congress of the Colorado River storage project, and in doing so we recognize the fact that there is considerable divergence of opinion as to exactly what the term "Colorado River storage project" means and comprehends. What we mean when we use that term is a plan of development which will accomplish these three results and ultimate objectives, and I do not list them in the order of their importance:

1. Permit the upper basin States in wet years to store water which is surplus in those years in order that in dry years we may meet our Colorado River compact commitments to the lower basin States;

2. By means of headwater storage and distribution units which are called participating projects, to impound and to put to beneficial use spring runoff water which now passes downstream without benefit to us, a part of the water apportioned to us by the compact;

3. Permit the generation of electric energy by means of power-plants constructed as integral parts of the holdover storage reservoirs, and the sale of that energy for the purpose of paying from the net revenues derived from such sale—and again not in the order of their importance—first, the cost of construction of holdover storage units with interest, second, the expense of the operation of the entire project, and third, the cost of construction of the participating projects without interest.

What units form a part of such a project, where they are to be located, their capacity and other such questions must be determined and answered by engineers, hydrologists, and other technical experts, and before their conclusions and recommendations are accepted they will, and should, be subjected to a searching inquiry by the project's proponents and by your committee to determine their physical and economic feasibility and justification.

For the participation of the Federal Government in such a program of progress and the development of natural resources there is, we submit, ample historical and economic justification. Since not later than the year 1824 Federal aid has been extended to projects designed to prevent and control floods, to make rivers easily navigable by dredging and widening, to improve harbors and harbor facilities, thus facilitating commercial intercourse between and among States and with other nations. All of this, not upon the theory that favored communities or areas are thereby benefited, but based upon the fact that the national economy is thus made stronger and more secure, and that the cost of construction of such works is beyond the reach of local governments or private interests.

We urge for the upper Colorado River Basin a program of progress and development which is our historically established heritage. Ever since the Louisiana Purchase in 1803, termed "Jefferson's mad plan" by its opponents, through the acquisition of the Mexican cession, characterized by none other than Daniel Webster as "a monstrosity, a disfiguration, an enormity," and through the purchase of the Territory Alaska from Russia following the war between the States, called Seward's folly by well-intentioned men who opposed it, America has followed this plan of progress and development despite the strenuous and insistent opposition.

The lessons of history which point to a better and fuller life for all Americans are not to be ignored or disregarded. We only ask that the lessons we have learned be kept clearly in mind when consideration is given this project.

We contend for the soundness of the proposition, the development of the upper Colorado River Basin with its vast area, and its vitally needed and almost unlimited natural resources will add immeasurably to the strength and soundness of the economy of the whole Nation in time of peace and if war should come.

We submit that if the time shall ever come when America sees no need for further progress or development, she will stagnate and wither and die as a great nation.

I ask, Mr. Chairman, that the full statement which I have prepared be received for the record, and I think it has already been received as a part of the record.

Mr. ASPINALL. That is correct, Mr. Barnard. Thank you, sir.

Mr. BARNARD. Thank you.

Mr. ASPINALL. The next witness is Frank C. Merriell, Grand Junction, Colo., engineer, engaging particularly in water matters, and who has been before this committee many, many times in the past. We are glad to have you with us this morning, Mr. Merriell.

As I understand it, you wish to have your statement filed and then you wish to speak extemporaneously. Is there any objection to the request?

Hearing none, it is so ordered.

STATEMENT OF FRANK C. MERRIELL, CHIEF ENGINEER, COLORADO RIVER WATER CONSERVATION DISTRICT, GRAND JUNCTION, COLO.

(The statement referred to follows:)

STATEMENT OF F. C. MERRIELL, CHIEF ENGINEER, COLORADO RIVER WATER CONSERVATION DISTRICT

It seems very necessary to explain to the subcommittee why upper-basin people, especially those from western Colorado, are sure they must have the storage project, in its main outlines, as quickly as it can be put to work.

During the negotiations which preceded the drafting of the 1922 compact by the Colorado River Commission, one member of that commission had a fixed determination to secure for the people of the lower basin a firm guaranty of Colorado River flow to the lower basin. Mr. Norviel of Arizona, did not at any time desist from his determination to secure such a guaranty and he was, in the end, successful.

The primary reason upper-basin people feel they must have the storage project is to counteract the deleterious effect of that guaranty in the 1922 compact upon the upper basin. To explain that effect certain terms used in hydrology must be defined. The most commonly known tool of the practicing hydrologist is a record of flow taken at some point on any stream where it is believed it will later have value, by standard methods with as great accuracy as possible. This record, which should cover as many years as it can, is, in the West, known as historical flow and sets up for some time unit, such as days, months, or years, the actual delivery of water past the point chosen on the stream. Another quantity which also appears in this analysis, and is also highly important is not the actual flow, but the hypothetical flow that would have occurred at the time the historical flow was measured, if there had been no use of any kind by men at any place above the point of measurement. This is called the virgin, or undepleted flow, and for the solution of many legal questions in water supply it often is more important than historical flow.

All members of the Colorado River Commission were agreed shortly after sessions were started that the probable average anual virgin flow of Colorado River, in the vicinity of Lee Ferry, at which point they decided to divide the Colorado River Basin into upper basin and lower basin, had for some years been and would continue to be, about 20 million acre-feet annually. They determined to divide at that time 15 million acre-feet evenly between the 2 basins, leaving what they conceived to be a considerable surplus for later division. In an effort to lessen the danger that was inherent in the guaranty of water to the lower basin, the commissioner for Colorado, Delph E. Carpenter, introduced in article III (d), of the compact the provision that the guaranteed amount of water should not be determined on an annual basis but should be spread over periods of 10 years. Such a period would start each year and only in the event

that delivery of water did not equal 75 million acre-feet at the end of a 10-year period would the upper basin be required to make up the deficiency, probably by restricting its use. Even the device proposed by Mr. Carpenter and included in the compact, has, in view of the actual record of recent flow, failed signally to furnish as much water for use in the upper basin (although it is still not all used) as the compact specified—7,500,000 acre-feet annually.

It is well known that the flow of rivers is variable, no 2 years' flow is ever the same, none is near the average, and on some rivers, Colorado River being one such, flow is extremely erratic. Early in this century there had been 1 year of extremely low flow (1902), when only 8,850,000 acre-feet passed Lee Ferry, but for the 25-year period 1905–29 the average historical flow had been 15,940,200 acre-feet at that point annually. The uses of men above Lee Ferry during the period were probably varying amounts increasing from slightly over 1 million acre-feet to about 1½ million acre-feet annually. Even the virgin flow at Lee Ferry had not been the 20 million acre-feet the commission assumed.

Even in this period of relatively high flow the erratic nature of Colorado River is well shown. In 11 years of the 25, historical flow at Lee Ferry was less than 15 million acre-feet and in 8 of those years even the virgin flow would have been less than that. The flow of the minimum year, 1919, was only 10,560,000 acre-feet while in 1917 the maximum flow was over twice as great—by 11,330,000 acre-feet.

Beginning in 1930 and lasting 25 years through 1954 the flow of Colorado River has been strikingly less than in the preceding 25 years. The minimum historical flow at Lee Ferry in 1934 was only 4,397,000 acre-feet which was 12,581,900 acre-feet less than the maximum flow in 1952, a range in variation of over 4 to 1. The average historical flow for this later period was 11,513,600 acre-feet yearly. This is only 72 percent of the historical flow in the preceding period. Virgin flow for the later period was 13,365,120 acre-feet thus showing by how much the virgin flow at Lee Ferry lacked of supplying the water allotted at that point.

In spite of this lack of water to supply the rights which should attach at Lee Ferry, there was during the period 1930–54 a surplus of 20,270,300 acre-feet in 10 of those years, which was, each such year, more than all the right allocated by the 1922 compact to both basins. The use of this water in the storage project would have provided the lower basin all the water to which it was entitled for consumptive use and would at the same time have made available for use in the upper basin a much higher average of water annually—which will soon be needed.

In the light of these facts it is essential to analyze, if that is possible, the reason for the opposition to the storage project of California water bodies, and of some of the State's Representatives in the Congress. Evidently, it is thought in California that its ability, without the storage project, to get the water allotted to the lower basin together with all the water allotted to the upper basin which that basin is not using, so far as it is present in the river, will enable California to secure and use for power much more water than as though the storage project were in existence. That this will be advantageous to California may not necessarily be true, and the history of storage and use of water in Lake Mead shows the point.

After storage was started in Lake Mead February 1, 1935, the lake was filled as quickly as possible and by summer of 1941 it was actually full. From that time until the end of 1952, Lake Mead has been operated as a full reservoir, which does not mean that there were not considerable annual variations of its content and power head, but that these were at all times the maximum possible in view of the flood-stage criteria laid down for that reservoir. This insured the maximum generation of power and a very large supply of water through 1952.

During 1953–54 the production of power was continued at about the same rate as had been possible with a full reservoir every year, in spite of the fact that the reservoir was rapidly being emptied because of low inflow in both these years. As a result it was necessary in 1954 to cut power production by about 12 percent and on January 31, 1955, the content of Lake Mead was only 12,305,000 acre-feet, less than the reservoir had contained since it was first filled, when it passed this content in June 1937. At this level there is a decrease in power head of 34 percent of the maximum power head and perhaps 30 percent of the average power head as it has been operated for so many years. With the decrease in power head the quantity of water being released must be increased to the maximum usable at the power head available to generate constantly decreasing increments of power. The only remedy under these conditions would have been sooner to reduce the output in order to conserve power head and secure more efficient operation.

If on the other hand, the storage project had been even partially built and were working during these years, the operation of Lake Mead would not have been greatly different during these 2 years than it had usually been and the reservoir would have been much more nearly full than it now is. If the present prospect of a fair water year in 1955 had been added to the regulation effected by the storage project. 1955 would have been in Lake Mead a year of essentially full reservoir operation, whereas without the storage project even a very good year must be one of several such to restore the operating conditions that were so successfully maintained from 1941 through 1952. In other words, it would appear that the most efficient operation of Lake Mead will be assured only if there is regulation of this highly erratic river in the upper basin. It is a remarkable confirmation of this idea that during the months of negotiations of the Colorado River Commission all the commissioners from both basins many times repeated their conviction that for the successful utilization of Colorado River, reservoir regulation must sooner or later be carried out in the upper basin.

Several advantages in addition to that just explained will accrue to the lower basin. The building of reservoirs in the upper basin will much lessen, although not entirely stop, the addition of silt to the loss of capacity Lake Mead has already experienced. Silt entering Lake Mead is not all deposited in the dead storage space which is ostensibly where it should ultimately be found. Now much of it is in the live storage space and that will always be true. This silt will neither generate power nor irrigate land but insofar as it is part of the flow delivered to Lake Mead under natural conditions it is measured as water, which it certainly is not.

When reservoirs have been built in the upper basin the necessity to carry empty several million acre-feet of storage capacity for possible floods can be largely eliminated. While floods are more apt to occur in the type of country composing the lower basin it is hardly conceivable that they will require so much flood storage as is now provided, and the level of Lake Mead can be raised with profit in power production by reason of the flood protection of the upper-basin reservoirs. That this protection for a most remote possibility does not lessen its necessity, means that somewhere on the river system these protective measures must be enforced.

The effect of all the factors discussed may now be assessed in western Colorado. It must first be said that all the water produced in that State, which is 70 percent of the total yield of the river, has as its first call the delivery of two-thirds of it to meet the obligation of the guaranty at Lee Ferry. In the table that accompanies this memorandum, which starts with listing of the historical flow at Lee Ferry, it is shown how the virgin flow is derived by the addition of all the various forms of consumptive use as nearly as these can be worked out. It is then necessary to deduct the amount guaranteed the lower basin and what remains is the water available for consumptive use in the upper basin. This amount, according to the 1922 compact should be 7,500,000 acre-feet but as shown in column (11) of the table is reduced, by low-river flow to 5,866,760 acre-feet, as an average for the period, 1930–54. It varies from a yearly negative amount of 1,806,600 acre-feet in 1934, to amounts which in 9 years of the 25 are more than the upper-basin allotment, as has already stated, total in the period some 20,350,300 acre-feet. But in all the other years of the period the flow is less, by considerable amounts, than the water the upper basin is supposed to have and varies very widely from year to year.

Analysis of flow, Colorado River at Lee Ferry, 1930 to 1954, inclusive

Year	Historical flow [1]	Diversions [1]		Municipal supply [1]	Irrigation			Virgin flow [1]	Lower basin [1]	Upper basin [1]	Colorado proportion [1]
		Colorado	Utah		Acres [2]	Acre-feet per acre	Total [1]				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1930	13,070.0	22.3	65.0	10.0	1,380	1.19	1,642.0	14,809.3	7,500	7,309.3	3,757.7
1931	6,388.0	16.0	35.0	10.0	1,380	.91	1,255.8	7,704.8	7,500	204.8	106.0
1932	15,290.0	26.6	45.0	10.5	1,380	1.27	1,752.6	17,124.7	7,500	9,624.7	4,954.9
1933	9,745.0	23.6	60.5	11.0	1,380	1.04	1,435.2	11,275.3	7,500	3,776.3	1,922.8
1934	4,397.0	16.8	83.0	11.0	1,380	.82	1,131.6	5,639.4	7,500	−1,860.6	−934.9
1935	9,911.0	41.6	54.5	11.5	1,385	1.05	1,454.3	11,472.9	7,500	3,972.9	2,030.1
1936	11,970.0	73.2	52.0	11.5	1,390	1.13	1,570.7	13,677.4	7,500	6,177.4	3,170.9
1937	11,900.0	78.5	59.2	12.0	1,395	1.13	1,576.3	13,626.0	7,500	6,136.0	3,144.3
1938	15,440.0	129.3	65.8	12.0	1,400	1.28	1,792.0	17,439.1	7,500	9,939.1	5,117.6
1939	9,394.0	99.9	63.8	12.5	1,410	1.04	1,466.4	11,036.6	7,500	3,536.6	1,804.3
1940	7,082.0	92.6	65.8	13.0	1,425	.94	1,339.5	8,592.9	7,500	1,092.9	539.7
1941	16,050.0	111.6	52.9	13.5	1,440	1.31	1,886.4	18,114.4	7,500	10,601.4	5,460.3
1942	17,030.0	51.0	64.2	14.0	1,455	1.34	1,949.7	19,108.9	7,500	11,608.9	5,981.7
1943	11,260.0	115.6	69.1	14.5	1,470	1.11	1,631.7	13,090.9	7,500	5,590.9	2,867.4
1944	13,220.0	80.2	68.0	15.0	1,485	1.20	1,782.0	15,099.2	7,500	7,599.2	3,906.7
1945	11,540.0	128.4	58.2	15.5	1,500	1.13	1,995.0	13,437.1	7,500	5,937.1	3,046.6
1946	8,744.0	114.4	61.0	16.0	1,520	1.02	1,550.4	10,505.8	7,500	3,005.8	1,529.6
1947	13,510.0	101.5	69.8	16.5	1,540	1.21	1,863.4	15,561.2	7,500	8,061.2	4,145.8
1948	13,690.0	84.7	86.4	17.0	1,570	1.21	1,899.7	15,788.0	7,500	8,278.0	4,258.0
1949	14,360.0	109.1	63.3	17.5	1,600	1.22	1,952.0	16,501.9	7,500	9,001.9	4,672.6
1950	11,060.0	125.1	81.3	18.0	1,630	1.11	1,809.3	13,093.7	7,500	5,593.7	2,868.9
1951	9,830.9	185.2	82.0	18.5	1,660	1.05	1,743.0	11,859.6	7,500	4,359.6	2,230.2
1952	17,978.9	185.6	70.0	19.0	1,690	1.36	2,298.4	20,523.9	7,500	13,032.9	6,718.7
1953	8,804.6	300.3	65.0	19.5	1,710	1.02	1,744.2	10,923.6	7,500	3,432.6	1,751.0
1954	6,101.1	378.7	55.6	20.0	1,730	.90	1,557.0	8,112.4	7,500	612.4	291.0

[1] 1,000 acre-feet.
[2] 1,000 acres.

(2)+(3)+(4)+(5)+(8)=(9). (9)−(10)=(11). (11)×51.75 percent=(12).

By comparing column (12) with the tabulation of "Present consumptive use," on page 7, it will appear that in 8 years out of 25 the Colorado proportion of water available for use is less than the present demand, which is bound to grow rapidly in the next few years. This is the very situation the storage project is intended to ameliorate and perhaps cure. Nothing about this use of water by the storage project is contrary to the provisions of the 1922 compact, and as a matter of fact, the Colorado River Commission, although it did not express this in the 1922 compact, had in mind at all times that some project, similar to the storage project would be a necessity in the upper basin.

Of the water which is the upper basin allotment, Colorado is supposed to have 51.75 percent of 7,500,000 acre-feet less 50,000 acre-feet allotted to Arizona, or 3,855,375 acre-feet. In column (12) of the table shown the actual water available for consumptive use within Colorado, which averages 3,015,240 acre-feet, but in 12 years of the period the water actually available is less than the average, as shown in the following tabulation:

	Water (acre-feet)		*Water (acre-feet)*
1931	105,500	1943	2,867,400
1933	1,927,800	1946	1,529,600
1934	934,900	1950	2,868,900
1935	2,030,100	1951	2,230,200
1939	1,804,300	1953	1,751,000
1940	539,700	1954	291,000

while in only 4 years of the period is the amount of water more than the average for the period, although less than the compact allotment for Colorado.

Without the storage project the figure for the average water available has no meaning for the water that can actually be used in western Colorado is not the average but only the water actually available in each year, which as the tabulation above shows would be entirely inadequate in 5 years out of the 12 listed and would seriously hamper the raising of crops in all of these years.

It only remains to list the present uses in western Colorado with a fair evaluation of future uses, which are now rapidly developing, to show that in western

Colorado necessity for the storage project is much greater than anywhere else in the upper basin, and that even present uses in western Colorado will be seriously hampered if the erratic flow of the river produces many more years of flow as low as it was in 1931, 1934, 1940, and 1954.

While actual consumptive use in the lower basin has not increased as rapidly as has always been expected the time is very near when such uses and those that can easily be foreseen for more water in western Colorado will demonstrate that Colorado River simply does not produce enough water to supply all the needs of its basin.

The table that follows shows, as closely as they can be ascertained the various uses of water in western Colorado at the present time. The list is followed by notes showing the origin of the items and other information about the composition of the table.

Western Colorado consumptive use

DESCRIPTION *Item*	*Amount (acre-feet)*
1. Estimated annual average supply, 1930–54	3,015,240
PRESENT CONSUMPTIVE USES	
2. Cropped,[1] incidentals,[2] irrigated; includes 50,000 acre-feet reservoir evaporation	1,050,040
3. Municipal and domestic	15,000
4. Present transmountain diversions	420,000
5. Private new land: Cropped,[3] incidental[4]	186,760
6. New small reservoirs, capacity 100,000 acre-feet	50,000
7. Proposed Fryingpan diversion	70,000
8. Increase Fraser & Williams, Denver diversion	59,000
9. Consumptive use, Collbran and Paonia projects, authorized	28,300
10. Growth consumptive use, Grand Valley and Uncompahgre projects	69,000
Total	1,948,100
FUTURE CONSUMPTIVE USES	
11. Oil shale, coal, uranium, and general industrial	800,000
12. Reclamation projects reported, 600,000 acres	750,000
Subtotal	1,550,000
Total	3,498,100
INCREMENTAL YEARLY INCREASES	
13. Private new land cropped, incidental and reservoirs	13,700
14. Increase, municipal and domestic	1,300
Total	15,000

[1] 790,610 acres.
[2] 106,810 acres.
[3] 148,680 acres.
[4] 18,070 acres.

NOTES

1. As was said above, the annual average water supply has no meaning unless the storage project is built, and the previous tabulation shows that in 7 years out of 12 listed, present consumptive uses will be so much greater than the supply as to insure an almost total crop failure in those years. No water would be available for future consumptive uses except in 1943 and 1950.

2. From final report, Engineering Advisory Committee to Upper Colorado River Basin Compact Commission—November 29, 1948, with 50,000 acre-feet of reservoir evaporation added.

3. An estimate of municipal uses in western Colorado, which are now increasing in practically every town.

4. The average diversion that can be realized by those now working.

5. From a recent check of irrigated land on 42 percent of the whole area it is believed the whole is represented by this item which includes incidental land (land watered by irrigation of adjacent land on which no crop is raised). This increase in irrigated land is occasioned by Forest Service policy of cutting grazing allotments and grazing time. Increase made mostly in last 8 to 10 years, and will continue for some years yet.

6. This office has listed 235 reservoirs built or enlarged in the last 8 years, holding 100,000 acre-feet of water of which half is asumed to be consumed and half return flow.

7. It is assumed this diversion will be authorized.

8. This is new water, which by more logical development on these drainage areas Denver can secure through the Moffat tunnel.

9. Projects authorized and the Paonia partly finished. Collbran can pay out and is not a participating project.

10. Old projects on which it is being attempted to settle idle lands.

11. Oil-shale demonstration plant of Bureau of Mines, working; Union Oil Co. plant of 1,000 tons daily capacity, to be built; 5 major oil companies own shale land near Union and will all build plants if its plant is a success; all will need domestic water and some may need plant water; a low-temperature coal-carbonization plant may be built in western Colorado this year; all will need water.

12. Projects listed in Cliffs Divide, Gunnison reconnaissance and various San Juan Basin reports of the Bureau of Reclamation, some of which are participating projects in storage project.

13. Increases in private irrigation development occasioned by Forest Service policy as stated in note 5. Building of reservoirs is also continuing in many parts of the region.

14. Many towns are now increasing water supply and will continue to do so, some such as Grand Junction, the largest town in the region, must make big additions to supply.

Uses shown under 13 and 14 will continue to increase no matter what is done about the storage project or by the United States.

Mr. MERRIELL. Mr. Chairman and members of this subcommittee, my name is F. C. Merriell. I have been a resident of the Grand Valley now in Grand Junction since the 7th of April 1894, and for the last half of that 60 years the Colorado River has been my principal preoccupation and occupation.

I want to say this: You people have heard this project described as a gigantic public power scheme. You have heard it described by the wildlifers as an invasion of beautiful scenery. You have heard it described by the people down the river as an infringement of their rights. I shall attempt to show you that if we do not secure the project for which we are asking it practically puts us out of business, and my discussion of this matter will be on the basis that if we do not get the facility for which we are asking.

You have heard the testimony of the Interior Department and the Bureau of Reclamation, and you have probably also heard many times the explanation of the situation in which the upper basin finds itself because of the guaranty of the delivery of water to the lower basin.

We have devised this scheme—and it is not the creature of the Bureau of Reclamation; it is our scheme—as a means of ameliorating our condition. We do not hope we can entirely cure it, but we do hope that we can improve it.

So a great deal of what is in my formal statement I will pass over with those remarks.

I will call your attention to the table which is on page 5 of those formal remarks, in which the second column of which there is listed the historical flow of the Colorado River at Lee Ferry. Now histori-

cal flow means the flow that actually took place, contrasted with another term which we use, called virgin flow, which is what would have taken place if nobody had lived above Lee Ferry. The condition of the river in the word "virgin" symbolizes it in the virgin stage. That is in column 9.

Now one thing you will observe in all of these columns, 2, 9, 11, and 12, is that the flow of the Colorado River is highly variable. In a period starting in 1930 and through 1945 it has gone from a minimum historical flow of 4,397,000 acre-feet to a flow in 1952 of 1,978,000 acre-feet. That, we believe, is the first reason why we must have the storage projects. Obviously we cannot base our usage here upon the actual flow because there have been too many years when the actual flow was not sufficient. And I say not sufficient—not only not sufficient to perform our guaranty, but, even more, insufficient to supply our wants.

Then in column 9 is the virgin flow, built up by adding all the present uses. In column 10 there have been substracted the amount of the guaranty for delivery to the lower basin. In column 11, there is listed what is left, and in column 12 Colorado's portion of what is left.

Now, as a matter of fact, that situation demands that we conserve in the upper basin the water of years which are in excess, as they have been, of the guarantee, of our use, and of all the uses on the river, in order to have that water in years when it is not sufficient.

Then, how does that affect the lower basin?

Storage in Lake Mead was started February 1, 1935. They filled the reservoir as quickly as they could, and in 1941 it was full. Then followed a period of operation starting in 1941 and ending in 1952 in which Lake Mead could have been called a reservoir in full operation. That does not mean that the water level stayed constant. Every year during the spring flood, May and June, the river filled the reservoir, and then the power demand took more or less of the water, and then in May and June again the next year it filled up. But it was in full operation and, consequently, the greatest amount of power that could be produced was, and of course there was more than adequate water for all the consumptive uses of the lower basin.

Now the California people seem to be very much afraid that if we build these reservoirs up above that condition will not continue. What is the condition now? At the end of 1952 the reservoir was down, and in 1953 it did not fill, but they went on using power water just as they had been. The next year the reservoir was a great deal lower. In 1954 the reservoir did not fill. 1954 was a worse year than 1955.

So that today, on the 31st of January, Lake Mead contains 12,305,000 acre-feet, a less quantity of water than it had contained since June 1937 when it was first being filled. They had cut their power output 12 percent, and the prospect is very good that without the storage reservoirs it will be a number of years before the condition of full reservoir operation is restored at Lake Mead. I think the California people are barking up the wrong tree because it is perfectly evident from the record of flow cited here that if they expect to get back into full reservoir operation, the river above has got to be regulated. Then they can fill that reservoir up and handle it any way they want to.

But if they—and this fallacy is very common among people who deal with water matters, that reservoirs cost money, we cannot afford to build them, and consequently we will not build reservoirs, we will just

take the run of the river. That is a very shortsighted fallacy and a couple of dry years will throw it out, and that is what they are experiencing right now.

Now taking our own case, in column 12 of this table there are listed 12 years in which the flow of the upper Colorado River was deficient for in-basin uses. In 1931 105,500 acre-feet was all the water there was; in 1933, 1,927,000; in 1934 we owed 934,900 feet. There was not any water at all and we were short that much. In 1935, 2,030,000; in 1939, 1,804,000; in 1940, 539,700; in 1943, 2,867,000; in 1946, 1,529,000; in 1950, 2,868,000; in 1951, 2,230,000; in 1953, 1,751,000; in 1954, 291,000.

Then in none of those years would there have been sufficient water in the upper basin to mature a crop anywhere.

Now then the only reason we have been getting by is that neither basin is using its allotted amount of water. The idea prevails that the lower basin has greatly increased its consumptive use since 1922. I do not believe the facts will sustain that. I think it very possible that the actual consumptive use in the upper basin has been greater during that period than it has been in the lower basin. I realize that will start a fracas, but I believe it is true.

Consequently, as I say, I rather think the California people are barking up the wrong tree.

Now then, with regard to our friends the wildlifers. Just a word of caution to them. It does no good to set aside this place and say you cannot go into it, set aside that place and say that has got to be preserved if the Park Service which administers them has no money, and the Park Service today has not got money enough to run the ones it is operating. I should say the best thing the wildlifers could do would be to get more appropriations for the Park Service before they tried to conserve any more areas.

So far as this is concerned, it is great, extraordinary, but there are a great many ordinary, if you please, neighborhoods in the West where the need is not so great which can be preserved forever so far as we are concerned.

Now then, to refer to page 7 of the statement, I want to read you my list of western Colorado consumptive uses.

Mr. ASPINALL. How much longer do you want?

Mr. MERRIELL. About 2 minutes.

Mr. ASPINALL. All right.

Mr. MERRIELL. The average supply estimate which I get is 3,015,240 acre-feet.

Now the consumptive use for irrigation, cropped areas, incidental areas and 50,000 acre-feet of reservoir evaporation is 1,050,040 acre-feet.

Municipal and domestic is 15,000.

Present transmountain diversions is 420,000 acre-feet.

Private new land, cropped and incidental—and there has been a great increase in private irrigation in western Colorado occasioned by the policy of the Forest Service to restrict both grazing allotments and grazing time. Small new reservoirs—and I have personally made the list of those—total 235 which have been built or enlarged, with a total capacity of 100,000 acre-feet, of which I estimate 50,000 acre-feet will be consumptively used and 50,000 acre-feet will appear as return flow.

Proposed Fryingpan diversion, 70,000.

Increase which Denver can make in its diversion from Fraser and Williams River, 59,000.

Consumptive use of authorized Collbran and Paonia projects, 28,300.

Growth of consumptive use in Grand Valley and Uncompahgre projects, 69,000 acre-feet.

That is a total of 1,948,100.

FUTURE CONSUMPTIVE USES

For oil shale, coal, uranium and general industrial, 800,000.

Reclamation projects already reported on some status, 600,000 acres, 750,000 acre-feet.

That makes a total of 3,498,100 acre-feet.

There will be in private irrigation an increase in municipal and domestic use an average of 15,000 acre-feet.

That is my statement.

Mr. ASPINALL. Thank you very much, Mr. Merriell.

Mr. MERRIELL. Thank you.

Mr. ASPINALL. The next half-hour of direct testimony will be given by representatives from eastern Colorado and western Colorado relative to section 11 which appears in the Dawson bill, the Rogers of Colorado bill, and the Fernandez bill.

We have with us this morning the mayor of Denver, Hon. Quigg Newton, who has made a splendid record in his administration of municipal activities in Denver.

Mr. Newton, we are glad to have you with us and you may proceed.

STATEMENT OF HON. QUIGG NEWTON, MAYOR OF CITY AND COUNTY OF DENVER, COLO.

Mr. NEWTON. Thank you very much, Mr. Chairman.

Mr. Chairman and members of the committee, first, I would like to thank you all on behalf of myself and behalf of the people of Denver for allowing me to appear on behalf of our city and make this statement. At the end of my statement I would like to present for a record a statement of facts and figures pertaining to Denver's water system.

My name is Quigg Newton. I am the mayor of the city and county of Denver, Colo. I am appearing in support of the upper Colorado storage bill and its participating projects. I shall address my statement particularly to section 11 of the bill because that is the part that directly relates to Denver.

Denver owns and operates its own municipal water system upon which over 600,000 people are totally dependent for their water supply. Of that total about 485,000 people reside within its city limits and the additional 115,000 reside in adjacent suburban areas. The population served by Denver's system has grown over 20 percent in the last 5 years; it has fully doubled since 1930.

At the present time Denver gets about two-thirds of the water it uses from the South Platte River. It has not been able to make any substantial increase in the amount of water it gets from that source for the last 15 years because all of the waters of the South Platte have been completely developed for the use of the 825,000 people dependent on it for domestic, agricultural and industrial water. Denver gets the remaining one-third of its present supply through transmountain

tunnels from small tributaries of the Colorado River, such as Fraser and Williams Fork. Denver's total water plant investment is fully $75 million, of which more than one-half represents reservoirs, tunnels, and canals for the diversion and storage of raw water.

Denver has less water than it needs right now. In part, the reason is severe drought for the past 2 years. In part, the shortage comes from our rapid rate of growth. By extension and complete development of its Fraser and Williams Fork collection systems—on which work is presently being pressed—Denver can increase its water supply enough to take care of an urbanized area of just about 800,000 population. We will have that number within the next 8 years unless within that time regional population trends change radically.

To support our growth beyond that point we have no practicable source of supply other than the Blue River, which is one of the tributaries of the Colorado River within our own State.

Denver has made an appropriation of water from the Blue River and our engineers have designed a tunnel 23 miles in length and two large reservoirs to catch this water during flood periods of the year and bring it into our water system. These three structures are the things called the Blue River project in section 11 of House bills 2836, 270 and 4488 presently before this committee. Denver has spent to date on this project over $1 million. This has covered detailed plans, rights-of-way, and geological tests and studies. The tunnel part of the project, which will take fully 8 years to complete, is under construction now and has been driven over a mile and a half.

The completed project will cost over $75 million, which Denver now expects to finance without Federal contribution. That project is designed to yield in average years, when fully complete, about 175,000 acre-feet of water per year. That amount of water added to our present sources will supply Denver in a continued growth to about 1,600,000 people. We believe that point may be reached in the next 25 to 40 years.

To make that growth possible and even to protect the number of people who will assuredly be dependent upon our water supply within the next 10 years, Denver needs the enactment by the Congress of the provisions embodied in section 11 of Senate bill 500 and House bills 2836, 270 and 4488. The reason we need this legislation is very simple. The date of Denver's Blue River water appropriation has now been finally established by our supreme court as June 24, 1946. That is a date several years junior to the priority date to which the United States is entitled for its Green Mountain Reservoir and powerplant located on the Blue River some 35 miles downstream from the intake point for Denver's tunnel.

That United States powerplant is big enough to take all the water of the Blue River, including what Denver needs for continued growth. Denver believes that under the terms of the Colorado River compact and of the Boulder Canyon Project Act, which followed the compact, the use by the United States of this Blue River water whenever that use is solely for generation of electrical power is subservient to Denver's taking of water for municipal uses and cannot interfere with or prevent diversion of water by Denver, even though Denver's priority date is junior to that of the United States. Final decision of that legal point may take years and no matter how it is decided the need of administrative power clearly to solve all possible problems of conflict

will still exist. The United States still owns much of the land on which Denver needs to build the two reservoirs for its Blue River project, and at one of these sites the United States has withdrawn the land as a Federal power site. Direct authority in the executive branch of the Government to sell, for value, the required areas is needed to facilitate the Denver project. Applications for acquisition of some vital items have been pending for many years under the usual routines of permits and land exchanges.

If Denver is to take any flood water from the Blue River and if concurrently the United States is to make maximum lawful use of its reservoir and powerplant, it is very necessary that there be express power in the appropriate agencies of the United States to negotiate with Denver's engineers a workable modus for operation of both projects with minimum interference, including, if that be necessary, relinquishment by the United States of some water which would otherwise be used solely to generate power. Section 11 makes such negotiation possible. Denver needs it.

I want to make it very clear that in asking legislation to facilitate this adjustment of Federal power uses to Denver's municipal needs, Denver is not seeking, and under section 11 would not get, any right to interfere with the operation of the Colorado-Big Thompson project at its maximum agricultural and municipal possibilities. Neither is Denver asking to impair in any way the efficient functioning of Green Mountain Reservoir as a supplement to the water rights of other users in western Colorado for agricultural or municipal purposes.

There are many water rights in Colorado on the Colorado River System long senior both to Denver's Blue appropriation and to Green Mountain Reservoir. These must continue to be recognized both by the United States and by Denver. We ask no change in that.

Green Mountain Reservoir has two primary storage functions aside from any utility for generating electricity. One is to catch and store replacement water for the Colorado-Big Thompson project. About one-third the capacity of Green Mountain Reservoir accomplishes this purpose, even under extreme conditions. We seek no right to interfere with that. Green Mountain Reservoir also acts as a supplement to the water supply of the group of canals that serve the Grand Junction area. 1954 was a very dry year. Much less than one-third the capacity of Green Mountain Reservoir proved adequate to give those canals the water they needed for agricultural and municipal purposes even in that drought year. We seek no right to interfere with the continuation of that practice.

What we do ask is to be able to negotiate with the United States for the reservoir sites we need and for an operating modus governing our respective projects, which may involve relinquishment by the United States of some of its power water. That power water yields the United States only about $1.35 per acre-foot. Denver expects the cost of development of water for its vital municipal purposes to be so great that every acre-foot it gets from the Blue will represent over $20.

Denver feels a strong sense of obligation to be able to continue its service of water to the many Federal installations dependent on its water system in the Denver area. Requirements arising from Federal installations alone require about a fifth of the total capacity of the Denver water system.

The Denver area represents nearly half the total population of Colorado. Denver needs water from the winter snows of western Colorado for its continued development.

This involves what is commonly called transmountain diversion. Such a diversion is perfectly lawful. It is the same sort of lawful diversion by which Los Angeles, at a considerable distance from the Colorado River, receives over 4 million acre-feet of Colorado River water per year, as shown in the Senate hearings on this legislation.

Denver is not as large as Los Angeles, but it is second only to Los Angeles in size among the cities dependent upon the Colorado River. Denver asks the chance to complete, at its own expense, a project which when fully developed and operated at capacity will not divert more than 180,000 acre-feet of Colorado River water in any year.

The inclusion of Denver's Blue River project in this legislation was expressly approved by the Colorado Water Conservation Board in resolutions adopted January 14, 1954. That board is the official policy-making body of Colorado in all water matters. That support has never been withdrawn or modified.

Now with the permission of the committee, I would like to submit a separate sheet of facts and figures pertaining to Denver's water system for inclusion in the record.

Mr. ASPINALL. Is there any objection to the request of the Mayor of Denver?

Hearing none, it is so ordered.

Thank you very much.

(The document referred to follows:)

DENVER WATER SYSTEM FACTS AND FIGURES

Population

	1940	1950	1954
Denver city limits (71 square miles)	322,000	416,000	483,000
Area within Blue line (114 square miles)	345,000	473,000	580,000
Urbanized area which might be served (185 square miles)	358,000	499,000	622,000
Metropolitan area, as defined by U. S. Census (4-county area, 2,918 square miles)	408,000	564,000	684,000
Persons served by Denver water system	370,000	490,000	600,000

Major Federal installations served by Denver Water Board

Rocky Mountain Arsenal
Fort Logan Hospital and housing project
Federal correctional institution
Fitzsimons Army Hospital
Lowry Air Force Base
Denver Federal Center
Rocky Flats atomic energy plant

Federal personnel in Denver, 1954

Military personnel	16,500
Nonmilitary employees	19,500
Dependents	70,000
Total	106,000

Raw water used

Year	Acre-feet	Persons served
1935 [1]	67,000	340,000
1940	84,000	370,000
1945	94,000	414,000
1950	121,000	490,000
1954 [1]	142,000	600,000

[1] Water use restricted.

Raw water yield

	1950	1951	1952	1953	1954
South Platte River	64,600	86,500	125,100	71,400	59,200
Moffat Tunnel	29,800	34,000	31,500	35,300	19,600
Williams Fork	9,000	11,200	6,800	7,400	5,500
Total	103,400	131,700	163,400	114,100	84,300

NOTE.—In each of the above tables water distributed by Denver through the city ditch for use of parks, institutional grounds, etc. within its urbanized area (approximately 2,000-acre feet per year) has been included; all water delivered by Denver for agricultural use outside the urbanized area (approximately 5,000 acre-feet per year which Denver is obligated to supply by contracts under which it acquired certain of its water rights) has been excluded.

Storage

	Acre-feet
Total capacity for storage	220,000
Water in storage:	
Nov. 1, 1952	175,000
Nov. 1, 1954	80,000
Mar. 1, 1955	71,000

Expansion possibilities of Denver Water System

South Platte.—Fully appropriated—no expansion feasible except by extinguishing present profitable uses in agriculture areas of permanent value.

Moffat.—System now being completed by—

(*a*) Full extension of collection system as rapidly as possible.

(*b*) Completion of 42,000 acre-feet reservoir No. 22 by spring, 1955.

(*c*) Completion of South Boulder Creek channel.

Improvements: In an average year these improvements will add 40,000 acre-feet; in a dry year 20,000 acre-feet.

Williams Fork.—Studies are rapidly being completed to determine the best method of taking Williams Fork water directly into the city distribution system, present use being through exchanges.

In an average year these improvements will add approximately 20,000 acre-feet, and in a dry year 10,000 acre-feet.

Blue River Project

Yield, 177,000 acre-feet.

Cost:	
Pilot tunnel, 23 miles, 10 by 10 feet and collection works	$40,000,000
Dillon Reservoir, 50,000 acre-feet	8,000,000
Two Forks Reservoir, 140,000 acre-feet	15,000,000
Total	63,000,000
Average cost per acre-foot per year:	
Amortization, 2 percent (50 years)	1,260,000
Interest, 3 percent on unamortized balance	945,000
Total	2,205,000

Average cost per acre-foot per year, $12.46.

Summary of revenue and expense

	1950	1951	1952	1953
Revenue	$4, 528, 770. 59	$4, 854, 501. 17	$6, 178, 704. 52	$6, 767, [illegible]. 27
Operating expense	1, 510, 507. 81	1, 771, 738. 32	2, 018, 259. 89	2, 173, [illegible]. 44
Net operating income	3, 018, 262. 78	3, 082, 762. 85	4, 160, 444. 63	4, [illegible]. 83
Interest expense	723, 007. 81	733, 255. 18	810, 692. 39	872, [illegible]. 04
Net income before depreciation	2, 295, 254. 97	2, 349, 507. 67	3, 349, 752. 24	3, 661, 681. 79
Depreciation expense	659, 447. 40	675, 119. 48	744, 989. 29	785, [illegible]. 21
Net income	1, 635, 807. 57	1, 674, 388. 19	2, 604, 762. 95	2, 875, [illegible]. 58
Acre-feet used	120, 338	119, 708	129, 084	131, 285
Net return per acre-foot	$13. 59	$13. 99	$20. 18	$21. 90

Capital invested in Denver water plant as of Sept. 30, 1954

[Blue River excluded]

	Plant investment Dec. 31, 1953	Construction in progress Sept. 30, 1954	Total plant investment Sept. 30, 1954
Raw water development	$23, 980, 942. 39	$11, 669, 134. 56	$35, 650, 076. 95
Filtration and treatment	14, 197, 318. 41		14, 654, 400. 66
Internal distribution	18, 954, 448. 55	1, 403, 146. 51	20, 357, 595. 06
Miscellaneous	3, 074, 922. 37	180, 225. 50	3, 255, 147. 87
Total	60, 207, 631. 72	13, 709, 588. 82	73, 917, 220. 54

Construction in progress, September 30, 1954

[Blue River excluded]

Raw water development:		
Reservoir 22	$10, 785, 777. 20	
Moffat collection system	883, 357. 36	
		$11, 669, 134. 56
Filtration and treatment:		
Moffat settling basin	407, 579. 03	
Moffat filter drain line	21, 098. 58	
Miscellaneous	28, 404. 64	
		457, 579. 03
Internal distribution		1, 403, 146. 51
Miscellaneous		180, 225. 50
		13, 709, 588. 82

SECOND CAPITAL OF UNITED STATES—PROBLEMS

1. Within the political limits of Denver there is located $36,902,000 of tax-exempted federally owned property (1953 city mill levy 39.55 mills; $145,947.41 lost taxes). One-sixth of Metropolitan Denver's population consists of Federal employees or dependents. Denver supplies these people with all municipal services without the benefit of a corresponding industrial tax base, the most prolific source of revenue to meet the cost of government, or for that matter, any other commensurate tax base.

2. Denver has a split water rate, one rate applying to Denver citizens who have invested almost $74 million in their water plant, and the other, a higher rate, for outside users. Most of the Federal installations using Denver water are outside Denver's political limits, but enjoy the lower rates. Subsidy to the Federal Government from this source in 1953 was $82,433.19.

INDIRECT BENEFIT TO FEDERAL GOVERNMENT FROM DENVER BUILT BLUE RIVER PROJECT

Diversion of an average of 177,000 acre-feet of water into the Denver water system will result in return flow to the South Platte River through Denver sewers of 140,000 acre-feet of water per year. If additional reservoirs are built

to catch and hold this return flow for release during the irrigating season, more than 50,000 acres of what is now dry, unproductive land northeast of Denver can be irrigated. The annual benefits thereby derived, computed in the same manner as those reported for H. R. 236 (Fryingpan-Arkansas project), are as follows:

Direct benefits each year	$1,330,000
Indirect benefits each year	2,296,000
Total	3,626,000

If no additional reservoirs are built, the return flow to the river during the irrigating season, plus some increase in supply for existing reservoirs, could be used beneficially. Under these circumstances, about 21,000 additional acres could be irrigated and the annual benefits would be:

Direct benefit each year	$558,600
Indirect benefits each year	964,300
Total	1,522,900

Mr. ASPINALL. The next witness speaking in favor of section 11 is Mr. Culverwell of Denver. Do you have a statement, Mr. Culverwell?

Mr. CULVERWELL. Yes, sir, a very brief one.

Mr. ASPINALL. Do you have any copies of it?

Mr. CULVERWELL. Yes, sir.

Mr. ASPINALL. May the committee have copies?

Mr. CULVERWELL. Yes, surely.

Mr. ASPINALL. You may proceed.

STATEMENT OF R. P. CULVERWELL, HUDSON, COLO.

Mr. CULVERWELL. My name is R. P. Culverwell, and I am a lifelong resident of the Valley of the South Platte River in Colorado. I have been retired now for 2 months, prior to which time for a third of a century I was active in the management of the Henry Irrigation District, which supplies 25,000 acres of otherwise dry land with water necessary to make it productive. Throughout this period the district encouraged me to be active in the welfare and development of the irrigation resources of the entire South Platte Valley northeast of Denver, of which Henrylyn is a part.

The great bulk of the arable area of the Platte Valley lies below Denver. Denver is only 10 or 12 miles from the foothills where the Platte River emerges from the mountains. The Platte flows in a wide, flat area having wonderful soil but so little water through natural rainfall and snow as to be almost a desert without supplementation by surface irrigation or wells.

We have many wells in the Henrylyn District, but the base supply for agricultural prosperity in Colorado is irrigation from surface streams. Our ground water acquifers reflect the dryness of the surface terrain so that our big problem is to carefully conserve and develop our surface moisture.

An examination of a topographic map of Colorado will show the vast relatively level plains of the eastern half of the State and the mountainous and rugged terrain of the western half. Although the great bulk of the level farmland is in eastern Colorado, the nature of the moisture bearing air currents is such that the great bulk of Colorado's water supply falls in western Colorado.

Almost every drop of water in the Platte River is used over and over again before leaving the State of Clorado. Reservoirs have been

built and the vast system of irrigation ditches distribute the water. But there is a greater need for water than there is water available.

In recent years a large part of the need has been met in the area below Denver by the return flow to the Platte River from Denver uses. Without Denver's storage and transmountain diversions from the headwaters of the Colorado River, there would be a tremendous economic loss in the Platte Valley. A provision has been drafted, as I understand, to insure that Denver will be able to divert water from the Blue River, a tributary of the Colorado, without interference from a hydroelectric installation owned by the United States Government. I do not speak for Denver, but for the people in the agricultural area northeast of Denver who benefit from Denver's return flow. This return flow is used for irrigation over and over again as many as six times, according to the United States Army engineers, before the water leaves Colorado.

This use and reuse and further reuse is of inestimable value to the people with whom I have lived and for whom I now speak. There are nearly 400,000 people in this area. About half of them have had their water supply made firm by the Colorado-Big Thompson project. The remaining half will receive a tremendous benefit from continued growth of Denver. The termination of this growth brought about by the use of Blue River water for making electrical energy rather than supplying the domestic needs of Denver, would be a great disaster to our people. We urge your favorable consideration of the request made by Denver for the benefit of these thousands of people, who indirectly will receive an even greater benefit from this water than the citizens of Denver, as the years make possible the development of this arid region.

Thank you.

Mr. ASPINALL. Thank you very much, Mr. Culverwell.

Now we have as the next witness Robert Delaney, of western Colorado, located at Glenwood Springs, who will speak for the position of western Colorado in relation to section 11 of the three bills formerly mentioned.

We are glad to have you here with us, Mr. Delaney. Is this your first appearance before this committee?

STATEMENT OF ROBERT DELANEY, GLENWOOD SPRINGS, COLO.

Mr. ROBERT DELANEY. That is correct, Mr. Chairman.

Mr. ASPINALL. I personally expect to see you before this committee many times in the future.

Dr. MILLER. Mr. Chairman, I want to ask a question before he starts. I notice you have a very lengthy statement. Most of it seems to be legal decision of the Colorado Supreme Court in a lawsuit. Is that to be a part of the record?

Mr. ASPINALL. That is to be a part of the file, if the committee agrees. Mr. Delaney will speak orally and ask permission at this time to file his statement, and his time is limited to 15 minutes in accordance with the decision heretofore reached.

Is there any objection to the inclusion of the statement, not the opinion of the court, as a part of the record?

Mr. SAYLOR. Mr. Chairman, I think until we have had the opportunity to hear Mr. Delaney as to what effect the decisions which he

has attached to the statement bears to it, we should reserve consideration as to whether it should be made a part of the file or the record.

Mr. ASPINALL. The decision will be reserved on the inclusion of the decisions of the Supreme Court of Colorado in case No. 16881 and 16888.

You may proceed, Mr. Delaney.

Mr. ROBERT DELANEY. Thank you, Mr. Chairman, and members of the committee:

My name is Robert Delaney. I am an attorney from Glenwood Springs, Colo. I appear here by direction of the Colorado River Water Conservation District, an organization created by statute representing seven counties and part of an eighth county in water matters in western Colorado, and also as a member of the Board of Directors of the Western Slope Water Association, a nonprofit corporation having representatives from all sections of the Colorado River drainage in Colorado.

I appear in opposition to section 11 of H. R. 270 and 2836 (also appearing as section 11 of S.500), which provision would permit the city and county of Denver to acquire by purchase water rights and other property rights of the United States Government in connection with that city's proposed diversion of waters from the Blue River on the western slope of Colorado, through the proposed Montezuma tunnel to the eastern slope of Colorado.

Since the hearings of this committee in January of 1954, there have been two principal developments in relation to Denver's attempted transmountain diversion from the Blue River, and to avoid repetition, this statement will be confined to a discussion of those developments. The first development of importance is the fact that Denver has withdrawn her request for a $75 million interest-free loan from the United States Government and in lieu thereof seeks to acquire water rights and other property of the United States under section 11 of H. R. 270, 2836, and S. 500. The second development of importance is the decision by the Colorado Supreme Court adverse to the contentions of the city and county of Denver concerning the adjudication of the waters from the Blue River, which I should like to mention briefly later.

The people of western Colorado, the area which provides over 70 percent of the waters of the Colorado River, are almost unanimous in opposing the belated attempt by Denver to inject the so-called Blue River project into this bill by means of what we regard in the State of Colorado as power politics. The reasons for this opposition were detailed by representatives of western Colorado in hearings concluded before this committee in January of 1954.

We firmly believe the provisions of section 11 as now framed are even more harmful and pernicious to the future growth and development of western Colorado than was the former attempt by Denver to secure the sanction and approval of the United States Government for this diversion by means of Federal moneys.

You will note that section 11 is general, vague, and ambiguous. No project report or precise definition has been submitted to define what is meant by Denver's Blue River project. Denver's plan for diversion from the Blue River has undergone many modifications, changes, and revisions. What Department of Government is intended by the words "appropriate agencies of the United States" is not specified. The water rights "used or acquired by the United States solely for the gen-

eration or power" are not limited or defined as to location or quantity, but would clearly include all waters flowing into, or impounded in, the Green Mountain Reservoir, and not required to fill decrees antedating those of the city and county of Denver. The "interests in land" and "other property of the United States" are not limited, described or defined and in addition to other property, could be construed to include that part of the Blue River watershed above Dillon owned by the United States Government.

As was mentioned in the hearings before this committee in January of 1954, the Green Mountain Reservoir is an integral part of the Colorado-Big Thompson project. It was constructed pursuant to the terms of Senate Document 80 following extensive settlements and conferences and a general settlement between the eastern and western slope of Colorado. It included as a basis for that settlement 52,000 acre-feet of replacement water, which Mayor Newton referred to, and 100,000 acre-feet of additional water for power purposes with the specific additional provision that—

> the water released shall be available, without charge, to supply existing irrigation and domestic appropriations of water, including the Grand Valley reclamation project * * * and for future use for domestic purposes and in the irrigation of land thereafter to be brought under cultivation in western Colorado—

it was therefore not restricted to power purposes, it was allocated to a specific defined function—

> water not required for the above purposes shall also be available for disposal to agencies for the development of the shale oil or other industries.

The Green Mountain Reservoir is the only substantial sources of stored water available to users along the Colorado River or its tributaries in western Colorado. In the 15-year period from 1937 to 1952, according to figures compiled by Mr. Jex which were testified to in the hearings heretofore had in this committee, there was an increase of almost 19 percent of lands placed under irrigation by private capital. There have been ever-increasing requirements and demands on the water impounded in the Green Mountain Reservoir for agricultural purposes. The uranium, oil shale and coal developments with their attendant industries vital to the national defense are just beginning. Unless a firm supply of water is assured, the agricultural and industrial development of western Colorado must stop.

Denver has attempted to justify this extraordinary proposal by claiming a need for additional water for municipal purposes. We submit the facts refute this claim. On the need of Denver for additional municipal water, we ask the committee to consider the testimony of John Barnard and Frank Delaney, appearing at pages 620 to 652 of the hearings before this committee in January of 1954 on H. R. 449, 443, and 4463, and that such testimony may be considered part of the record in these hearings.

Bureau of Reclamation, by studies completed after extensive investigation, has issued a report showing that even assuming a population of 1 million people, Denver's domestic water requirements in excess of available supplies will not exceed 49,000 acre-feet. Glenn G. Saunders, speaking for the Denver Water Board has listed this requirement as 73,000 acre-feet of water and has further defined the proposed project as—

the core of a large Blue-South Platte project proposed by the United States Bureau of Reclamation to bring an additional 270,000 acre-feet of water to the upper South Platte Valley * * *

I should specifically like, in relation to that statement of Glenn Saunders, ask that it be compared with the statement of Mayor Newton to the effect that not more than 180,000 acre-feet of water will be diverted out of the Blue River.

As we see it, the real purpose of section 11 is to permit Denver to sell and speculate in water she now has, and water the Denver Water Board hopes to obtain from the Blue River for power generation and agricultural purposes at a cost greater than that required to utilize those same waters in western Colorado for beneficial purposes. This is the only basis on which Denver's Blue River project can be feasible. This fact is clearly recognized in the references by the Colorado Supreme Court to Denxer's contract and alliance with the South Platte Water Users' Association.

The Colorado-Big Thompson project, of which the Green Mountain Reservoir is an integral part, was constructed at a cost of approximately $169 million, of which the irrigators thereunder are obligated to repay only $25 million, or less than one-sixth of the total cost. The remainder of the cost, if it is to be paid back at all, must be reimbursed from power revenues. The Green Mountain hydroelectric plant, which will be practically deactivated if Denver secures the waters that provide the supply for that reservoir, repays the United States about $500,000 a year and has an average annual generation of 60.6 million kilowatt-hours. Without the capacity of this particular hydroelectric plant, the ability of the project to pay out will be jeopardized. About 58 million kilowatt-hours, substantially the same amount generated by the Green Mountain plant, of the electricity generated at the plants of the system are required to lift the water exported from the Pacific side of the Continental Divide to the Atlantic side. This is a lift of a minimum 230,000 acre-feet of water a vertical distance of at least 80 feet to the level of the transmountain diversion tunnel. In addition, a substantial part of the economy of western Colorado is dependent upon the power generated from this project. There are powerlines built to supply REA consumers in areas up to 100 miles from the plant.

As previously mentioned, the Colorado Supreme Court has handed down a decision since the hearings of January 1954, which involves the rights attempted to be acquired by section 11. As a result of that decision, when considered in connection with the undisputed facts of the case, as was conceded, I think, by Mayor Newton in his statement, the United States has the prior and better right to the use of water used to generate power. The same question is also for adjudication in a case pending in the United States District Court for the District of Colorado. Denver would not need the section 11 legislation if she could win either of said cases in the courts. Hence, Denver asks the Congress to give her by legislation, what she cannot attain in court.

Section 11, as far as we are able to determine, presents an unprecedented request for special legislation. So far as we can determine, never in the history of reclamation has there been a proposal to take away, or give away, a water right that turns the generators in a plant forming a part of a project costing the United States millions of

dollars, practically none of which has been repaid, particularly where there are downstream beneficiaries and parties in interest who are not to be considered in the proposed legislation.

The nearest approach we have been able to find is the legislation sought by the city of Eugene, Oreg., in H. R. 7815 at the second session of the 83d Congress.

As the Colorado Supreme Court properly determined, Denver does not need the amount of water claimed for domestic purposes, as was evident in the opinion of the Colorado Supreme Court reflecting the fact that Denver had contracted to sell up to half of the water here involved for purposes not in any manner connected with the Denver municipal system. Section 11 constitutes an attempt by a great city to speculate in water it may never need. To the extent that Denver is permitted to speculate in water, the oil shale, coal, and other resources of western Colorado may remain in its primeval state, and in that area there may be no further dispersal of industry to further the national defense.

There is attached as a part of this statement a copy of that Blue River decision. As has been mentioned, it is tendered in the hope it may be filed. It is particularly tendered for the reason that from that decision it may be clearly seen that Denver's diversion proposal constitutes a direct interference with power rights of the United States; that Denver does not need the quantity of water demanded for domestic use; that the rights of beneficiaries on the western slope of Colorado to waters impounded in the Green Mountain Reservoir are recognized pursuant to Senate Document 80 as part of the law of that State, and as further recognition that the Supreme Court of Colorado construes the reclamation laws now in existence in the manner in which they are construed.

Now Mayor Newton has mentioned the approval by the Colorado Water Board of this proposed legislation, if I understood him correctly, by resolution of that board in January of 1954. I believe copy of that resolution is part of the record of this committee in hearings of January 1954 and would particularly like to call the committee's attention to the language thereof in respect to what the Water Board stated concerning Denver's request, the feasibility thereof.

I do not believe—if I am wrong, I stand corrected—I do not believe that section 11 in its present form has been presented or approved by the Colorado Water Board. Thank you.

Mr. ASPINALL. Thank you very much.

Is there any objection to the filing of the court decision as a part of file of hearing and not as a part of the record?

Mr. SAYLOR. Mr. Chairman, in view of the fact that this decision has been referred to both by the mayor of the city of Denver as a proponent of section 11, and referred to by Mr. Delaney as an opponent of section 11, in view of the fact that there is a further case pending before the Federal courts involving this same subject, I feel that for the benefit, not just of the members of this committee, but for the other Members of Congress who might be interested, that this committee would be doing them a favor in having this opinion included as a part of the record following Mr. Delaney's statement.

Mr. ASPINALL. Do you make the request?

Mr. SAYLOR. I make the request.

Mr. ASPINALL. Is there any objection?

Mr. ENGLE. I object.

Mr. ASPINALL. Objection has been made.

Is there any objection to the request of the Chair it be made a part of the file?

Hearing none, it is so ordered.

(The document referred to will be found in the committee files.)

Mr. ASPINALL. In accordance with our former agreement, the witnesses who have testified will bring their chairs up before the table, all of them, including Mr. Frank Delaney, Colorado's representative on the upper Colorado River Basin, Mr. Clifford Jex, who is an engineer to whom reference was made by Mr. Smith, and Mr. Roberts, who is with Mayor Newton.

QUESTIONING OF IVAN C. CRAWFORD, DAN H. HUGHES, SILMON SMITH, CLIFFORD H. JEX, JOHN B. BARNARD, FRANK C. MERRIELL, QUIGG NEWTON, R. P. CULVERWELL, ROBERT DELANEY, FRANK DELANEY, AND HAROLD O. ROBERTS

Mr. ASPINALL. In accordance with our previous agreement, we will proceed on 5 minutes apiece. Those who do not wish to use their time may yield it back or yield it as they see fit to some member of the committee, and our hearings will be able to be closed in accordance with our agreement to adjourn the meeting at 12:30.

At this time the Chair recognizes the gentleman from California, Mr. Engle.

Mr. ENGLE. Mr. Chairman, I would like to address a question to Mr. Merriell, chief engineer of the Colorado River Water Conesrvation District.

Mr. Merriell, I am very much interested in the statement that you made with respect to the function of the upper basin storage as related to the lower basin uses of water. Now it is not clear to me why you think that the upper basin storage will help the lower basin in securing its allotted amount of water. If the reservoir at Lake Mead is less than half-full, will not that reservoir catch all the water anyway inasmuch as water runs downhill and that is the only place it has to go?

Mr. MERRIELL. The basis of my assertion is this: Human cupidity has always worked. A big year comes along, Lake Mead fills up, and the lower basin people utilize all that water when it flows. Then the small year comes along and they have no water. In other words, if the regulation is started in the upper basin, the lower basin will benefit from it.

Mr. ENGLE. As a matter of history, has the reservoir at Lake Mead actually spilled any water?

Mr. MERRIELL. It did, sir, in 1941. That was intentional. It was an attempt to check the operation of the spillways. But since 1941 no water has been spilled from Lake Mead. There was about 4 million acre-feet spilled in that year.

Mr. ENGLE. Is it true to say that unless water is being spilled or might be spilled that all the water that the lower basin can catch can be caught and held at Hoover Dam and Lake Mead?

Mr. MERRIELL. It could be held, yes, but it will not be. If the reservoir is full of water this year, the people of the lower basin will gen-

erate power with that water and run the reservoir down, and then if next year is a bad year, they will not have any water.

Mr. ENGLE. What you mean to say is that with only Lake Mead there, it is necessary to maintain a large percentage of the reservoir for flood control storage, but if the upper basin storage was built, the amount of space reserved at Lake Mead for storage would be to that extent lessened?

Mr. MERRIELL. If part of the flood control is performed in the upper basin, it does not need to be performed again at Lake Mead.

Mr. ENGLE. That means then that Lake Mead can be held at a higher continuous level?

Mr. MERRIELL. Yes.

Mr. ENGLE. And as a consequence of that, the operation in the lower basin would be more uniform and more stable, is that what you are saying?

Mr. MERRIELL. And more profitable.

Mr. ENGLE. I think that is all the questions I have, Mr. Chairman. Thank you very much, Mr. Merriell.

Mr. ASPINALL. The Chair recognizes the gentleman from Nebraska, Dr. Miller.

Dr. MILLER. I have been interested in section 11 as it appears in the Dawson bill, H. R. 270, and as it appears in the Rogers bill, H. R. 4488. The wording seems to be different in the two bills. Can someone from the Denver group indicate which wording they would prefer, the Dawson interpretation or the Rogers interpretation?

Mr. ROGERS of Colorado. May I interrupt?

Dr. MILLER. Yes.

Mr. ROGERS of Colorado. The intention is that they should be the same.

Dr. MILLER. The intention is they shall be the same?

Mr. ROGERS of Colorado. Yes.

Dr. MILLER. I would ask, Mr. Chairman, that section 11 of each bill be inserted at this place instead of reading the entire section.

Mr. ASPINALL. Hearing no objection, it is so ordered.

(The sections referred to follow:)

SECTION 11 OF H. R. 270

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver: *Provided*, That any such transfer shall be so limited as not to preclude the use of the property other than water rights for the necessary functions of the United States Government.

SECTION 11 OF H. R. 4488

SEC. 11. The appropriate agencies of the United States are authorized to convey to the city and county of Denver, Colorado, for use as a part of its municipally owned water system, such interests in lands and water rights used or acquired by the United States solely for the generation of power and other property of the United States as shall be required in connection with the development or use of its Blue River project, upon payment by Denver for any such interest of the value thereof at the time of its acquisition by Denver, and provided that any such transfer shall be so limited as not to preclude the use of

the property other than water rights for the necessary functions of the United States Government.

Dr. MILLER. I would like to ask if the city of Denver now has the right to condemn under their own watershed for water uses?

Mr. NEWTON. Yes, I believe it does, sir, except against the Federal Government.

Dr. MILLER. Except against the Federal Government?

Mr. NEWTON. Yes.

Dr. MILLER. Has the city exercised all of its rights to condemn the water for domestic use for the city and county of Denver?

Mr. NEWTON. I would like to refer to Mr. Harold Roberts, who is the counsel for the Water Board. I would like to reply to that question in this way: That Denver has exercised its rights to condemn in certain instances, but it has not condemned water on the eastern slope primarily because of the damage that the withdrawal of such rights from certain existing users would have to our economy.

Dr. MILLER. And existing users are the irrigators?

Mr. NEWTON. Irrigators, yes. Irrigators and industrial users.

Dr. MILLER. And section 11, I believe, comes about because of the court decision recently, or last year, since the hearings in 1954 which makes it impossible for Denver to get additional water supplies from other areas of the watershed.

Mr. NEWTON. The reason for section 11 is simply—it is very simple—is simply to permit the Federal Government to negotiate with the city of Denver and convey to the city of Denver the land that Denver needs to build its own water system and to negotiate for the sale of power rights, and only power rights. It does not stem entirely from the litigation. As a matter of fact, section 11 is required, as we see it, regardless of the outcome of the litigation that is now being pursued in the State and Federal courts.

Dr. MILLER. What would be the position of the folks in Denver, if section 11 is eliminated as far as the bill is concerned?

Mr. NEWTON. I think I can say that the people of Denver would regard the omission of section 11 as a very grave injustice to the people of a growing city, presently between 600,000 and 750,000 population in the metropolitan area.

I would like to go on from there, to say, sir, that the people of Denver are wholeheartedly in support of the upper Colorado River development program and would continue to support that program because of indispensable necessity in the development of the West.

Dr. MILLER. How many acre-feet of water is Denver presently using?

Mr. NEWTON. I think that is contained in our statement of facts and figures, and it is approximately 140,000 acre-feet.

Dr. MILLER. 140,000 acre-feet of water yearly?

Mr. ROBERTS. May I call attention to the statistics on that in the facts and figures that were added to Mayor Newton's testimony. It shows that the water used has increased from 1935, 67,000 acre-feet, up to 142,000 acre-feet in 1954.

Dr. MILLER. I believe the mayor testified this land would give them about 180,000 additional acre-feet.

Mr. ROBERTS. Not in an average year. That is a maximum figure that was testified to.

Dr. MILLER. That was a maximum figure.

Mr. ROBERTS. Yes. The average figure would be considerably under that. The present 142,000 is inadequate, and under that our storage is going down instead of being maintained.

Dr. MILLER. I think that is all.

The CHAIRMAN. Will the gentleman yield to me for one question?

Dr. MILLER. Yes.

The CHAIRMAN. I want to address another inquiry to Mr. Merriell. Mr. Merriell, I am just turning over in my head the things that you have said, and if I properly interpret your remarks, you say that some upper basin storage is not only necessary to protect the delivery of water required to be delivered under the compact to the lower basin, but the existence of that storage in other ways will actually be beneficial to the lower basin.

Now I want to ask you whether or not in your opinion more than one major storage project in the upper basin is necessary in order to bring about those benefits and to provide that additional regulation of the river.

Mr. MERRIELL. There have been various opinions expressed upon that. Some people have placed the necessary amount of regulatory storage at 20 million acre-feet and some people have placed it higher. It is obviously a very great quantity of water when a year with only 4 million acre-feet of flow can be followed by one with 17. The necessary amount of that storage will be dependent, of course, upon the reservoir site that can be utilized.

Now one reservoir site, Glen Canyon, is very large, and possibly for some years Glen Canyon would be sufficient, but it is quite possible that after some years more storage would have to be provided.

Mr. RHODES. Will the gentleman yield to me for a question?

Mr. ASPINALL. The time of the gentleman has expired, but the Chair has yielded a minute of his time to Dr. Miller, and will be glad if Dr. Miller will yield to the gentleman from Arizona.

Dr. MILLER. Yes.

Mr. RHODES. I want to ask this question: Of course, this whole project is more or less dependent for its financial feasibility on the production of electric power. You mentioned the temptation which exists in the lower basin to go ahead in good years and use water for the generation of as much power as possible. I will ask you now, in the event of a good year in which Glen Canyon is pretty well filled, if the same temptation would not exist on the part of the people of the upper basin to do the same thing and release great quantities of water to produce great quantities of electricity.

Mr. MERRIELL. They might be tempted. In fact, if the Glen Canyon power is sold to the lower basin, as has been contemplated, they might not only be tempted, they might be pushed.

But they realize their business, which is to regulate that river and deliver the required quantity of water every year, and they probably will resist.

Mr. RHODES. May I ask one more question?

Mr. ASPINALL. One more question.

Mr. RHODES. Is it not true that the Bureau of Reclamation, which is a part of the United States Government, will be responsible for the amount of power which will be produced from these works in the upper basin?

Mr. MERRIELL. It will be produced through the agency of the Bureau.

Mr. RHODES. So they will be in charge of the question as to how much water will be released and how much power will be produced?

Mr. MERRIELL. Their operations at Lake Mead indicate that generally they have followed a conservative course. That has not been true in the last 2 years, but generally they have followed a conservative course in administering Lake Mead.

Mr. ASPINALL. The time of the gentleman has expired, plus 3 additional minutes belonging to the Chair.

The Chair recognizes the lady from Idaho, Mrs. Pfost.

Mrs. PFOST. Mr. Chairman, I yield my time to my colleague the gentleman from Colorado, Mr. Rogers.

Mr. Rogers of Colorado. I would first like to direct a question to Mr. Silmon Smith.

As I understand, Mr. Smith, in your prepared statement on page 3 you point out that only H. R. 3384 would give the State of Colorado approximately 26.2 percent of the amount of water that they would be entitled to develop under the 1948 compact. Is that your statement?

Mr. SMITH. Mr. Congressman, that figure of 26.2 does not refer to a quantity of water but to the cost of the project.

May I refer to Mr. Jex, who came here for the purpose of answering these questions?

Mr. ROGERS of Colorado. Yes, I will be delighted. Go ahead, Mr. Jex, and give the information that explains what you have in mind by this 26.2. Does that mean the proposed development percentage that the State of Colorado would have out of the contributions of the 70.1 that she now contributes to the river?

Mr. JEX. That is right, Congressman. Could I add this—that the 26.2, as Mr. Smith stated, relates only to cost of development, and you asked the inqury on what the percentage would be as it related to water.

Mr. ROGERS of Colorado. That is right.

Mr. JEX. The figure, as I have compiled it, is 31.5.

Mr. ROGERS of Colorado. 31.5. And under the upper Colorado River compact of the 4 States Colorado has been allocated a consumptive use of 51.5, has it not?

Mr. JEX. 51.75.

Mr. ROGERS of Colorado. Yes; 51.75. And by this compact Colorado has still and can use under the compact of the upper basin States the full amount of almost 20 percent more of the water in the river. It is 32 and 51, about 19 percent.

Mr. JEX. Congressman, we are talking here, if I get your question, about two different matters. You were asking about the percentage of development under a certain bill here as it relates to the entire bill.

Mr. ROGERS of Colorado. Yes.

Mr. JEX. Now if I get your question, now you are asking how this percentage relates to the compact percentage.

Mr. ROGERS of Colorado. That is right.

Mr. JEX. Actually there is no relation between the two.

Mr. ROGERS of Colorado. There is no relation?

Mr. JEX. That is right.

Mr. ROGERS of Colorado. I want to clear that up.

Now the next question I think I should direct to Mr. Robert Delaney as it relates to his statement, on page 1, line 2:

I appear here by direction of the Colorado River Water Conservation District, an organization created by statute representing seven counties and part of an eighth county in water matters in western Colorado, and also as a member of the board of directors of the Western Slope Water Association, a nonprofit corporation having representatives from all sections of the Colorado River drainage in Colorado.

Now the question is: Do you know of a resolution adopted by one or both of these organizations that would oppose any development in the Colorado River, out-of-the-basin development, until a full and complete development and works in connection therewith had been constructed? Do you know anything about that resolution?

Mr. ROBERT DELANEY. If I understand the question, Congressman, until the works of the storage project. Is that it?

Mr. ROGERS of Colorado. Yes.

Mr. ASPINALL. The time of the gentleman has expired. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. I will be glad to.

Mr. HOSMER, I ask unanimous consent to yield 4 minutes of my time to the gentleman from Pennsylvania.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

Mr. SAYLOR. The first question I have is directed to Mr. Hughes. Am I correct, Mr. Hughes, in my judgment and understanding of your statement, that paragraph contained on the bottom of page 2 and at the top of page 3, that it indicates that in your considered opinion, in order for the western slope of Colorado to put to beneficial use any more of its waters, it is necessary for you to have storage projects, and the type of storage projects which you are recommending to this committee is not storage projects for power, but storage projects for putting water up on land for beneficial consumptive use?

Judge HUGHES. That is correct.

Let me make this further statement: It is my individual opinion that water is far more valuable for consumptive use in our area than it necessarily is for power. I am not depreciating the holdover reservoirs.

I want to go one step further.

Mr. DAWSON. Will you yield?

Mr. SAYLOR. Go right ahead, Judge.

Judge HUGHES. Farming conditions have changed in the last 30 years. The economists tell us that in the past—we refer to it as the horse and buggy days—a farmer who owned his land, his livestock, and his machinery, even though prices went down in the depression, could go for 13 or 14 years before he was wiped out. Now the farmer, like the businessman, has set expenses. If he misses one year, he is half wiped out if these prices go down.

I refer to the statements of good economists that if these prices go down for 2 to 2½ years, the farmer is through, whereas it used to take 13 to 14 years to wipe him out. That means that we cannot farm without adequate water supply on account of the tremendous increase in annual operating expenses incurring on a farm. For that reason we cannot go on our direct-flow irrigation rights, we must have storage rights back of those rights.

Mr. SAYLOR. Am I correct in determining that both you, Mr. Crawford, and Mr. Smith, who appeared here and testified as representa-

tives from the western slope of Colorado, in principle are favoring what your present Governor has indicated in some of his releases, that Colorado, which supplies a great deal of this water, should be given the opportunity to put these smaller participating units into effect first?

Judge HUGHES. I am not prepared to answer—but that is our opinion. We recognize that if the water is to be made available, according to the statements of what we assume to be competent engineers—I refer to the engineers of the Bureau of Reclamation as well as our own—there must be a holdover storage plan so as to equalize the dry years and the work years. In my own area we have had only 1 normal year in the last 7 years. Whether that is a cycle, I do not know, but it is serious. I do know that.

Mr. SAYLOR. Judge, have you noticed that the figures for the Bureau of Reclamation indicate that the evaporation losses at Glen Canyon Reservoir site alone in 1 year are more than all of the participating projects would put to beneficial consumptive use?

Judge HUGHES. That worries me and worries all of us. Let's put them a little higher, Curecanti, and we will not have those losses.

Mr. SAYLOR. Now I think the statement has been made by the representatives of the Bureau yesterday that 58 percent of the water to which the upper basin is entitled under the Colorado compact could be put to beneficial consumptive use without any storage project, and that the amount could be increased with the smaller participating units which you have testified. Do you or does anybody from the upper basin know how much water could be put to beneficial consumptive use by using the small participating projects? I direct that question to any of the people from the western slope.

Mr. ASPINALL. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. That question is predicated upon the assumption that the money was made available for construction of these projects?

Mr. SAYLOR. Absolutely. My whole question is predicated upon the assumption that the Congress would approve the participating projects as separate and distinct from storage projects. In other words, those projects which would actually put the water to beneficial consumptive use.

Judge HUGHES. I think the Congressman is entitled to an answer. I think in western Colorado your assumption would be fairly reasonable. I have no basic knowledge of the needs of Utah, for instance, or of New Mexico, and I cannot say that same situation would be true there. But as far as I am familiar, living in western Colorado since 1904, I would think that your assumption is reasonable, that if we had these high-up small reservoirs it would give us a very reasonable and large use of the waters available which are now going downstream.

Mr. SAYLOR. Now the next question I have I want to direct to Mr. Barnard. Mr. Barnard, in your statement you referred to the storage projects. Would your opinion or statement be changed in any manner by having the smaller participating projects built first?

Mr. BARNARD. I would go along with Judge Hughes on that.

I want to make this additional observation, Mr. Saylor: Without the holdover storage reservoirs, we can anticipate, based on the history of the river flow, those years in which it would be impossible for us to fill our headwater reservoirs because of the demand on the upper basin by the lower basin under the terms of the compact.

Now undoubtedly for the immediate benefit of the western slope in my opinion, the immediate benefit would be greater from those reservoirs than from the storage projects. But from a long-range picture, I will still say that the headwater storage projects, important as they are, would not perform the entire function.

Mr. ASPINALL. Will the gentleman yield for a clarification there?

Mr. SAYLOR. Yes.

Mr. ASPINALL. What you are saying, Mr. Barnard, is that in order to protect users in the upper tributaries you must have the operation of the exchange principle. Is that correct?

Mr. BARNARD. That is correct. Otherwise you run into periods when you cannot fill those reservoirs up there; they do you no good.

Mr. SAYLOR. Now, Mr. Barnard, did not the original Colorado River compact take into consideration the very things that you have mentioned as the reason for putting in these large storage projects, in that, although the compact requires the delivery of 7½ million acre-feet a year to the lower basin, it specifies that you cannot fall below 75 million acre-feet in any one 10-year period?

Mr. BARNARD. That is right.

Mr. SAYLOR. Therefore, the compact and the people who signed it originally realized that the river does not flow the same every year and that, therefore, in the wet years you pile up an advantage in the lower basin and can take credit against the 75 million acres.

Mr. BARNARD. That is true.

Mr. SAYLOR. Is that not correct?

Mr. BARNARD. Even if true, that still in my opinion points up and emphasizes the necessity for these holdover reservoirs to meet that commitment, Mr. Saylor.

Mr. SAYLOR. That is a matter of opinion, sir.

Mr. BARNARD. And it turns on an interpretation of the Colorado River compact. I do not pretend to say I am qualified to make such an interpretation until the Supreme Court has spoken.

Mr. ASPINALL. The time of the gentleman has expired.

The Chair recognizes the gentleman from Florida, Mr. Haley.

Mr. HALEY. Mr. Chairman, I merely want to make an observation here. Apparently we are getting back into civil control of our Government. I notice we have 11 witnesses before the committee here this morning. We have heard so much recently in the last few years about task force, I am glad to see we are getting back to the old American game of football.

I yield the balance of my time to Mr. Rogers of Colorado.

Mr. ASPINALL. Mr. Rogers.

Mr. ROGERS of Colorado. Directing my attention to the question I asked Mr. Delaney, are you aware of the resolution adopted by your association which, in effect, says that you would oppose all out-of-basin diversion until the in-basin development had been completed? Are you aware of that resolution?

Mr. ROBERT DELANEY. The Colorado River Water Conservation District; yes, sir.

Mr. ROGERS of Colorado. And that would include the Fryingpan-Arkansas project?

Mr. ROBERT DELANEY. That is the way I read it; yes, sir.

Mr. ROGERS of Colorado. Now I believe that on page 2 of your statement you said that section 11 is "general, vague, and ambiguous."

My question is: If this section could be rewritten so as to move the general, vague and ambiguous parts, would you then be opposed to section 11?

Mr. ROBERT DELANEY. I think, Congressman, to the extent that Denver seeks water for purposes other than their municipal needs, and to the extent that they have not explored other sources to supply those needs, that the position of the western slope would be opposed to it.

Mr. ROGERS of Colorado. Then I take it your position would be that if Denver had made a survey and came up with an answer that she needed this water, and by amending this section so that you could spell it out, know what it means, you would have no objection to Denver getting the water that it needs?

Mr. ROBERT DELANEY. We feel, and our engineers tell us, that Denver can supply her requirements without jeopardizing the Green Mountain Reservoir.

Mr. ROGERS of Colorado. My question is: Suppose that the engineers come up with the answer that she cannot supply her needs. Then would your position be the same?

Mr. ROBERT DELANEY. I think that is correct, to the extent it jeopardizes the western slope; yes, sir.

Mr. ROGERS of Colorado. Directing your attention to page 3 of your statement, wherein you state:

> It was constructed pursuant to the terms of Senate Document 80 and included 52,000 acre-feet of replacement water and 100,000 acre-feet of additional water for power purposes with the specific additional provision that "the water released shall be available, without charge, to supply existing irrigation and domestic appropriations of water, including the Grand Valley reclamation project"—

Now my question to you is: If this legislation were spelled out wherein it specifically says that Senate Document No. 80 should be complied with in every particular, would your group then still be opposed to section 11?

Mr. ROBERT DELANEY. I think probably yes, Congressman, although I do not know that has been explored or that specific question has been extended to the group. But those matters are litigation.

Mr. ROGERS of Colorado. You base your entire opposition to the claims of Denver on the supposition that Senate Document No. 80 is being violated, do you not?

Mr. ASPINALL. The time of the gentleman from Florida has expired.

The Chair recognizes the gentleman from Utah, Mr. Dawson.

Mr. DAWSON. I would like to direct my first question to Judge Hughes.

Judge, I think you have the same idea of how the water should be used that I have, but I want to make it clear. As I understand you, you say you do not depreciate the value of the holdover reservoirs. Is that right?

Judge HUGHES. That is right.

Mr. DAWSON. And you are including the main storage reservoirs we have been speaking of—Glen Canyon and Echo Park?

Judge HUGHES. What study I have given to it leads me to the conclusion that even though the repayment program was not tied in with those reservoirs, a large additional amount of storage should be provided to guard against these extremely dry years that apparently we have facing us.

Mr. DAWSON. So what you are saying is that the prime interest we have is in getting the water for consumptive use?

Judge HUGHES. That is correct.

Mr. DAWSON. That is to put on the farms and for people to use rather than generating hydroelectric power?

Judge HUGHES. Yes, sir.

Mr. DAWSON. But that the hydroelectric power and the storage reservoirs are necessary in order to bring about that consumptive use?

Judge HUGHES. I think that is undoubtedly correct unless we have a change in weather for the better. If we do——

Mr. DAWSON. And these reservoirs are necessary to hold us over the high years and the low years in order to permit us to make that consumptive use?

Judge HUGHES. That is my understanding of our understanding in the West.

Mr. DAWSON. I think I can thoroughly agree with you on that, and apparently the only question now is whether more projects should now be authorized in these bills?

Judge HUGHES. That is the view.

Mr. DAWSON. We are all in agreement on the general principle we must have these reservoirs in order to permit that consumptive use up above.

Judge HUGHES. Yes, sir.

Mr. DAWSON. My next question is directed to Mr. Smith. I am a little disturbed, Mr. Smith, over your statement on page 1 that the western slope of Colorado should be considered a 70 percent stockholder with the three other upper basin States. In other words, I take it from that that the rest of Colorado is just out of the picture, that the western slope is entitled to 70 percent and the other three States are entitled to the other 30 percent. Is that it?

Mr. SMITH. Mr. Congressman, we recognize that in the compact of 1922 and in all subsequent compacts and agreements that eastern Colorado is a part of the State of Colorado. Eastern Colorado, of course, furnishes no water to this river. So far as the 4 States are concerned, the 70 percent refers to the 4 States. We furnish in western Colorado 70 percent of the water that flows to Lee Ferry.

Mr. DAWSON. Are you now seceding from the rest of the State of Colorado or do you admit they are entitled to any water? Now you are entitled to 52 percent of the water in Colorado. The rest of us do not care how you divide it. But when you say the western slope is entitled to 70 percent of all of the water in the upper basin I think you are violating the terms of the 1948 compact; are you not?

Mr. SMITH. Congressman, I think you misread my meaning. Seventy percent of the water furnished by the upper basin is furnished by Colorado. As to the other 3 States we furnish 70 percent and they furnish the other 30 percent. We do not contend and never have contended that western Colorado is all of Colorado. There is about 400 acre-feet of water presently being diverted from western Colorado to eastern Colorado.

Under the 1922 compact it was contemplated that eastern Colorado was a part of the State. At that time it was contemplated that not in excess of 5 percent of the waters of the Colorado River could be transported to eastern Colorado. That was before the days of airplanes.

Mr. DAWSON. Are they not still part of the State—eastern Colorado?

Mr. SMITH. Certainly they are.

Mr. DAWSON. Then why should they not participate in some of this 52 percent of the water?

Mr. SMITH. It is 51.75.

Mr. DAWSON. We will not quibble over that.

Mr. SMITH. It makes a lot of difference when you get down to the bottom of the barrel. They are participating. They expect to participate. The theory of Colorado is, as represented by the legislation in 1943, that there should be no diversions from western Colorado that would interfere with the present and future uses by western Colorado of the water that originates at that place. Now that is the policy of Colorado as expressed by the legislature in 1943 as applied to conservancy districts. It does not supersede the appropriation doctrine that if you take your money and make an appropriation before I do, that you may do so.

Mr. DAWSON. My time is fleeting, so I just want to ask some questions briefly now.

The next one. You state that 56 percent of this water is going for transmountain diversions. I take it you are including the water in all the upper-basin States, and the big majority of that 56 percent is on the Central Utah project in Utah; is it not?

Mr. SMITH. Let Mr. Jex answer that, please.

Mr. ASPINALL. The time of the gentleman from Utah has expired at this time. We will have a little additional time to come back.

The Chair recognizes the gentleman from Oklahoma, Mr. Edmondson.

Mr. EDMONDSON. Mr. Chairman, I would like to take advantage of just a minute of my time to call the committee's attention to something that I know everybody has undoubtedly noticed in the morning papers, and that is that the first great dust storm of 1955 is upon us, that a blanket of dust as high as 15,000 feet is being carried at this time across the States of southern Nebraska and Kansas and Oklahoma and New Mexico and Colorado. I know that this is vital legislation, and I am deeply interested in seeing it pushed, but I hope that this committee and the Department of Interior, as well, will very shortly give attention to this emergency created by the Dust Bowl.

Mr. ASPINALL. Will the gentleman yield for an observation?

Mr. EDMONDSON. Yes.

Mr. ASPINALL. The gentleman is not suggesting to this committee that we try to change the wind currents and the rains?

Mr. EDMONDSON. Not at all. I am merely suggesting that we consider giving attention to this problem of damage to our land out there which is resulting from the drought and from the absence of an immediate emergency program in that area to take care of it.

I would like to yield the balance of my time to my colleague from Colorado, Mr. Rogers.

Mr. ROGERS of Colorado. Directing my question again to Mr. Delaney, you have filed here a decision of the Supreme Court of the State of Colorado which, in effect, says that the United States Government shall have a priority ahead of the city and county of Denver for electrical purposes. That is the effect of this opinion, is it not, Mr. Delaney?

Mr. ROBERT DELANEY. In part, yes, sir.

Mr. ROGERS of Colorado. And you are familiar with the Colorado River compact adopted in 1922?

Mr. ROBERT DELANEY. I am familiar with it, not an authority on it.

Mr. ROGERS of Colorado. You are familiar with the water laws of the State of Colorado, are you not?

Mr. ROBERT DELANEY. I believe so.

Mr. ROGERS of Colorado. And does not both the Colorado River compact and the water laws of the State of Colorado provide that the use of water shall be first to municipalities for domestic purposes, second, to irrigation, and, third, for manufacturing? That is your understanding of the State constitution and as provided in this compact?

Mr. ROBERT DELANEY. That is the order of priority assuming equal dates of appropriation; yes, sir.

Mr. ROGERS of Colorado. And under the laws of the State of Colorado, if a municipality desires to use water they could get it by condemnation, could they not?

Mr. ROBERT DELANEY. Yes.

Mr. ROGERS of Colorado. Against an earlier priority?

Mr. ROBERT DELANEY. With certain limitations, yes.

Mr. ROGERS of Colorado. Now that being the law, will you explain to this committee how the city and county of Denver can carry out a condemnation proceeding against the United States Government to get water that it is entitled to under the laws of the State of Colorado?

Mr. ROBERT DELANEY. In the first place, if it is Green Mountain water or Blue River water, we do not concede the United States is entitled to it, Mr. Congressman. Secondly, of course, it is recognized that the city and county of Denver does not have the right of eminent domain against the United States Government.

Mr. ROGERS of Colorado. Yes. But assuming that it is as you have outlined in your statement—I believe that you have stated on page 2 that under Senate Document No. 80 it was 52,000 acre-feet for replacements and 100,000 acre-feet for power purposes. Now that 100,000 acre-feet for power purposes, you recognize that the city and county of Denver cannot condemn against the United States Government. Is that right?

Mr. ROBERT DELANEY. Yes, sir.

Mr. ROGERS of Colorado. Do you know of any method whereby the city and county of Denver can accomplish its rights under the State constitution and under State statutes unless we have legislation like section 11 which permits the Bureau of Reclamation and the Secretary of the Interior to comply with the laws of the State of Colorado? Do you know of any method?

Mr. ROBERT DELANEY. If the inquiry is directed to the municipal requirements of the city and county of Denver, I believe, Mr. Congressman, that the city has other sources of power that they can take rather than jeopardizing the Green Mountain Reservoir or taking waters out of the Blue River first.

Mr. ASPINALL. The time of the gentleman from Oklahoma has expired. The Chair recognizes the gentleman from California for 1 minute.

Mr. HOSMER. Mr. Chairman, I am not questioning the witnesses from the State of Colorado because I believe that they are wasting their time here. The illegality of the project was admitted and it can

never be built. That deed was done yesterday when the Bureau witnesses admitted that all the proposed participating projects could be built and make consumptive use of the water without the necessity for holdover storage at Glen Canyon or Echo Park to meet the requirements of article III (d) of the Colorado River compact. That sawed off the shaky peg upon which the project's proponents were attempting to justify it legally. All bills before this committee are now admittedly in violation of the compact. I doubt if the Secretary of the Interior can send his witnesses back up here for further testimony without subjecting themselves to an injunction for interfering with the compact, let alone starting to build any other project if the bills are passed, which I consider highly unlikely.

Mr. Chairman, that is my opinion and belief and the reason I do not avail myself of the opportunity to question these witnesses.

Mr. ASPINALL. May the Chair say to the gentleman from California I do not think the entire time is wasted.

The Chair recognizes the gentleman from Montana.

Mr. METCALF. I yield my time to my colleague from Colorado.

Mr. ROGERS of Colorado. Getting back to the question I asked, and assuming that after proper investigation it has been determined that the city and county of Denver does not have the water supply that you indicate, do you know of any method other than section 11 whereby Denver can get their water rights and water under the State law, keeping in mind the priority of use?

Mr. ROBERT DELANEY. I know of no method whereby the city and county of Denver can obtain the rights in the Green Mountain reservoir except by legislation.

Mr. ROGERS of Colorado. I do not believe I got you correctly. I did not understand you.

Mr. ROBERT DELANEY. I say to the Congressman I know of no method whereby the city and county of Denver can obtain the rights adjudicated to the United States in Green Mountain Reservoir other than by legislation.

Mr. ROGERS of Colorado. You are familiar with section 8 of the Reclamation Act which requires that the Secretary of the Interior or his agent, when he makes an appropriation in a State, must comply with the State law. You are familiar with that section?

Mr. Robert DELANY. Yes.

Mr. ROGERS of Colorado. Recognizing that is his duty and responsibility, and recognizing, as you just said, that you know of no method whereby Denver can take advantage of her own State constitution and State law, don't you think that in an orderly procedure of the administration of this stream that some authority should be given to the Secretary to have him comply with section 8 of the Reclamation Act?

Mr. Robert DELANEY. Denver has a decree dated in 1948 out of the Blue River which it is entitled to exert against any priority subsequent thereto.

Mr. ROGERS of Colorado. Yes, but I am talking about a priority before Denver's priority of 1946 that you and I know, at least under this Supreme Court decision, and indicated that the government started its work and had an early date for priority. I question it, and I will take it back to our own State law and section 8 of the Reclamation Act wherein the Secretary must comply with the State law.

Now don't we run into a condition that must be remedied if the Secretary of the Interior complies with section 8 of the Reclamation law?

Mr. ROBERT DELANEY. I do not believe so, no.

Mr. ROGERS of Colorado. You don't.

Now let's go to the next question.

You state on page 4 that—

> the real purpose of section 11 to permit Denver to sell and speculate in water she now has, and water the Denver Water Board hopes to obtain from the Blue River for power generation and agricultural purposes at a cost greater than that required to utilize those same waters in western Colorado for beneficial purposes.

My first question is what is the basis for the statement that Denver is going to sell and speculate in water?

Mr. ROBERT DELANEY. Among the findings of the Colorado Supreme Court in the decision, a copy of which is attached to the statement, I think that fact is pretty well borne out by the contract between Denver and the South Platte Water Users Association, and further, by statements of the representatives of the city and county of Denver by the fact that they do not have a need for municipal purposes for the amount of water they seek to obtain.

Mr. ASPINALL. The time of the gentleman has expired.

The gentleman from Arizona, Mr. Rhodes.

Mr. RHODES. Mr. Chairman, I would like first to address myself to the comments of my colleague from California, Mr. Hosmer.

This, I think, indicates possibly a new line of attack by the Colorado River Board of the State of California against this project, as well as any other reclamation project which might be built on the Colorado River.

As most of the people in this room know, the State of California has been attempting to get the Upper Basin States embroiled in the case of *Arizona* v. *California*, and thereby to cut off further development in the upper basin for years until this particular case might be resolved.

Now the statement of the gentleman indicates that even if this bill is passed, even if Congress in its wisdom decides that this project should be constructed, that the State of California will then, by injunction, attempt to keep the Secretary of the Interior from going ahead with the project.

I would like to say, Mr. Chairman, that as a representative of the State of the lower basin I do not like such tactics. I hope that they will not be pursued.

Mr. HOSMER. Will the gentleman yield?

Mr. RHODES. I will not yield at this time. There will probably be more time later on.

At this time I would like to yield the balance of my time to the gentleman from Wyoming, Mr. Thomson.

Mr. DAWSON. Will the gentleman from Wyoming yield to me for an observation?

Mr. THOMSON. Yes.

Mr. DAWSON. I would like to join with my colleague from Arizona in the statement he has just made to confirm the fact he has now put in the record.

Mr. ASPINALL. Will the gentleman from Wyoming yield to the chairman for an observation?

Mr. THOMSON. Yes.

Mr. ASPINALL. The Chair just wishes to state that he appreciates very much the statement of the gentleman from Arizona, a member of the lower basin.

Mr. SISK. Will the gentleman yield?

Mr. THOMSON. I only have a few minutes here, and I appreciate it, Mr. Rhodes.

Mr. Merriell, I am a little perturbed by your statement on the first page:

All members of the Colorado River Commission were agreed shortly after sessions were started that the probable average annual virgin flow of Colorado River in the vicinity of Lee Ferry, at which point they decided to divide the Colorado River Basin into upper basin and lower basin, had for some years been and would continue to be about 20 million acre-feet annually.

Is that not 20 million acre-feet annually predicated upon full storage use of the river?

Mr. MERRIELL. That was a decision made by the original Colorado River Commission in 1922, and has no basis except the state of the river as they interpreted it. No storage is contemplated at all.

Mr. THOMSON. Without belaboring that, do you base that upon an examination of the records of that body?

Mr. MERRIELL. I recently read all of the minutes.

Mr. THOMSON. Are you familiar with Chairman Hoover's statement in the very opening of the session in which he said:

The problem is not as simple as might appear on the surface, for while there is possibly ample water in the river for all purposes if adequate storage be undertaken, there is not a sufficient supply of water to meet all claims unless there is some definite program of water conservation.

Mr. MERRIELL. They contemplate storage, but their original idea was that the flow of water had been for some years 20 million acre-feet as an average, which was at least very optimistic.

Mr. THOMSON. Mr. Arthur P. Davis with the Bureau of Reclamation said:

At one time it was thought that there was an abundance of water for the lower river without storage. That never appealed to me, and a little investigation proved it unfounded, but the possibilities of storage in the lower basin as well as in the upper basin are so great and the feasibilities so clearly established to what extent it would be necessary that we feel certain in saying that the waters of the Colorado River can practically all be conserved.

Mr. MERRIELL. From my recent reading of all the minutes every member of the commission at some time or other, some of them several times, not only recommended storage in the lower basin but in the upper basin as well for the purpose of regulating the river.

Mr. THOMSON. I wonder if this sounds like a reasonable quote, too.

In the 15th meeting there Mr. Emerson, who is from Wyoming, said:

Any plan contemplates storage.

And Mr. Hoover, who is chairman, after all the previous discussions, said:

The compact itself must be predicated in storage; otherwise there is no water. The water has been exhausted in the river now. The flow today is preempted. There is no water for division unless we predicate storage. Obviously the compact must be predicated on storage.

Mr. ASPINALL. The time of the gentleman from Arizona has expired.

Mr. HOSMER. Mr. Chairman, I have a point of personal privilege.

Mr. ASPINALL. State your point of personal privilege.

Mr. HOSMER. My motives have been attacked by the gentleman from Arizona and those who associated themselves in his remarks, and I desire to make a statement with respect thereto.

Mr. ASPINALL. As far as the Chair is concerned, he did not attack the motives of the gentleman from California. I do not believe——

Mr. HOSMER. He certainly attacked the integrity of the gentleman from California. He challenged, in effect, that I was apparently operating as an agent of the Colorado River Board or some such thing.

Mr. RHODES. I would agree that if I said that I did attack the motive of the gentleman and I would like to have him have a chance to answer.

Mr. ASPINALL. The Chair will allow the gentleman from California to have 2 minutes.

Mr. HOSMER. I merely want to say this, that if the members of this committee and the Congress choose to ignore these very strong legal possibilities, that is well. But I do not feel that they should ascribe motives to those who do choose to bring those points up are being of an ulterior nature.

There are, as admitted by one of the witnesses here—I think it was the judge or another one of the gentlemen—serious legal problems now before the court that are inexorably entwined in the project that is proposed, serious legal problems, gentlemen, affecting my State and 600 million—or 6 million southern Californians. It will be 600 million, I might add, in the foreseeable future.

I must point out these possibilities to the committee. Water is our lifeblood in southern California. Southern California is the most rapidly growing and perhaps the most productive section of the entire United States of America. We depend vitally upon the continued source of supply of the excess of 5 million acre-feet of water a year to which we are entitled by compact, by contract, and by appropriation, and we shall use every means within our command to protect those legal rights.

Mr. RHODES. Mr. Chairman?

Mr. ASPINALL. The gentleman did a very good job, and the Chair wishes to congratulate him.

Mr. RHODES. I would like, as a point of personal privilege, to have 1 minute to apologize to the gentleman from California.

Mr. ASPINALL. It is rather unusual, but the Chair cannot deny the wishes of the gentleman from Arizona.

Mr. RHODES. The gentleman from Arizona had no intent of impugning the motives of the gentleman from California. If the gentleman from Arizona intended to impugn the motives of anybody it certainly was not the gentleman from California or the right-thinking people of the State of California.

The gentleman from Arizona did intend to impugn the motives of the Colorado River Board of the State of California and certain other interests which are connected with that board.

Mr. HALEY. I hope the gentleman's legal observations and percentages are a little better than his population figures.

Mr. ASPINALL. We will proceed in regular order.

The Chair recognizes the gentleman from California, Mr. Sisk, for 5 minutes.

Mr. SISK. Mr. Chairman, I would just like to observe, speaking for the 7 million people north of Tehachapi, that I do not necessarily find the testimony of yesterday to prove anything from a legal standpoint with reference to my colleague from California.

I would like to direct a question to Mr. Merriell:

With reference to the table, Mr. Merriell, in your statement here, I would like to ask a question along this line:

Assuming that the Glen Canyon storage project should be authorized and was built to retain waters of something over 20 million acre-feet, how many years in the future would it be before Echo Park, let us say, would become needed for control of the river?

Mr. MERRIELL. That is dependent upon so many contingencies of development, both in the upper and lower basins, that it is not possible to make a real estimate of that. It is simply a matter of saying that possibly further storage would be necessary. But to make an estimate is quite beyond human ability.

Mr. SISK. Based on your figures here it would seem to me that with the storage composed in Glen Canyon plus the storage already at Lake Mead, which, after all, does control the water for lower basin States to a considerable extent, we would be projecting, or must project our thinking, for something well over 50 years into the future before we would ever need the additional storage, unless we assume, sir, that the river would flow a great deal more than what the figures since 1930 show. Is that correct?

Mr. MERRIELL. Consider this: It might be possible to develop the other sites rather than Glen Canyon and be safe for a number of years, and that would involve a lower investment. That is a possibility as well. It is not possible for anybody to go so deeply into the operation of this thing as to lay down dates when this and that and the other thing will be needed. I am an engineer, but that is beyond me, and I think it is beyond all engineers.

Mr. SISK. Could I ask you this question, Mr. Merriell: Do you feel that Echo Park represents a more important feature of this project, let us say, than Glen Canyon, assuming that only a portion of the project could be built?

Mr. MERRIELL. In some ways it does. In the first place, where this project will sell power, the first places are in the vicinity of Salt Lake and of Denver, and the most direct transmission that can be devised in the project is from Echo Park to each of those places. Now, that is the principal reason, and there are other collateral reasons. There is a possibility of a very great industrial use right close to Echo Park in the phosphate beds of the Uinta Mountains, and other possibilities in the Uinta Mountains, in the Grand Valley, in industrial use, whereas Glen Canyon is a long ways from there.

Of course, this is true: If Glen Canyon is built first, probably the power would be sold in the lower basin, where I understand they need power.

Mr. SISK. Thank you, Mr. Merriell.

Mr. Chairman, I yield the balance of my time to Mr. Rogers.

Mr. ASPINALL. The gentleman has 45 seconds.

Mr. ROGERS (Colorado). Mr. Delaney, again, if you examine section 10, I am sure in your statement at the bottom of page 5 you do not

intend to say that the city and county of Denver would acquire this without making payments for the same, as you have indicated?

Mr. ROBERT DELANEY. I do not know the formula of the city and county of Denver for acquisition. I assume they would pay for power rights as such.

Mr. ROGERS (Colorado). And so it is provided in section 11 of my bill, and all bills except those introduced by my colleague, Mr. Aspinall.

Mr. ROBERT DELANEY. Yes.

Mr. ASPINALL. The time of the gentleman from California has expired.

The Chair recognizes the gentleman from Colorado, Mr. Chenoweth.

Mr. CHENOWETH. I want to express great pleasure in having this group of witnesses from Colorado here today. I am sure the members of the committee who are not from Colorado do not appreciate the fact that we have today heard men who are recognized as experts in the water field. Some of these witnesses have devoted their entire lives to the study of water problems and irrigation problems, not only in Colorado, but in the entire West. I think the committee is indeed fortunate to have these men here today.

I was going to suggest, Mr. Chairman, that it might be well for the committee to retire and let these witnesses sit around the table. I believe they could come up with a better answer than probably we are going to come up with, because they have that expert knowledge that we do not have.

Mr. Chairman, reference has been made to litigation which is pending in Colorado. I think perhaps my time might best be used by directing a question or two to both sides of this controversy.

However, before I do that I want to assure the gentleman from California, and others who may be opposed to this project for any reason, that while the State of Colorado may be divided on some of the details of this project, we are united on the Colorado River storage project and intend to support it unanimously and wholeheartedly.

I would like to ask Mayor Newton or Mr. Roberts to take a minute to tell us what is involved in this recent suit which has just been filed. I would like to have Mr. Delaney or Mr. Barnard give us their version of the same.

Mr. ROBERTS. There has been no recent suit filed. An adjudication proceeding has been pending in Summit County, which is a routine matter, for a number of years.

One phase of that suit went to the Supreme Court of Colorado. It was finally decided, fixing Denver's priority date for its Blue River appropriation, as 1946.

The court sent back for retrial the question of what is the date of appropriation of Green Mountain Reservoir, as that was clouded in the first trial by the withdrawal of the United States of America from the proceedings.

The court sent it back for trial, giving the United States a chance to make its appearance if it wished; otherwise the issue can be decided by that right being represented by the beneficiaries or those claiming to be the beneficiaries of the reservoir.

Mr. CHENOWETH. Is that the only issue involved?

Mr. ROBERTS. That is the only issue that is involved there—the date and the character, the extent and any conditions that are upon the ap-

propriation of the United States of America by building Green Mountain Dam and its power plant.

Mr. CHENOWETH. Do you have any observations, Mr. Delaney?

Mr. ROBERT DELANEY. There are three of counsel on the other side of that question who are much better versed on that.

Mr. CHENOWETH. Whom would you suggest?

Mr. ROBERT DELANEY. Mr. Frank Delaney, Mr. Barnard.

Mr. FRANK DELANEY. There are two questions involved on this rehearing. One is the storage rights, 152,000 acre-feet, which is not only used, a part of it, for power purposes, but for other purposes downstream, and a direct-flow right utilized by the Government of the United States, a direct-flow right from the Blue River, amounting to 1,726 cubic second-feet. Those two issues are involved.

Mr. CHENOWETH. Those issues were not decided, then, in the case that went to the Supreme Court. What were the issues decided by the Colorado Supreme Court?

Mr. FRANK DELANEY. The question of whether or not Denver is entitled to a direct-flow right of 1,600 cubic second-feet. And the date of priority—Denver claimed back two different dates, 1921 to commence with and 1927 later on, which was the final date claimed, and the Supreme Court said that that priority date should date from 1946.

Mr. CHENOWETH. What is the significance attached to the fact that the United States Government withdrew from the first case?

Mr. FRANK DELANEY. I do not know. The Attorney General took the position that the State courts had no jurisdiction over property rights and claims of the United States.

Mr. CHENOWETH. Some reference has been made to a suit pending in the United States district court in Denver now. What issues are involved in that suit?

Mr. FRANK DELANEY. The United States, at the time it withdrew from the proceedings in the State court, instituted a proceeding in the Federal District Court of Colorado to determine the same matters.

Mr. CHENOWETH. What type of suit?

Mr. FRANK DELANEY. Well, they asked for a declaratory judgment construing Senate Document No. 80 under which the Colorado-Big Thompson project was constructed, and also to determine the conflicting rights, the priority rights of the United States, as against the city of Colorado Springs, the city of Denver, and some other persons.

Mr. CHENOWETH. Were some of the same issues involved in the Federal case as in the State case?

Mr. FRANK DELANEY. Practically the same issues, I would say.

Mr. CHENOWETH. Thank you, Mr. Delaney.

Mr. ASPINALL. The time of the gentleman has expired.

The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. I am thinking that in this section 11 controversy affecting the city of Denver and the western slope people, I am sure from the discussion here that there is no question but that the priority of any domestic use is far greater than that of power or irrigation that we just do not talk about it in the same breath.

But, I am wondering as I read section 11 if there is not a means set up in there, if it is properly interpreted, to take care of the objections of the western slope people because I think I can see their side of it, too. They have some priorities and they have some rights that they would like to see protected.

I notice in the Colorado Supreme Court opinion—and it is attached to somebody's statement—that the court there observed that there is substantial evidence to support a finding of future need for water from the Blue River, within a reasonable time.

I would say, coming from a State where there are two major cities growing about as rapidly as Denver, I know the needs of such fast-growing cities.

But the observation I wanted to make is this: Under section 11 it provides that if the city and county of Denver acquire such interest in land and water rights they may do so upon payment for any such interest of the value thereof.

Now, as I interpret that section, both sides can be satisfied in this in that if Denver needs and can acquire the water, and western slope loses water that would generate power. Why isn't the cost to be paid for that water lost to the western slope and power generation?

I would like to ask Mayor Newton if, in asking that we put section 11 in the act here, that is the thought you people have in mind, that you are going to make up to the western slope people what they lose? Because certainly that water can be taken down to the city and sold for far more than it would be worth to generate power.

Mr. NEWTON. I would like to make one little comment there on your last remark.

I would like to point out clearly to the committee that this water is being acquired by Denver solely for municipal needs, and for no other purposes whatsoever, and not for sale or "speculation" as was inferred by another witness.

It is my understanding that Denver has expressly agreed, or at least that section 11 expressly provides, that Denver will pay the value of the water rights that are acquired from the Federal Government, and that those water rights are power rights only. They are not rights of any other kind. They are rights to create power.

Mr. UDALL. Why isn't part of the determination of the value a loss to the western slope people in what power would otherwise be generated by that water? Why shouldn't they be compensated and everybody be happy?

Mr. NEWTON. I think that is a correct statement. Of course there is no formula in section 11 for the determination of value.

Mr. UDALL. Mr. Rogers, is that the view you take of section 11?

Mr. ROGERS. That is right; section 11. Under section 11, all we are asking for is that in the event we are bound by the priority date for domestic purposes, at a date beyond that of the power purposes, that the city of Denver be authorized to purchase by making payments. And that is why my bill in section 11 on page 14 says, "upon payment by Denver." And the rights are those that the United States Government has spelled out, according to all the agreed testimony here, under Senate Document No. 80.

Mr. UDALL. It seems to me that if section 1 does not provide that, it certainly could be drawn so it would provide for it.

I am not trying to take sides, I am trying to be a peacemaker, as a matter of fact. I would like to see if the law cannot be drafted so that both sides can be protected, because I do think that a municipal need is a paramount need and that we ought to take care of it, if we can, without hurting the other people, because they have rights that certainly should be protected.

Mr. ASPINALL. The time of the gentleman from Arizona has expired. The Chair has 2 or 3 questions.

Mayor Newton, in your statement you referred to the Blue River project. Do you have a report prepared on the Blue River project?

Mr. NEWTON. We have a report in preparation at the present time, Mr. Chairman.

Mr. ASPINALL. How soon will it be available?

Mr. NEWTON. That will be available within the next 2 weeks.

Mr. ASPINALL. Would you send to this committee a copy of your report?

Mr. NEWTON. I will see to that.

Mr. ASPINALL. Showing a study on the physical and the economic feasibility of the project?

Mr. NEWTON. I certainly will see to that.

Mr. ASPINALL. There has been some reference to the proposal of Denver to pay for the power rights in what is understood to be Green Mountain Reservoir. How long does the city of Denver expect to make payment? Over how many years in the future would payment be made?

Mr. NEWTON. Mr. Chairman, it, of course, is not specified in section 11, and I would be unable at this time to try to summarize the terms of any contract that might be negotiated. Presumably indefinitely.

Mr. ASPINALL. Would your report show what is determined to be the economic life of the power facilities at Green Mountain Reservoir?

Mr. NEWTON. I would like to refer to Mr. Roberts on that question.

Do you happen to know whether the report will refer to the economic life of the power facilities at Green Mountain?

Mr. ROBERTS. I do not believe that the report challenges the fact that the power installation at Green Mountain is a permanent installation there.

Mr. ASPINALL. Mr. Roberts, you understand the contribution that the power facilities at Green Mountain Reservoir make to the Colorado-Big Thompson project?

Mr. ROBERTS. Yes, Mr. Chairman. I understand that it makes a contribution to that project.

Mr. ASPINALL. And that contribution is extended into the future almost indefinitely, is it not?

Mr. ROBERTS. I cannot say offhand how long that contribution runs, Mr. Chairman. I think it appears on the——

Mr. ASPINALL. It extends until the final payment to the Government for the cost of the project, does it not?

Mr. ROBERTS. I believe it does.

Mr. ASPINALL. And then it becomes of value to the General Treasury of the United States Government, does it not?

Mr. ROBERTS. That would be the case.

Mr. ASPINALL. Now, does Denver intend to make payment in sufficient amounts to take care of whatever that amount might be? Does Denver intend to make that payment immediately, or does Denver wish to make the payments extended over a period of years?

Mr. ROBERTS. Let me suggest, Mr. Chairman, that if Denver paid the United States currently from year to year an amount representing the power loss to the United States in that year that it would spread the burden of the compensation over the same length of time as the life of the power project of the Government, and to pay that as a current

charge rather than to try and reimburse a capital sum which would operate in the future.

Mr. ASPINALL. That is, in essence, the Denver proposal?

Mr. ROBERTS. That is what we assumed the negotiations would lead to, that for each acre-foot of water we took, to which the United States was otherwise entitled for power purposes, that a payment to the United States, representing the power value of that acre-foot of water, would be made currently.

We have statistics on that. The United States has made the claim that that power value is substantially $1.35 per acre-foot used; that is used in the year. That is an annual amount, and if we took 50,000 acre-feet of water that the United States would otherwise be entitled to for the particular year I assume that that figure, multiplied by $1.35, would approximate the burden upon the Government and the charge that might properly be expected from Denver.

And that would be repeated the next year. If our invasion of the following year was 35,000 acre-feet, then our payment for that year would be the smaller amount. If it ran up to 170,000 acre-feet, our obligation would be that much larger for the particular year.

Mr. ASPINALL. One more question and then my time will have expired.

Mr. Mayor, as I understand your statement a short time ago, you disassociated yourself with the petition of Mr. Culverwell, is that right?

Mr. NEWTON. I did not intentionally do so. I have not read his statement and therefore am not a party to it.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. Mr. Chairman, I would like to yield my time to the gentleman from Wyoming, Mr. Thomson.

Mr. THOMSON. Mr. Merriell, do I understand page 7 of your statement correctly that your present and authorized uses that are to be made by Colorado of the Colorado River water are 1,948,000 feet?

Mr. MERRIELL. Yes.

Mr. THOMSON. That is your estimate?

Mr. MERRIELL. That is right.

Mr. THOMSON. So out of a total of 2,500,000 acre-feet of consumptive use that the Bureau said is now present or authorized in the upper basin, Colorado has 1,948,000, and you have had several projects previously authorized and some constructed, in order to make use of that, have you not?

Mr. MERRIELL. Yes.

Mr. THOMSON. That is all.

Mr. SAYLOR. Mr. Chairman, I would like to ask Mr. Merriell a question with regard to his table.

Mr. Merriell, in presenting to this committee a table showing the amount of water to which Colorado is entitled, have you taken into consideration the treaty between the United States of America and the United Mexican States, which requires the annual delivery to Mexico of 1,500,000 acre-feet of water from the Colorado?

Mr. MERRIELL. No, sir.

Mr. SAYLOR. Therefore, any figures which you have submitted would be subject to being reduced by that portion of that treaty which could be allocated to the upper Colorado Basin; is that correct?

Mr. MERRIELL. Yes.

Mr. SAYLOR. Now, the next question I have to direct to you is to Mr. Smith.

On page 2, Mr. Smith, you state that the State of Colorado will never, as a State, have the right to use more than about 2,800,000 acre-feet?

Mr. SMITH. That is correct, sir.

Mr. SAYLOR. How do you arrive at that figure, sir?

Mr. SMITH. Perhaps I had better let my experts tell you, but I would like to tell you how I answer that.

A year or two ago the State of Colorado entered into a contract with Messrs. Jewett, Hill and Somebody, of California, to analyze the use and quantity of water in the Colorado River with regard to western Colorado.

Mr. Hill, after a study of that situation, found that the total amount of water that Colorado could depend upon consuming upon the Colorado River compact, and the upper basin States compact, was 3,100,000 acre-feet.

Mr. Hill admitted that he had not taken into consideration the treaty with the United Mexican States in arriving at that figure.

If you subtract 300,000 feet, which may very well be—and nobody knows—the amount of the Mexican burden to Colorado, you will come out with 2,800,000 acre-feet.

Maybe my contemporary has a better answer.

Mr. JEX. I think that is all right.

Mr. SAYLOR. One other thing. How much of that 2,800,000 acre-feet is now being put to beneficial consumptive uses?

Mr. JEX. In round figures, Congressman, we are using about 1,800,000.

Now, I appreciate that in the comments of Mr. Merriell just a few minutes ago, I think that his figure from his independent study was about 1,900,000. So it is around 1,800,000 or 1,900,000, as we see it.

Mr. SAYLOR. Am I correct, Mr. Smith, in determining from your statement that it is your opinion that the future development of western Colorado will and can put to beneficial consumptive use all of the waters of the Colorado to which the State of Colorado is entitled?

Mr. SMITH. Without reservation, that is my opinion.

Mr. SAYLOR. I would like to direct the next question, then, to the Mayor of Denver.

If, Mr. Mayor, the people of western Colorado, whose area provides all of the waters that the State of Colorado furnishes, for the Colorado River, can, within the foreseeable future, put to beneficial consumptive use all of the waters to which your State is entitled, under what basis can you come before this committee and ask that a transmountain diversion be authorized to eastern Colorado for the use of your city?

Mr. NEWTON. Mr. Congressman, it is our opinion that the western slope cannot use all of the water, the remaining water to which Colorado is entitled, without excessive subsidy. And I would also like

to make a further statement that it is my assumption—and I believe supported—that the Colorado River compact allowed for Colorado a sufficient amount of water for the use of the entire State of Colorado, and that it was not intended that the amount remaining for Colorado's use would be used only on the western slope.

Mr. SAYLOR. Mr. Mayor, am I not correct that the eastern slope does now take some considerable portion of the water for Colorado by means of transmountain diversions for use on the eastern slope?

Mr. NEWTON. That is true.

Mr. ASPINALL. The time of the gentleman is exhausted.

Mr. NEWTON. May I ask Mr. Roberts if he would like to add to that statement? That is a very important question that has been asked.

Mr. ASPINALL. How long will it take?

Mr. NEWTON. Mr. Roberts, would you like to add to that statement?

Mr. ROBERTS. That is exactly the information that we have about this, that in order to use all of that water in western Colorado excessive subsidy from Federal sources would be necessary to make possible those large and enlarged uses, and that the water law of Colorado does not allocate the water that arises in the basin exclusively to that basin. We have recognized transmountain appropriation and use of water at the very beginning of the State, and the amount of water from the Colorado River presently used in eastern Colorado is not, by any means, in excess of our equitable share of that river, but is less than our equitable share, and the division of that river, of the Colorado share in that river, between eastern and western Colorado can properly award to Denver the additional water that it is now getting.

Mr. ASPINALL. The Chair recognizes the gentleman from Utah.

Mr. DAWSON. Mr. Chairman, I recognize that our time is about up, but I would like to correct the record before this meeting adjourns, to clarify the statement made by the gentleman from California, Mr. Hosmer.

The deed was done when the Bureau witnesses yesterday admitted that all proposed participating projects could be built and make consumptive use of water without the necessity for holdover storage at Glen Canyon and Echo Park to meet the requirements of article 3 of the Colorado River compact.

Mr. HOSMER. A point of order.

Is this not time to be devoted to cross-examining witnesses here.

Mr. ASPINALL. Mr. Hosmer, the Chair was very compassionate, as far as you were concerned, a little while ago.

Mr. HOSMER. I will withdraw it.

Mr. DAWSON. I simply want to call attention to the fact that on page 140 of the transcript and over to page 192 of the transcript of yesterday, it makes it amply clear both from Mr. Dexheimer and Mr. Larson that the statement of the gentleman from California is simply a misstatement of the facts.

If I had time I would read the record.

Mr. ASPINALL. There is no time.

Mr. HOSMER. Will the gentleman yield?

Mr. ROGERS of Colorado. May I ask one more question?

Mr. HOSMER. Will the gentleman yield?

Mr. ASPINALL. The time has expired.

However, I will not deny my colleague.

Mr. HOSMER. Mr. Chairman, I wish to call the gentleman from Utah's attention to this statement from page 8 of the testimony introduced in the record by Mr. Larson of the Denver Office, his prepared statement.

The phraseology of his statement is as follows:

The initial storage projects units would provide a greater amount of replacement storage than would be needed to permit the increases in consumptive use which would result in the initial development.

Mr. ASPINALL. The committee session is adjourned. We shall meet on Monday next, to hear additional witnesses.

(Whereupon, at 12:35 o'clock p. m. the committee recessed until 10 a. m., Monday, March 14, 1955.)

59799—55—pt. 2——5

COLORADO RIVER STORAGE PROJECT

MONDAY, MARCH 14, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation of the full Committee on Interior and Insular Affairs will now be in session for the further consideration of those bills having to do with the authorization of what is known as the upper Colorado River storage project.

At this time we shall hear from one of our distinguished colleagues, Senator Wallace F. Bennett of Utah who has a short statement that he wishes to make at the beginning of today's hearing.

Senator Bennett, we are very glad to have you with us.

STATEMENT OF HON. WALLACE F. BENNETT, A UNITED STATES SENATOR FROM THE STATE OF UTAH

Senator BENNETT. Mr. Chairman, I am going to put my statement in the record, but there is one letter it contains that I think will be of interest to the committee and probably might serve as a background for the discussion in the next 2 days, so I would like to read that letter.

Mr. ASPINALL. You may proceed.

Senator BENNETT. I inquired some time ago of the Atomic Energy Commission as to their impression of the possible effect on hydroelectric programs of the development of nuclear power and therefore I was furnished the other day with a copy of a letter addressed by W. F. Libby, Acting Chairman of the Atomic Energy Commission, to Mr. Aandahl of the Department of the Interior, and I have the permission of the Department to read that into the record.

The letter is dated March 9, 1955, and says:

DEAR MR. AANDAHL: This has reference to your letter of February 17 wherein you ask for an expression from the Atomic Energy Commission as to how soon we estimate that the goal of producing electrical energy, utilizing atomic energy, might be competitive in costs to other fuels; also our views as to the time period which might be involved before electric energy could be produced directly from atomic energy; and whether or not we feel that hydroelectric, or even conventional, fuel plants will soon become obsolete.

Generation of electricity from nuclear fuel should first become competitive with conventional fuels in areas of high cost electricity. We feel this could happen during the 1960's. However, regardless of this fact, it is our feeling

that hydroelectric plants which can be economically justified at this time probably will not become obsolete during their useful life.

The letter is signed by W. F. Libby, Acting Chairman of the Atomic Energy Commission.

Mr. Chairman, it is contained in its proper place in the statement, but I thought it might be interesting to the committee to hear that much and I appreciate the opportunity of being here this morning.

Mr. ASPINALL. Thank you very much, Senator, and your statement shall be placed in the record and made a part of the hearings at this place.

(The prepared statement of Senator Bennett follows, together with statement of Congressman Craig Hosmer:)

STATEMENT OF HON. WALLACE F. BENNETT, A UNITED STATES SENATOR FROM THE STATE OF UTAH

CALIFORNIA HAS HAD "FIRST TURN" ON THE COLORADO RIVER WATERS

The Colorado River compact was signed in 1922 to equally divide the waters of the Colorado between the upper and lower basin in advance of their actual use. This was done so that southern California could commence development of her share of the Colorado waters. The upper-basin States were willing to step aside and allow southern California to develop first providing it was agreed that the upper States could at a later date develop their half of the water. It was recognized by the people of Utah that California was climatically, geographically, and economically in a better position to proceed with irrigation and storage projects then than was the upper basin. Moreover, we too were greatly concerned about the recurring floods which were then constantly menacing southern California, particularly the Imperial Valley. Consequently, we were willing to defer to southern California and give her "first turn" on the river.

Had we in the upper-basin States wished to be vindictive in 1922, we could have effectively blocked any additional development in southern California including the Hoover Dam. However, the upper basin, in the interest of interstate comity and reasonableness, agreed to the 1922 compact. This is in remarkable and refreshing contrast to the threat issued by southern California last Friday that even if the upper Colorado project is authorized, they intend to tie it up in the courts, and I presume, endeavor to kill the project completely by interminable delay.

The upper-basin States intend to abide by the compact, but the southern California position is now obvious. They intend to kill the upper Colorado project at any cost even if it means violating the commitments of the Colorado River compact of 1922. Apparently a younger generation of southern Californians find it easy to forget the promises and compacts of its predecessors.

"FIRST TURN" OF INCALCULABLE VALUE TO SOUTHERN CALIFORNIA

For a variety of reasons, the lower basin has been developed more rapidly than has the upper basin, as evidenced by such monumental works as the Hoover Dam, Parker Dam, Davis Dam, and the All American Canal, among others. A comparison of the relative development of the two basins is most illuminating particularly in light of the approximate equality of development contemplated by the 1922 compact:

	Million acre-feet annually
Colorado River water put to use:	
Lower basin	5.5
Upper basin	2.5
2.2 to 1 ratio.	
Total storage capacity of projects constructed or authorized for construction:	*Million acre-feet*
Lower basin	38.6
Upper basin	1.7
23 to 1 ratio.	
Development of power by projects constructed or authorized for construction by Congress in generating capacity:	*Kilowatts*
Lower basin	1,700,900
Upper basin	32,000
53 to 1 ratio.	

The overwhelming bulk of the above development has been for the benefit of southern California. Thus the lower basin has developed 53 times more generating capacity, 23 times more storage capacity and has put 2 2/10 more water to use and is using more daily. In addition, millions of dollars are saved by halting the floods which previously devastated the lower Colorado, and particularly the Imperial Valley.

I wonder if our downstream neighbors really realize just what this first turn to the Colorado water and resulting power has meant to them? On the lower Colorado alone, under national reclamation law, approximately 450 million has been invested for the development of water and power for Arizona, California, and Nevada; and when you add to that an investment in reclamation of equal magnitude on other rivers in those States, you have the very impressive total of $894 million.

SOUTHERN CALIFORNIA HAS SAVED $1 BILLION BY HAVING "FIRST TURN"

But this is only half, or less than half, of the story. If these same projects were built today, at current prices, they would cost $1,825 million. In other words, the privilege of having "first turn" has saved our downstream neighbors a billion dollars—a billion which they will not have to pay back or pay interest on.

If the upper Colorado development project is authorized and built, we will have to pay back twice as much as they must do for equal value. There are three ways in which our friends downriver might look at this with us. First, if the development of both ends of the river had begun in the twenties, the cost of each would have been approximately equal as our share of the water is. Second, at the prices of the twenties there would be no question of "economic feasibility." And third, even at today's prices, we can build the initial phase of the program on the upper river for the billion saved by the lower basin because they had first turn.

We in Utah have watched with pleasure the great progress made in the lower basin. We have witnessed the extensive agricultural developments, the growth of industrial developments, the population influx and the overall increase in wealth made possible to a great extent by the utilization of the Colorado waters and the very important byproduct—power.

The entire nation has been inestimably benefitted by the development of the lower basin and there is every reason to believe a similar boon will be conferred by a corresponding development of the upper basin's share of the Colorado water. We believe that it is now our "water turn." Out of the pioneer experiences with water there emerged a unique figure, the "water-master," whose job was to see that every man along the stream had his turn and his share. The Colorado River compact of 1922 established our share and we are now asking Congress as the water-master to see that we get our turn.

Now that our turn has come, there are those who say that times have changed, that we don't need a turn in the upper basin because of fear that nuclear energy may render hydroelectric dams obsolete.

HYDROELECTRIC POWER VERSUS ATOMIC POWER

It has been suggested by opponents of the upper Colorado River storage project that nuclear fuel will shortly displace hydroelectric and steam power. It is urged, therefore, that the Glen Canyon and Echo Park Dams would be obsolete before they are paid for.

While I am looking forward with great hope to rapid development of atomic power, I think that it would be imprudent and most unwise to summarily halt further hydropower and steam development.

POWER UTILITIES WANT UPPER COLORADO POWER

Neither the public power users, municipalities, and REA co-ops, nor the private power companies of the upper basin seem to share this fear that the hydropower dams will become obsolete for they are all anxious to contract for any available power from the power dams of the upper Colorado project. Moreover, the Atomic Energy Commission is the largest single consumer of hydroelectric power in the United States.

The Electric West magazine for February of 1955 includes a "Calendar of New Generation" in the western United States showing that the power companies are continuing unabated their hydro- and steam-power expansion.

Summary—Calendar of new generation

Year	Hydro			Steam			Engine		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total	Federal	Non-Federal	Total
1954	476, 084	194, 800	670, 884	0	1, 528, 000	1, 528, 000	0	14, 618	14, 618
1955 [1]	927, 100	113, 000	1, 040, 100	0	1, 067, 000	1, 067, 000			
1956	564, 500	178, 200	742, 700	0	670, 000	670, 000			
1957 [1]	607, 400	344, 000	951, 400	0	631, 250	631, 250			
1958	580, 125	1, 030, 000	1, 610, 125	0	243. 000	243, 000			
1959	347, 500	265, 000	612, 500	0	244, 000	244, 000			
1960	488, 500	75, 000	563, 500	0	60, 000	60, 000			

[1] Years 1955 and 1957 differ in steam and hydro totals which seem to be an error in tabulation.

Source: Electric West, February 1955, vol. 114, No. 2, pp. 80 and 81.

However, this great expansion is for the Western United States alone. The proposed development for the entire United States would total approximately 8 million kilowatts per year.

I think it is revealing that the Feather River project in California is proposed for future construction and that it includes 440,000 kilowatts of installed capacity at the Oroville Dam. I understand further that the city of Los Angeles is most desirous of purchasing power from the Central Valley project. Apparently, the State of California believes that hydropower has a future.

I wonder if those who oppose the project, particularly southern California, have actually faced the imminent damage they may be doing to the entire reclamation program and law.

ATTACKS ON RECLAMATION

I think that it must be obvious to this committee that the upper Colorado project is being used by its opponents as a vehicle to directly attack the entire reclamation law. It is surprising to me, therefore, that southern California which has benefited so much from reclamation should now be a party to this attack, unless they now feel that getting the upper-basin water for their own use is more important than any further reclamation projects in southern California.

The mathematical legerdemain concocted by the opponents to discredit the project is a case in point. They object to the time-honored reclamation law on the books since 1902 that money loaned on the irrigation features of the project is interest free. Fantastic figures have been hatched whereby they compound the interest for 50 years on the entire reimburseable irrigation balance. They don't mention that two-thirds of the project will be repaid with interest or that the other third is fully reimburseable and that less than 3 percent is nonreimburseable.

If reclamation is to be put on this new basis of interest computation, then all other Federal expenditures must bear similar examination. Compare reclamation with rivers and harbors and flood-control projects for example:

RECLAMATION COMPARED TO FLOOD CONTROL AND RIVERS AND HARBORS

Nearly $9 billion has been spent on flood control in the United States. Not 1 penny has or ever will be repaid. All of the loan given for the upper Colorado project will be repaid. Not 1 penny of interest has ever been paid on the $9 billion. Yet, two-thirds of the upper Colorado project bears interest. The following table applying this novel interest compounding for only 5 fiscal years follows:

Federal expenditures for flood control and rivers and harbors improvements, fiscal years 1949–53

	Amount	Interest payments for 50 years (compounded annually at 2½ percent	Total principal and interest
Total United States	[1]$3, 061, 562, 995	$7, 461, 361, 872	$10, 522, 924, 867
Selected States:			
Arkansas	181, 000, 000	441, 000, 000	622, 000, 000
California	193, 000, 000	470, 000, 000	663, 000, 000
Florida	58, 000, 000	141, 000, 000	199, 000, 000
Illinois	112, 000, 000	272, 000, 000	384, 000. 000
New York	72, 000, 000	175, 000, 000	247, 000, 000
Oregon	294, 000, 000	716, 000, 000	1, 010. 000, 000
Pennsylvania	110, 000, 000	267, 000, 000	377, 000, 000
South Dakota	137, 000, 000	333, 000, 000	470, 000, 000
Texas	193, 000, 000	471, 000, 000	664. 000, 000
Washington	166, 000, 000	405, 000, 000	571, 000, 000
For the upper basin States:			
Colorado	13, 000, 000		
New Mexico	5, 500, 000		
Utah	1, 500, 000		
Wyoming	1, 000, 000		
Total upper basin	20, 192, 654		

[1] $9 billion to fiscal year 1955.

So there has been a 10½ billion subsidy to flood control in only 5 fiscal years. The 50-year interest figure on flood control is misleading since the principal is never repaid and consequently it should be calculated as long as the United States Government stands or to infinity.

Summary of flood control and rivers and harbors

Subsidy for fiscal years 1949–55:

Subsidy fiscal years 1949–53	$10, 522, 924, 867
Subsidy fiscal years 1953–55	2, 420, 015, 093
Subsidy authorized in 1954	3, 593, 227, 182
Total subsidies appropriated or authorized in fiscal years 1949–55	16, 536, 166, 142

I hope that it will be obvious that not only is reclamation jeopardized by this special inteerst computation argument but that flood control and rivers and harbors work of the Corps of Engineers is many times more vulnerable. There are countless other functions of our Federal Government which are similarly endangered by resort to this argument.

RECLAMATION COMPARED TO FOREIGN AID

The same test should apply to the $100 billion which we have spent in foreign aid since World War II. Among the total for foreign aid is $919,700,000 for aid to foreign agriculture. Of this latter total, expenditures for land reclamation and irrigation schemes comprised $403,100,000. The total for transportation, communications and utilities (including power) amounts to $1,826,900,000, much more than the upper Colorado project.

History alone will tell the final story as to whether or not our expenditures in foreign countries have been wise and fruitful, but history has already proved the value of reclamation out in the Western States through which the Colorado River flows. Further, reclamation asks only for a loan from the Government which will be repaid and most of it with interest, while foreign aid is an outright grant, never to be returned and certainly without interest.

A second phase of the attack against reclamation as brought to bear in attacks against the upper Colorado River storage project is against use of the power revenues to aid in irrigation. When it is considered that the same people who use the water from which the power is derived, will also buy and benefit from the

power, it seems only right that power revenues be used to aid in developing the water for beneficial use.

Reclamation has proved its worth many times over and I hope and trust that this committee will not capitulate to this all-out attack against our reclamation law.

With this future predetermined by the availability of water we in Utah do not wish to be a dehydrated State while our share of the Colorado River water continues to pass through Utah into the lower basin and into the Pacific Ocean, eternaly wasted. The future of the State of Utah hangs in the balance and that future is now in the hands of this committee in the form of the upper Colorado River project which will make our water available to us at long last. I hope that this committee will report out the bill favorably at it dod so wisely in the last session of Congress.

STATEMENT OF HON. CRAIG HOSMER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

ATOMIC ENERGY PROGRESS TOWARD GENERATING ELECTRIC POWER

The age of nuclear power has arrived and electric power companies are now building at their own expense new plants which will supply electricity produced by atomic fission.

What does this mean to conscientious legislators who must evaluate proposals to invest large sums of money in new Federal hydroelectric projects?

Simply that they must look at them, not only in the light of all factors heretofore considered, but with this additional question in mind: In the foreseeable future will nuclear power be transformed into electric energy at cheaper rates than electric energy can be obtained from water power?

If the answer is "Yes", then our vast hydroelectric plants may become obsolete white elephants, giving way to more efficient nuclear-electric plants just as the horse and buggy gave way to the more efficient automobile. If this should happen, the Federal Treasury would never recover the millions it might pour into hydroelectric and related developments.

With millions, and possibly billions at stake, consideration of this possibility is absolutely essential if Congress is to act with responsibility in this day of swiftly moving scientific progress.

The proposed multibillion dollar upper Colorado River storage project is a specific instance.

Bills now before the Congress call for a spending authorization ranging from $1 to $1.8 billion on the upper Colorado River. They would construct numerous irrigation projects, the revenues from which could repay only 10 percent of their cost. Tied in the bills are expensive hydroelectric projects, the power revenues from which would be expected to repay not only the cost of the power dams and installations, but also 90 percent of the cost of the irrigation projects.

Planning figures show that it may take up to 100 years to pay for these projects out of the hydroelectric power cash register.

Thus, for financial success, nuclear-electric energy must not be produced more cheaply than hydroelectric energy for at least 100 years.

What are the prospects in this regard?

Simply, that not in 100 years, not in 50 years, but in a much shorter time nuclear-electric energy will be produced much cheaper than hydroelectric energy.

Remember, just 15 years ago, in 1940 nuclear power was practically unheard of. By 1945, 5 short years later, the first A-bomb had exploded over Hiroshima. Research for peacetime use was so concentrated during the subsequent 10 years that today commercial nuclear-electric energy generating plants actually are being constructed.

The British Government announced a 10-year program for building 12 atomic power stations at an estimated cost of $840 million. The British say these plants will produce electricity at a cost of 6 mills per kilowatt-hour in comparison with their present conventional generating cost of 7.2 mills.

United States cost figures prepared by James A. Lane, of Oak Ridge National Laboratory, show the average figure in this country for producing electricity in conventional steam plants is 7 mills per kilowatt-hour, while the cost in a nuclear plant would be 6.7 mills.

That is without considering that nuclear-electric plants can actually produce plutonium as a byproduct which can be sold for a high price, in the neighborhood of $100 a gram.

If this be done, there is little cost left for power generation to bear, and a reactor plant could put on the transmission line 1- or 2-mill current instead of 6.7-mill current. Even if the military demands become satisfied and the price of plutonium eases back to its fuel value of about $20 a gram, the sale of byproduct plutonium can be a substantial source of operating revenue.

That is why Rep. Cart T. Durham, of North Carolina, vice chairman of the Joint House-Senate Atomic Energy Committee, just a few days ago predicted that atomic experts will develop a reactor in the next 2 years that will produce power as cheaply as oil, coal, or water.

Within 5 years, he said, atomic powerplants should be commercially competitive with present lower cost sources of power, which, of course, are the hydroelectric plants.

During a speech in Los Angeles on February 15, Floyd B. Odlum, financier and president of Atlas Corp., predicted that by 1975 all electricity in the United States will be generated by uranium based powerplants. He, too, said that even at present atomic energy is practically competitive with other fuels for the generation of electric power.

Using a cubic-inch block of wood as a symbol representing a similar block of uranium 235, Odlum said that 20 such little blocks of U-235 would supply enough energy to provide New York City with all its electrical needs for a 24-hour period.

Of course, there are numerous technical difficulties yet to be overcome in the production of nuclear-electricity. But the fact is they are being overcome and sometimes in the very process of building nuclear-electric facilities.

Consolidated Edison of New York, one of the Nation's leading power producers, boldly announced only a month ago that it will soon build a nuclear-electric generating plant to add to its system.

Thus the problem is facing us squarely, and we cannot dodge it in connection with the upper Colorado proposal. The Bureau of Reclamation and the Congress must have their eyes open to these facts of modern day life. There must be a clear-cut determination as to whether or not nuclear-electric energy developments will turn this proposed multibillion dollar expenditure into a dead loss. We cannot inflict such an enormous new burden on the Nation's taxpayers for several generations to come.

Therefore, Congress must hold thorough hearings on this point. It must even delay consideration of the legislation for a year or two, if need be, so that it may be evaluated in the light of results of nuclear-electric energy research and development now underway.

So that the Congress may be further informed I am backing up this plea by citing additional information collected over the past few weeks.

On March 27, 1954, the Joint Committee on Atomic Energy said in a report that:

"* * * economically competitive atomic power will be a reality in the United States within the next 10 years."

On March 9, 1954, Henry D. Smyth, member of the Atomic Energy Commission, said in an address:

"It is evident that we can build power plants which will convert the energy released in nuclear fission into electrical energy to be fed into transmission lines."

The electric companies public information program said in a 1953 report:

"Nuclear power looms on the horizon as an energy source which might well become competitive with coal, oil, gas or falling water in the next few years. Within the past 2 years nuclear heat has converted water to steam, from which electricity was generated."

In a report to Congress in July, 1954, the AEC stated it could be reasonably expected that nuclear fuel would be economical enough to compete with conventional fuels in the foreseeable future. Atomic material costs have been brought to a record low, and ore processing developments have resulted in major reductions in the cost of fissionable materials and paid for themselves "many times."

Thorium, which can be converted by atomic reactions into a fissionable material, is three or four times as plentiful as uranium, the report said.

Dr. John R. Dunning, dean of engineering at Columbia University, said on June 3, 1954:

"The important conclusion from the data is that already, with only about 10 years of any appreciable searching for uranium, we have completely reversed our position held in the immediate postwar period when most so-called experts were saying we couldn't possibly have enough uranium to build an atomic power economy.

"In this short space of time, there has come general agreement that our uranium reserves constitute the major fuel reserves in the world for the future. A figure something like 25 times as much energy in uranium as in coal, oil and gas is now usually quoted.

"There, again, this figure has to be viewed as a tentative figure. It wouldn't surprise some of us too much to find there were 100 times as much energy in the form of atomic fuels as future progress develops in atomic energy release methods, atomic fuel recovery methods, raw material prospecting, and so on down the line.

"The important lesson is that our future energy reserves are abundant in the atomic field."

On December 20, 1954, the Associated Press reported from Washington in the Salt Lake Tribune:

"Within 20 years about twice as much electric power will be furnished by the atom as is now generated by waterpower, according to a private study prepared for the use of investor groups.

"The growth will represent 'conservatively' a private investment of about $6 billion in nuclear-powered electric plants, it was estimated, of which more than one billion dollars will go into reactors alone.

"The survey was made by H. Dewayne Kreager, metal and power specialist associated with John R. Steelman. Steelman, a top assistant to former President Harry S. Truman, now is an industry consultant here. Kreager until mid-1953 was the executive officer of the Office of Defense Mobilization.

"Labeled an 'economic timetable,' the survey predicted that from 1975 to the end of the century, 80 percent of all new generating capacity installed in this country will be atompowered.

* * * * * * *

" 'The first 10 years should be regarded as an experimental period,' the study says; '1965 is the estimated and somewhat arbitrary date at which power from nuclear reactors is expected to become economically competitive with existing thermal (coal- or oil-fueled) plants.

" 'However, 1965 is an "outside" date; competitive electric power from nuclear energy may come as early as 1960.' "

A 5-year program of the AEC will embrace five different reactor projects costing a total of $241 million.

The projects are:

1. A full-scale nuclear powerplant to be built by Westinghouse Electric and Duquesne Light near Pittsburgh.
2. A "boiling water" reactor to be built by the Argonne National Laboratory. This reactor promises to cut power costs substantially.
3. A sodium-graphite reactor to be built by North American Aviation, Inc. This reactor may produce more atomic fuel than it burns.
4. A fast "breeder" reactor to be built by Argonne.
5. A homogeneous reactor to be built at Oak Ridge.

In March 1954, a report of the Joint Committee on Atomic Energy stated:

"There is real confidence that atomic power can be produced at a cost competitive with fossil fuels such as coal and oil within the next decade by exploring these five approaches."

Lawrence R. Hafstad, director of reactor development for the AEC, said on July 21, 1954:

"* * * in uranium we have what promises to be both a compact and a cheap source of energy. * * * One pound of uranium, about a cubic inch, contains as much energy as * * * 1,500 tons of coal. That this energy promises to be cheap, we can see by calculating the cost of the 1,500 tons of coal. At $8 a ton, this would be in the neighborhood of $10,000, whereas the cost of 1 pound of uranium is more like $20."

A story in the New York Times, December 12, 1954, said:

"Leaders of the Nation's $25 billion electric light and power industry have come to the conclusion that they must build nuclear reactors. This decision has been reached despite the greater efficiency of coal at present for generating steam for power.

"In a private report being sent to the executives and engineers of the country's power companies, emphasis is placed on atomic fission as the future source of energy. * * *

"Some of the finest atomic engineering minds in the country put the findings together after considerable research. The report is being issued by the electric power companies information program (PIP).

" 'The consensus of opinion is that within 10 years, or possibly sooner, private industry will cross the threshold of economic nuclear power,' the study says."

Congress has appropriated more than $13 billion for atomic energy activities.

The Atomic Energy Commission already is the world's third largest business. Only Metropolitan Life Insurance and American Telephone & Telegraph have greater assets. Physical assets owned by the AEC is considerably larger than such assets of General Motors and Standard Oil of New Jersey. If the present expansion program continues, the AEC will soon be the world's largest single enterprise.

More than 150,000 persons were given employment under the AEC program in 1953.

Faced with a growing shortage of coal for power generation, Great Britain has turned to the development of commercial nuclear power reactors as before noted. "This is a historic day for Britain," declared Goeffry Lloyd, minister of fuel and power, when he announced the plan to Parliament February 15. He spoke of "tremendous prospects" that "offer possibility of a new industrial revolution."

Canada is completing a big reactor, after which private enterprise will be permitted to develop commercial nuclear power.

Norway and Sweden are engaged in extensive work to develop nuclear power for commercial use.

Brazil, Australia and India are at work to develop nuclear power for commercial use.

The Edison Electrical Institute said in its 1953 report:

"Commercial utilization of nuclear energy * * * could result in important conservation of the Nation's reserve of fossil fuels, a highly desirable long-range objective. Moreover, this potential source of fuel may ultimately provide a means for reducing fuel costs at central stations."

On February 17, 1954, President Eisenhower said in a message to Congress:

"In 1946, too, economic industrial power from atomic-energy sources seemed very remote; today, it is clearly in sight * * * largely a matter of further research and development. * * *"

Mr. ASPINALL. Are there any questions that anyone wishes to ask of the Senator?

Thank you very much.

Senator BENNETT. Thank you.

Mr. ASPINALL. Last Friday we moved with commendable dispatch, in my opinion, in the procedure which we followed.

This morning we shall have before the committee representatives of the State of New Mexico, who are proponents of the legislation. They are scheduled to complete their direct presentations in 20 minutes, and unless there is an objection, we shall have a statement from each one and then reserve the questioning until the final statement has been made and then we will have all of the witnesses before us for questioning. Is there any objection to this procedure?

Mr. SAYLOR. Mr. Chairman, I have no objection, but in view of the fact that the people who came from the great State of Colorado covered a considerable period of time, even though we moved with dispatch, I do not see how it is possible for men of the character who are going to testify here this morning to complete their statements in 20 minutes, and I think it is the understanding if they will run over a little it is not going to be held against them.

Mr. ASPINALL. I think the gentleman is correct in his position. I do not expect them to run over very much, because they do not have one of the controversies that the State of Colorado has, which took more time than any other particular matters during last Friday's hearing.

At this time we shall listen to a statement by John Bliss, State engineer, New Mexico, a member of the Upper Colorado River Commis-

sion. Mr. Bliss has been before the committee several times heretofore, and we welcome you again this morning.

STATEMENT OF JOHN BLISS, STATE ENGINEER, NEW MEXICO, AND STATE COMMISSIONER ON THE UPPER COLORADO RIVER COMMISSION

Mr. BLISS. Thank you. Mr. Chairman, my statement is going to be very brief. I would like to just turn it in for the record, if I may, and then ask that the other statements be presented shortly after by the others who will appear. And then I have a statement which I would like to make on the quality of water, following that.

As far as the State of New Mexico is concerned, I would merely like to say that the new Governor has presented evidence in the Senate subcommittee backing the Colorado River project 100 percent, particularly, of course, as it applies to the State of New Mexico, and we do earnestly solicit your favorable consideration of the legislation.

One point might be mentioned, that is that certain objections to the transmountain diversion of water into the State has now been settled, as evidenced by certain letters in the Senate subcommittee hearings.

Mr. ASPINALL. Is there any objection to the request of the witness that the statement be made a part of the record of the hearings?

Hearing none, it is so ordered; and thank you very much, Mr. Bliss.

(The prepared statement of Mr. Bliss follows:)

STATEMENT OF JOHN BLISS

My name is John Bliss. I am State engineer of New Mexico and the State commissioner on the Upper Colorado River Commission. I appear before you in behalf of the Colorado River storage project and participating projects.

Last week at the hearings before the Senate Subcommittee on Interior and Insular Affairs, I had the pleasure of presenting our Governor's complete endorsement of the project, particularly as it affects New Mexico interests.

The Navaho storage reservoir is an essential first step in the development and use of the San Juan River waters. Without it, it will be impossible to divert water to the Navaho project, which is a vital factor in the program to improve the lot of the Navaho Indian Tribe, and to the adjacent white lands unit of that project. The reservoir will also provide large holdover capacity, thereby making possible the diversion of substantial quantities of water to the Rio Grande Basin for domestic, municipal, and suplemental irrigation uses. These two projects are now before this commitee for provisional authorization.

Because the two projects compete with one another for a common water supply, it is felt that provisional authorization at the present time is essential to permit the State to work out satisfactory agreements which will establish the respective sizes of the two and will protect developments on both sides of the divide. Preliminary project reports on both plans are complete and are now in the process of circulation for comment. It is hoped that final project reports will be available in the not too distant future.

The Hammond project and the New Mexico portion of the Pine River extension project are included in the bills for authorization at this time. Although small (they involve a total of only about 4,000 acres), they provide an initial step in the much needed development of the basin. Ultimately it is expected that, within New Mexico's compact limitations, projects will be constructed for all irrigation, domestic, and municipal requirements, and for the exploitation of the immense natural resources of the San Juan area, including coal, gas, oil, uranium, and many others.

Last year there was opposition from the State of Texas to the transmountain diversion of water to the Rio Grande Basin. I am happy to now say that agreement has been reached between New Mexico and Texas which resolves that controversy. Letters from the lower Rio Grande valleys have been filed with the Senate subcommittee indicating that in consideration of certain language

incorporated in the several bills now under consideration, Texas withdraws its opposition to the project.

Favorable consideration of the Colorado River storage project and participating projects by your committee and by the Congress is earnestly solicited.

QUALITY OF WATER REPORT

Mr. Chairman, in addition to my statement as New Mexico commissioner, I was requested some months ago by the Upper Colorado River Commission to make a study of the present and future potential qualities of the waters of the Colorado River at Lees Ferry. The question of the suitability of the depleted future flows of the river for irrigation and other purposes has been raised by certain lower basin interests and it was felt that it should be answered as fairly and accurately as possible.

As a graduate civil engineer (Colorado Agricultural College, 1925), I have worked for the last 30 years almost entirely on water and water supply problems. In 1935 a suit was brought by the State of Texas against the State of New Mexico charging violation of the Rio Grande compact of 1929. An important phase of the suit involved the question of quality of water and the obligation of upstream users to deliver water of a certain quality as well as quantity to downstream rights. I took an active part in the suit, particularly that phase of it dealing with water quality. Incidentally, no decision as to the legal liability of upstream users regarding quality of water was ever made in that suit because a compact agreement subsequently was reached between the States and the suit was dismissed.

Since that time I also appeared as a witness in a case on the lower Pecos River which bore directly on the question of water quality.

With this brief statement as to my qualifications, I wall proceed, if I may, my report on quality of water of the Colorado River.

Mr. ASPINALL. The next statement is to be made by Mr. Tom Bolack, chairman of the board, Upper Colorado River Grass Roots, Inc. We are glad to have you with us, Mr. Bolack.

STATEMENT OF TOM BOLACK, CHAIRMAN, UPPER COLORADO RIVER GRASS ROOTS, INC.

Mr. BOLACK. Mr. Chairman and members of the committee, my name is Tom Bolack and my home is Farmington, N. Mex. Recently I was elected chairman of the Upper Colorado River Grass Roots, Inc. As chairman of this organization I am pleased and highly honored to be able to appear before this committee in support of the Colorado River storage project and participating projects.

I wish to report to this committee which is considering legislation to authorize this most important project, that the Upper Colorado River Grass Roots, Inc., has a membership composed of over 100,000 Aqualantes in the four States of Colorado, New Mexico, Utah, and Wyoming. They serve without salary or expense account. These citizens come from all walks of life. Who are these Aqualantes? The term itself means "water vigilantes," or individuals who are dedicated to the proposition of defending their right to develop the water resources of their States.

They range in age and importance from grade-school children, junior-high children, high-school students, business and professional people, and housewives, State officials, and right on up to the Governor of each of the four States. All have one thing in common: They are all cognizant of the importance of developing the water resources of the upper Colorado River Basin. Furthermore, every individual is enthusiastic in his support. The best evidence of this is

the willingness with which individuals have contributed so freely with their money and efforts to get this worthy job accomplished.

The Aqualantes and the Upper Colorado River Grass Roots, Inc., are looking forward with the hope and confidence that the first session of the 84th Congress will enact legislation making possible the utilization of water resources of the upper-division States in order to provide a more prosperous future for themselves and their posterity.

I do not wish to burden this committee further except to state that I wish to request that my statement in support of the Colorado River storage project, which appears on pages 259–261 of the printed hearings on S. 1555 of the second session of the 83d Congress, be incorporated by reference in this hearing. Thank you.

Mr. ASPINALL. Thank you very much, Mr. Bolack.

The next witness appearing for New Mexico is John Patrick Murphy, executive secretary, Middle Rio Grande Flood Control Association.

We are glad to have you with us, Mr. Murphy.

STATEMENT OF JOHN PATRICK MURPHY, EXECUTIVE SECRETARY, MIDDLE RIO GRANDE FLOOD CONTROL ASSOCIATION

Mr. MURPHY. Mr. Chairman and members of the committee, in the interest of brevity and to conserve the time of this committee, I respectfully request that by reference, you incorporate my testimony of last year, which appears on pages 519, 520, 521, and 522 of the printed hearings on H. R. 4449, H. R. 4443, and H. R. 4463, January 18 through January 28, 1954.

Last year we had opposition to our project from the lower valley in New Mexico and from the El Paso District in Texas. The opposition was caused solely by our plan to construct power dams and a retention dam on the Chama River which is a major tributary of the Rio Grande. Our differences have since been resolved by deleting all contemplated dams from the Chama and placing the retention dam and storage reservoir on Willow Creek.

We have letters confirming this statement from Mr. N. B. Phillips, manager, El Paso County Water Development District of El Paso, Tex. and from Mr. John L. Gregg, manager, Elephant Butte Irrigation District of New Mexico, Las Cruces, N. Mex. These two gentlemen appeared before this committee in opposition last year and we are happy indeed to have them for us, instead of against us, this year.

I will ask that copies of these two letters be made a part of the record following this statement.

We were further handicapped last year by not having our feasibility report completed. This year, we are pleased to inform you that the report has been completed and it fully justifies the project as being feasibly sound, with the ratio of benefits showing 1.84 to 1. In the Senate hearings on February 28 last, the Bureau of Reclamation stated for the record that the San Juan-Chama feasibility report had been completed and would be circularized (in accordance with the Flood Control Act of 1944) within the next 30 days. This completed report therefore will be available for use and study by this committee.

The various bills before this committee as introduced in the Congress, all provide for a careful screening of these participating pro-

jects and they must comply with the qualifying criteria as set down by the Congress. Hence, we are pleading with this House committee, for provisional or conditional authorization at this time of New Mexico's projects, so that we may thus, be assured of equal recognition with the other units of the upper Colorado River comprehensive plan.

We felt fully justified in seeking provisional authorization last year; but now that our feasibility report has been completed and in the hands of the Department of the Interior, and since it proves our project to be highly feasible with a benefit-cost ratio of 1.84 to 1, we hope this committee can now grant our request to include the San Juan-Chama project on a provisional basis.

In conclusion, I sincerely hope that we have convinced this committee that water is the vertiable lifeblood of New Mexico and that our potential uses far exceed the present supply, and it is imperative, therefore, that the Federal Government authorize the construction of essential facilities, that will enable New Mexico to get and use its rightful share of the waters of the San Juan River and its tributaries.

I appreciate very much this opportunity to appear before your committee, and on behalf of the Middle Rio Grande Flood Control Association and the 400,000 persons whom we represent, I wish to say thank you.

Then I have these 2 letters that are addressed to Senator Clinton P. Anderson and these are the 2 copies I would like to have included.

Mr. ASPINALL. Is there any objection to having the statement made by Mr. Murphy made a part of the record of the hearing?

Hearing none, it is so ordered.

(The prepared statement of Mr. Murphy follows:)

STATEMENT BY JOHN PATRICK MURPHY, EXECUTIVE SECRETARY, MIDDLE RIO GRANDE FLOOD CONTROL ASSOCIATION

Mr. Chairman and members of the committee, my name is John Patrick Murphy, I am executive secretary of the Middle Rio Grande Flood Control Association. This association has been authorized by the 400,000 people who live in the middle Rio Grande Basin and the upper Canadian Basin, to appear on their behalf and plead for an additional supplemental water supply.

While endorsing the Colorado River storage project and participating projects as a whole, we are especially interested in that portion of the program dealing with the share of the Colorado River water allocated to New Mexico under the upper Colorado River compact; and we have been authorized to represent the people who are seeking 235,000 acre-feet of water through the San Juan-Chama project.

In the interest of brevity and to conserve the time of this committe, I respectfully request that by reference, you incorporate my testimony of last year, which appears on pages 519, 520, 521, and 522 of the printed hearings on H. R. 4449, H. R. 4443, and H. R. 4463, January 18 through January 28, 1954.

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As already stated—we are not repeating our detailed remarks as rendered before this committee last session, but we sincerely hope you will study the significant and salient features of that important testimony, such as: (1) That our valley area is described as semiarid with precipitation ranging from 5 to 7 inches per year; (2) most of the precipitation in the Rio Grande Basin is through snowfall which occurs in the high mountainous areas; (3) the principal source of water in the lower elevations, therefore, comes from diverting stream flow and underground pumping; (4) population trends in arid New Mexico follow river streams and the Rio Grande Valley alone, contains over 50 percent of the population of the State; (5) this tremendous increase in population, far above the national average, has created a water problem for all cities and towns in the valley; (6) the terrific increase in the use of underground water pumped for municipal purposes has decreased the flow of the river, thereby reducing the water supply for irrigation; (7) extremely important defense establishments have been located in the Rio Grande Valley. They include: Atomic energy projects, guided missiles, Air Force bases, and numerous other military installations; all of which require large amounts of water, and accentuate our need for this San Juan-Chama diversion; (8) there are 6,000 Indians in the valley living in 9 pueblos, and as agriculture is their principal economy, they too are seriously threatened by this ever-increasing shortage of water from which the region is suffering.

The foregoing factors, coupled with the alarming decrease in precipitation in New Mexico over the past 10 years, demonstrate that this State is headed for water bankruptcy, if not already virtually there.

The desperate need for importing additional water into the basin has definitely been established. The San Juan River is the only source available. It truly is our last waterhole.

Utilization of these now-unused waters of the San Juan—of transcendent importance to the Middle Rio Grande Valley—has been envisioned for over 20 years. Therefore, when in 1948, New Mexico was finally apportioned its share of Colorado River water, it immediately became imperative that a plan be developed on an equitable basis to derive the maximum beneficial use of this new unappropriated water.

The Governor of New Mexico, in his official comments, and in a letter to the Honorable Douglas McKay, Secretary of the Interior, emphasizes that the Navaho project and the San Juan-Chama project are closely related because they have a common source of water supply. New Mexico feels that the two projects cannot properly be considered separately. The State therefore feels that the proper course is to seek concurrent provisional authorization on the two projects at this time.

So, we not only ask this committee to recognize that New Mexico has great need for the beneficial consumptive use of all of its water, but we also plead for understanding consideration of the interrelationship between the projects as discussed in the preceding pertinent comments of our former Governor, and which have the wholehearted support of our present Governor.

Furthermore, we want to state that we in New Mexico feel that the Congress should approve the entire Colorado River storage project and participating projects. We look upon this as a carefully thought out comprehensive plan that contains a blueprint for each state in the upper basin to follow.

Likewise, we all feel, that no unit or project should carry priority over the other, and if one part is authorized and another part fails to get simultaneous recognition, there would be the tendency or preception to assume granting of precedence with prior authorization.

The various bills before this committee as introduced in the Congress, all provide for a careful screening of these participating projects and they must comply with the qualifying criteria as set down by the Congress. Hence, we are

pleading with this House committee, for provisional or conditional authorization at this time of New Mexico's projects, so that we may thus be assured of equal recognition with the other units of the upper Colorado River comprehensive plan.

We felt fully justified in seeking provisional authorization last year but now that our feasibility report has been completed and in the hands of the Department of the Interior, and since it proves our project to be highly feasible with a benefit-cost ratio of 1.84 to 1, we hope this committee can now grant our request to include the San Juan-Chama project on a provisional basis.

New Mexico's economic health and growth are wholly dependent on water. Our usable water supplies, always a grave concern, are today critically short and failing further every day. Droughts always have hit New Mexico hard. They have made our economy sick too often, too long. Our people are paying an enormous price for the delay in the apportionment of the use of the waters of the upper Colorado River and its tributaries.

For years and years that much-needed water has been flowing right out of our State. New Mexico is deriving no benefit from it. It is imperative that this waste be stopped as soon as is humanly possible.

In conclusion I sincerely hope that we have convinced this committee that water is the veritable lifeblood of New Mexico and that our potential uses far exceed the present supply, and it is imperative, therefore, that the Federal Government authorize the construction of essential facilities, that will enable New Mexico to get and use its rightful share of the waters of the San Juan River and its tributaries.

We join wholeheartedly, with the other witnesses in urging favorable action on the request for authorization of the Colorado River storage project and participating projects which, for reasons clearly stated, definitely should include at least provisional authorization for the San Juan-Chama project.

I appreciate very much this opportunity to appear before your committee, and on behalf of the Middle Rio Grande Flood Control Association and the 400,000 persons whom we represent, I wish to say, "thank you."

Mr. ASPINALL. You have heard the request that two letters, one from Mr. Phillips, of Texas and one from Mr. Gregg, of New Mexico, stating their changed position on this legislation from that position held by them last year, also be made a part of the record at this place in the hearing. Is there any objection?

Mr. SAYLOR. I have no objection. I am afraid these letters do not go as far as the witness has indicated and therefore I think it is necessary that they be part of the record.

Mr. ASPINALL. Hearing no objection, the letters will be made a part of the record at this place in the hearing.

(The letters referred to follow:)

EL PASO COUNTY WATER IMPROVEMENT DISTRICT NO. 1,
El Paso, Tex., February 21, 1955.

Hon. CLINTON P. ANDERSON,
United States Senator,
Senate Office Building,
Washington, D. C.

DEAR SENATOR ANDERSON: This is to acknowledge, with thanks, your communication of February 14, relative to the hearings on S. 500, scheduled for Monday February 28, at 10 a. m.

This is to advise you that I do not wish to be heard, or care to file a statement relative to your bill, S. 500, in case there is to be no change relative to the San Juan-Chama project, as was agreed to last year in S. 1555, between Senator Daniel and yourself.

In the event, however, that any change in the language pertaining to the San Juan-Chama project is contemplated, I desire to reserve the right to either be heard or file a statement before the hearings on the bill are closed.

Sincerely yours,

N. B. PHILLIPS, *Manager.*

ELEPHANT BUTTE IRRIGATION DISTRICT OF NEW MEXICO,
Las Cruces, N. Mex., February 17, 1955.

Senator CLINTON P. ANDERSON,
United States Senate,
Washington, D. C.

DEAR SENATOR ANDERSON: Thank you for your letter of February 14, 1955, regarding hearings on S. 500 which will begin on February 28. We do not believe that it will be necessary for a representative of this district to participate in the hearings this year.

Very truly yours,

JOHN L. GREGG, *Treasurer-Manager.*

Mr. ASPINALL. The next witness is Mr. Hubert Ball, chief engineer, Middle Rio Grande Conservancy District.

STATEMENT OF HUBERT BALL, CHIEF ENGINEER, MIDDLE RIO GRANDE CONSERVANCY DISTRICT, ALBUQUERQUE, N. MEX.

Mr. BALL. Mr. Chairman, I wish to thank Congressman Saylor of Pennsylvania for recognizing the fact that New Mexico's time is very short. However, we realize that this committee's time is limited and since there are so many competent witnesses who have testified to the engineering facts before me, I do not wish to take up any other time than to request that my statement which has been filed with the committee be made a part of the record.

In that statement I requested that the testimony I submitted at the hearings last year be incorporated in these hearings and I assume that would be done by reference. I think that is all I have to say, Mr. Chairman.

Mr. ASPINALL. Thank you, Mr. Ball.

Is there any objection to the statement made by Mr. Ball being made a part of the record of the hearing?

Hearing none, it is so ordered.

(The prepared statement of Mr. Ball follows:)

STATEMENT OF HUBERT BALL, CHIEF ENGINEER, MIDDLE RIO GRANDE CONSERVANCY DISTRICT, ALBUQUERQUE, N. MEX.

Mr, Chairman, last year I submitted a statement to this committee presenting the position of the district which represents the people of the middle Rio Grande area in New Mexico. That statement was quite lengthy and set out the benefits which would accrue to our area from the construction of the Navaho Dam and the San Juan-Chama project, portions of the Colorado River development program.

This statement was of an engineering nature and detailed the expected use of the water and the change it would make toward a successful operation of the Rio Grande compact within the Middle Rio Grande Conservancy District.

Since there has been no change in the engineering details and the general views on this project, I request that my statement as shown on pages 529–532 at the hearings held January 18–28, 1954, before the Subcommittee on Irrigation and Reclamation, which is a part of the Committee on Interior and Insular Affairs of the House of Representatives, be made a part of the record of these present hearings. I also wish to add the following brief statment.

The directors of my district request me to assure you that we sincerely support the upper Colorado River project you are now considering. We believe the direct and indirect benefits that would follow the completion of this program would be far greater than present computations would indicate. We believe that the great development of this area, comprising 12 percent of the land area of this Nation, would be of untold value to the welfare of our area, and would add substantial support to the continued effort to maintain the position of our country as the most progressive and fully developed in the entire world. The people of our State also believe that this development would only add to the great industrial

development of the Eastern and Southern States of our country through the expanding market which would result from the increased purchasing power which would be produced in the 4-State area to be developed.

The steadily increasing population of this Nation with attendant service industries requires and demands wider fields and greater horizons. We think that the time is getting late for such a program and that an early start is most imperative. We believe this Congress and its committees have the vision and the courage to authorize and commence this great undertaking which would be a priceless heritage to the future welfare and happiness of our country.

In conclusion, we earnestly request and expect that these projects, the Navaho Dam, the Navaho Indian projects, and the San Juan-Chama, which are so vital to thep rogress of our State of New Mexico, will be included in this legislation.

Mr. ASPINALL. The next witness is Mr. I. J. Coury. Mr. Coury is a member of the New Mexico Interstate Streams Commission and adviser to the New Mexico Commissioner of the Upper Colorado River Commission.

STATEMENT OF I. J. COURY, MEMBER, NEW MEXICO INTERSTATE STREAMS COMMISSION, AND ADVISER TO NEW MEXICO'S COMMISSIONER OF UPPER COLORADO RIVER COMMISSION

Mr. COURY. Mr. Chairman, I do not have a prepared statement. In view of the fact the time allotted the State of New Mexico was so short, I waived my time for making a formal statement to allow Mr. Bliss sufficient time to make his statement on the quality of water.

Mr. ASPINALL. You will be with New Mexico's witnesses for examination, if so desired?

Mr. COURY. Yes, sir.

Mr. ASPINALL. That will be fine, Mr. Coury.

STATEMENT OF JOHN BLISS, STATE ENGINEER, NEW MEXICO, AND STATE COMMISSIONER ON THE UPPER COLORADO RIVER COMMISSION—Resumed

Mr. ASPINALL. We shall now listen to Mr. Bliss, who at this time will make a statement relative to the quality of water.

Mr. Bliss.

Mr. BLISS. Mr. Chairman, the question of quality of water of the Colorado River has been raised in this hearing before this subcommittee, and also in the Senate, and last fall I was given the assignment of replying to the question of quality.

Now whether or not an upper basin State has any legal obligations to deliver a given quality to a lower basin State is beside the point as far as this paper is concerned.

I imagine I should qualify myself a little bit for the purpose of the record.

I have worked in quality of water work or general water work for about 30 years of my life. I am a graduate civil engineer. Back in 1935, when the State of Texas and the State of New Mexico had some little difference over the waters of the Rio Grande, I appeared as a witness particularly on quality of water work in that hearing. Later than that I also appeared in a suit on the Pesos River which also involved the question of the quality of water. I have worked in those fields for a number of years.

Now to hurry along with my statement. The problem in the Upper Colorado River is simply this: That with the consumption of water

in the upper basin it will have some effect upon the lower basin, and the question is what effect will it have.

Water falling on the land as rain or snow is practically pure and from there it starts to gather salts as it goes on downstream. That situation continues the further down it goes. Now man, by his activities, can affect that quality in a number of ways. The most important is by irrigation. He can also affect it by municipal and industrial uses. By storing water in large hold-over reservoirs, there is some effect, by the transmountain diversion of water and by the drainage or reclamation of certain lands, the quality may be affected.

The most important effect, as far as the Colorado River is concerned, is the use of water for irrigation purposes. In that process, the water with its dissolved solids is placed upon the land, the plants themselves take up little or no salts or dissolved solids, the return waters carry the dissolved solids back to the land. In effect, therefore, what happens is that you consume the water but the dissolved solids go on downstream. So the effect of irrigation is to increase somewhat the concentration of the dissolved solids in the water.

The waters of any natural stream involve a number of constituents. They vary somewhat in the waters of the West but in general they are composed of two groups, the positive ions which are sodium potassium, calcium, and magnesium, and the negative ions which are largely bicarbonates, carbonites, fluorides, and sulfates.

There is no need to go into the effect the various constituents have on the quality of water. In general they have little effect, except possibly the constituent sodium, which has a deleterious effect upon the growth of plants themselves and upon the quality of the soil, and a measure of the quality of irrigation water is the sodium percentage in that water, that is, the relation of the sodium ion to the other positive ions.

In that connection, I may say that the Rubidoux Laboratory at Riverside, Calif., has made a considerable study of the question of quality of water and its effect upon plants and upon soils, its effect, in other words, upon the suitability for irrigation purposes.

They have developed a chart which I have shown on the board there, which shows in a general way the suitability or unsuitability of water for irrigation purposes.

I will go over there later and describe a little bit what is on that chart.

In determining what happens to the water in the upper basin, it was analyzed on two bases. One was the initial phase projects, which were taken as the projects under consideration last year. There were 12 participating projects, as I recall, in the bill last year, and those were used as the initial phase projects in this study.

If they are changed somewhat, the projects are all relatively small and the effect on the conclusions would be very minor unless there were a substantial change one way or the other.

If I may go back here for a moment. The chart uses the two criteria——

Mr. ASPINALL. Will you first identify the chart?

Mr. BLISS. That chart is labeled "Suitability of Water of the Colorado River at Lees Ferry for Irrigation Purposes," and it is a copy of the chart prepared by Mr. Wilcox of the Rubidoux Laboratory which I just told you about. The two criteria used are the total dis-

solved solids or total salinity of the water and the sodium percentage, and you may see that I have two criteria here for total salinity. One is in equivalents per million and the other is in tons per acre-foot of dissolved salt. I have used this scale at the top of the chart. It shows that up to about six-tenths of a ton per acre-foot and below a sodium percentage of 70 to 80 percent you have excellent to good water. Between six-tenths and 1 6/10 tons per acre-foot and below a sodium percentage of 50 to 60 percent, you have good permissible water. Further out you have doubtful to unsuitable water, and, at the extreme, unsuitable water. As you get higher sodium percentage you also, of course, have unsuitable water due to the sodium element.

Now the waters of the upper Colorado River as they appear at Lees Ferry under natural conditions vary quite widely in their dissolved solid and in the sodium percentage. There is a green box here which shows the extreme variations of the water which formerly went down to the lower California area. It varied from a dissolved solids of about three-tenths up to about 2 4/10 tons per acre-foot and sodium percentage of about 20 up to over 50 percent.

With the construction of the initial phase projects, these 12 which were considered last year, the large holdover storage in reservoirs would reduce or smooth out that extreme fluctuation in quality to a very minor range shown on the chart here in orange. It is possible that that range might be a little larger one way or the other. Analyses were made on an annual basis, and if it were possible to do it on a day-by-day basis, it is possible those fluctuations would be a little greater those those shown.

I have put on here a mark which shows that the average of the 3 reservoir conditions at Lees Ferry was a water which carries about seventy-three one hundredths of a ton of salt per acre-foot and about 35 percent sodium. It is right at this point right here on the chart [indicating]. With the construction of 12 initial phase projects which would consume about 14 percent of the additional water supply but above that now appearing at Lees Ferry there would be a slight increase in both the sodium percentage and in the total dissolved solids carried in the water, the concentration of dissolved salts. The effect would be very minor.

With the ultimate depletion in the upper basin of 7½ million the effect would be somewhat larger. I am not going into the details, because of time, as to how I arrived at that conclusion. I think the record is rather clear. I think the estimates made are reasonable. It shows that under ultimate development we would end up with a water supply of about 1 ton per acre-foot at the lower end of the upper basin and with a sodium percentage of below 50 percent.

I might say, Mr. Chairman, that those conclusions are in accord with those found by the Bureau of Reclamation.

There is one item in which we vary somewhat and I would like to tell you about it at this time.

The Department of the Navy, the United States Geological Survey, the University of California, and others, a few years ago entered into a study of Lake Mead and what happened in that reservoir.

Dr. Howard, who is with the Geological Survey, made estimates of what happened in large reservoir basins when the water is held for long periods of time.

In Lake Mead he found two things happened: One was that solids in solution actually went out of solution. The other was that in Lake

Mead there are large saline deposits in the virgin river branch of the basin where gypsum and common salts are found in considerable quantities, and the two effects neutralize one another, so it is not possible to analyze accurately what happens in Lake Mead.

On the other hand, in the Rio Grande Basin, Elephant Butte Reservoir, we have rather complete records for a long period of time and it is possible to determine very closely what happened in that basin. Now there is some danger, of course, of transferring the data from one large river basin to another, but there are great similarities between the two basins and it is felt that the figures arrived at by the comparison are within reason.

In the Elephant Butte Basin a long-time record shows that the dissolved solids in irrigation water stored in the reservoir actually are precipitated out of solution. In other words, the salts are deposited within the reservoir basin. The amount of that deposition in the case of Elephant Butte is about 12½ percent or about one-eighth of the total supply. What causes that the experts do not know. They simply know that it does happen. There have been several theories advanced as to why it happens but there has been no adequate explanation.

C. S. Howard, in analyzing what happened in Lake Mead, found that about half that or about 6 3/10 percent of calcium carbonate or common lime was actually deposited out in Loke Mead. It was found in the Elephant Butte case that the other dissolved constituents also were deposited from solution. Therefore, it is very logical to assume that the same thing happened in the Lake Mead Basin.

Therefore, in arriving at the 1 ton per acre-foot ultimate quality of the water at Lee Ferry, I have concluded that one-eighth of the dissolved solids in the Green Canyon Reservoir will be deposited.

I will close my statement by quoting on page 14, the final page of the report, a statement by Mr. Julian Hinds, who was general manager and chief engineer of the Metropolitan Water District of Southern California.

Mr. Hinds has this to say:

> The quantity and quality of solids dissolved in the water were carefully checked. The dissolved solids in the unregulated river varied with the flow and ranged from less than 300 parts per million during floods to about 1,000 parts per million at low flow. Lake Mead equalizes this variation to an average mineral content of about 600 parts per million (0.81 tons per acre-foot). Boron and fluorine are not present in harmful amounts. Exhaustive studies show that the mineral content under the most unfavorable future conditions will be lower than the average for waters diverted and successfully used in the Yuma and Imperial Valleys prior to the construction of Hoover Dam. It is fully established that the water of the Colorado River is of high quality, except for a fairly high percentage of hardness which can be removed at a reasonably low cost.

I can only add to that I am in complete agreement with Mr. Hinds' statement.

Mr. ASPINALL. That concludes your statement?

Mr. BLISS. That concludes my statement.

Mr. ASPINALL. Is there any objection to having the full statement of Mr. Bliss and the chart which are incorporated therein made a part of the record?

Mr. HOSMER. Reserving the right to object, but I shall not do so. Will that chart there appear too in the record?

Mr. BLISS. It is in the report, sir.

Mr. HOSMER. I withdraw my reservation.

Mr. ASPINALL. Hearing no objection, it is so ordered.
(The prepared statement of Mr. Bliss follows:)

PRESENT AND FUTURE QUALITY OF COLORADO RIVER WATER AT LEE FERRY

INTRODUCTION

This report has been prepared at the direction of the Upper Colorado River Commission at its meeting in Denver, Colo., October 30, 1954, to answer some of the questions which have been raised as to the quality of the water of Colorado River at Lee Ferry which can be expected to result from the consumptive use of water by projects constructed under the Colorado River storage project and participating projects. The authorization of the initial phase of this project is currently being sought in the Congress of the United States.

The writer is indebted to the Quality of Water Branch of the United States Geological Survey, the Bureau of Reclamation, the Department of the Navy, the Rubidoux Laboratory of the United States Department of Agriculture and the International Boundary and Water Commission for the basic data contained in this report and to a number of individuals of wide experience in the quality of water field for their advice and technical assistance in its preparation.

THE PROBLEM

The Colorado River compact of 1922, apportioned the waters of the stream system between the upper and lower basins, the division point being at Lee Ferry near the Utah-Arizona State line. The compact provided that 7,500,000 acre-feet of water annually could be consumptively used by the States of the upper basin above Lee Ferry, provided that certain quantities were left in the stream for use in the lower basin. It provided for the beneficial consumptive use of 7,500,000 acre-feet annually in the lower basin plus the right to increase this consumptive use by 1 million acre-feet per annum. It also provided under certain circumstances for the allocation of any unapportioned waters of the system which might be available for new uses on or after October 1, 1963.

As of the date of the original Colorado River compact, approximately 2,050,000 acre-feet of water on the average was being consumptively used annually in the upper basin and approximately 2,900,000 acre-feet per year in the lower basin. Between 1922 and the date of the upper Colorado River compact, 1948, uses of water in the upper basin actually dropped slightly. However, including prospective uses by presently authorized projects, the present annual consumption will be about 2,400,000 acre-feet. Uses in the lower basin have substantially increased during the period, being about 5,030,000 acre-feet by 1938. Under initial stage development in the upper basin, including Glen Canyon and Echo Park Reservoirs and the 12 participating projects whose authorization was sought in the several bills before the Congress last year, consumptive uses above Lee Ferry would increase to about 3,200,000 acre-feet annually. Ultimately it is assumed that the full consumptive uses contemplated by the compact will be attained in each basin (see table I).

TABLE I.—*Uses of water in Colorado River Basin*

UPPER COLORADO RIVER BASIN (WYOMING, UTAH, COLORADO, NEW MEXICO, AND ARIZONA)[1]

	Irrigated acreage	Depletion, acre-feet
Year 1922	1,370,000	2,003,600
1920-24 average	1,366,000	2,049,200
Year 1948	1,385,000	1,926,000
1945-50 average	1,385,000	1,883,600
Present depletion including presently authorized projects:		
Based on 1929-51 average		2,421,000
Based on 1931-47 average		2,404,000
Initial phase, Colorado River storage project:		
Based on 1929-51 average		3,706,200
Based on 1931-47 average		3,671,200
Ultimate project		7,500,000

[1] H. Doc. 364, 83d Cong., 2d sess.

LOWER COLORADO RIVER BASIN [2]

	Gila River		Colorado River	
	Acreage	Depletion acre-feet	Acreage	Depletion acre-feet
Year 1922:				
Arizona	344, 318		72, 893	
New Mexico	8, 933		4, 217	
Utah			18, 148	
Nevada			10, 094	
California:				
In-basin			40, 839	
Out-of-basin			340, 000	
Mexico	4, 001		(3)	
Total:				
In-basin	357, 252	1, 029, 100	146, 191	501, 500
Out-of-basin, 1922			340, 000	2, 186, 600
Out-of-basin, 1920-24 average				2, 404, 000
Year 1948:				
Arizona	716, 111		113, 416	
New Mexico	11, 728		4, 332	
Utah			22, 100	
Nevada			11, 321	
California:				
In-basin			63, 676	
Out-of-basin			427, 850	
Mexico	3, 962		(3)	
Total:				
In-basin	731, 801	2, 145, 900		1, 810, 100
Out-of-basin, 1948				[4] 3, 183, 800
Out-of-basin, 1946-50				[4] 3, 215, 500

[2] Report on Water Supply of the Lower Colorado River Basin, Project Planning Report, U. S. Bureau of Reclamation, November 1952.
[3] Not known.
[4] Includes the figure of 180,500 acre-feet of water which was diverted to Metropolitan water district in 1948. This diversion has increased substantially since 1948

The compact states in article VIII that "present perfected rights * * * are unimpaired by this compact." The word "impair" has been seized upon by certain lower basin interests as a basis for their contention that the upper basin is obligated to deliver a certain quality as well as a certain quanity of water at Lees Ferry. Whether the wording of the compact itself or the water law of the Western States imposes any obligation on the part of an upstream user to deliver water of a given quality to a downstream user, or whether it does not, the question of quality has been raised by opponents of the legislation and should be answered as fairly and accurately as possible.

This report will attempt to show in some detail the effect of the initial phase of the Colorado River storage project and participating projects on the quality of Colorado River water at Lees Ferry. It will also show, in a general way, the quality of water which can be expected after full devlopment of the upper basin as contemplated by the 1922 compact.

FACTORS AFFECTING QUALITY OF WATER

There are a number of factors which affect the quality of the water which falls in any stream basin. Precipitated as nearly pure water in the form of rain or snow it immediately starts to gather soluble materials from the soil over which or through which it passes. Man, in using water for his purposes, may change the quality of water in a river basin to a considerable extent. Some of these man-produced factors are irrigation; domestic, municipal, and industrial uses; drainage, including the leaching of salts which may have accumulated in the soil; storage of water in major holdover reservoirs; and the diversion of water outside of the natural drainage basin.

Up to th presnt time, at least, man's activities have had little or no effect upon the natural processes of precipitation, runoff or percolation to the natural streams. Whether, in the future, he may be able to produce an appreciable change in these factors seems questionable. It is assumed in this report that the natural accumulation of dissolved solids in the waters of the Colorado River Basin will not be changed by man's activities.

The consumptive use of water by irrigation is probably the major man-produced factor which affects the quality of the waters of wastern streams. In the irrigation process, water is diverted from a stream (or pumped from under-

ground) and spread upon the land. A substantial portion of this water is taken up by the growing crops, the remainder either flowing back to natural channels as waste water, percolating into the ground and finding its way back to natural channels, or being evaporated into the air. Very little of the dissolved solids in the water is absorbed by the plants. The salts carried to the land, therefore, must either be carried back to the streams in the return waters or be deposited on the land. If permanent agriculture is to continue in any basin the salinity of the water in the soil cannot increase above the salt tolerance of the crops grown. Basically, therefore, irrigation uses of water within the Colorado River Basin or any river basin will consume the water required by the irrigation process but will return to the streams practically the same quantities of dissolved solids which were diverted from them.

To some extent the use of water for irrigation purposes will change the relative amounts of the several dissolved constituents. In passing over and through the soil there is a tendency for the water to drop some of its less soluble salts and to pick up some of the more soluble salts in the soil. The extent of such effect, which is called base exchange is limited for any single irrigation use. The total effect upon the quality of any given water supply will depend largely upon the extent of its use and reuse for irrigation purposes.

Domestic, municipal, and industrial uses, although vital to development of the basin, will constitute a relatively small percentage of total water consumption. Their relative effect on the quality of water will be much the same as that of irrigation. In the report it is assumed that use of water for these purposes will neither add nor subtract from the total quantities of dissolved solids carried by the streams.

Some basins where irrigation is now or may be practiced contain soils or ground waters or both which carry greater than usual quantities of soluble salts. In such areas, irrigation can be successfully practiced only by leaching away the excess salts. If the subsoil is porous, leaching may occur as a part of the irrigation process; if not, it may be necessary to install drainage conduits to carry away the excess salts and water. Even in basins where the salt content of the soil is normal, the process of irrigation will naturally leach some chemicals from the soil and leave some which were carried to the land by the irrigation waters. In each new irrigation project there will usually be some temporary increase in salt content of the return waters due to a flushing out of the irrigated lands.

An analysis of the arable lands of the upper basin which are being considered for irrigation development under the proposed Colorado River project indicates that areas where the soil concentrations are greater than ordinary constitute but small fractions of the total. The important facts in any area where leaching of the soil may occur are: (1) that the resulting salt increase is usually limited in amount and (2) that it is a temporary condition. Because the individual upper basin projects all consume relatively small amounts of water compared to the total amount of water in the main rivers, the effect of such flushing by one or even several new projects constructed concurrently will have little net effect upon the quality of the water supply at Lees Ferry. Further, most of such leaching will have been completed long before the ultimate project is developed. In this report, therefore, no attempt has been made to evaluate the temporary effect of soil leaching on water quality in considering either the initial phases or the ultimate development of the project.

In 1948–49 a comprehensive study of Lake Mead[1] was conducted by the Department of the Navy in cooperation with the Department of the Interior, Department of Commerce, University of California, and others. The report, now in the process of publication, covers a detailed study and analysis of most of the physical phenomena and changes which occur in the operation of this large holdover reservoir.

One of the principal effects of storage is the mixing of the varying qualities of the seasonal runoffs of the stream. The relatively saline flows of the fall and winter months are sweetened by the better quality spring runoffs from snowmelt. Summer torrential flows may be either better or worse than the average qualities depending upon the areas drained by such storms. Further discussion of the smoothing effect of holdover storage on quality of released water will be found later in the report.

Since no salts are removed from solution by the evaporative process, the increase in salinity concentration resulting from reservoir evaporation will vary directly with the amount of such evaporation.

[1] Lake Mead Comprehensive Survey of 1948–49, by W. O. Smith, C. P. Vetter, G. B. Cummings, and others, February 1954, in 3 volumes.

The Lake Mead studies indicate two other phenomena which have an effect upon the quality of water passing through the reservoir. Analysis of the qualities of inflow and outflow together with studies of the reservoir water itself show that some salts are actually precipitated out of solution in the storage basin. These salts, which in general comprise the less soluable constituents, seem in part to be precipitated because of temperature changes and in part to be carried down by the gradual settling of the finely divided sediments transported by the inflowing streams. In Lake Mead, the Virgin River branch or Overton arm of the reservoir basin contains substantial deposits of sodium chloride and gypsum. The effect of these soluble beds on the quality of Lake Mead waters gave some concern to the gelogists and others who studied the matter prior to Hoover Dam construction. Although studies indicate that some solution from these beds has occurred during the past 19 years of operation, the amount of such solution has not been as great as was originally feared and seems to be decreasing yearly as the beds become covered by silt deposits. C. S. Howard[2] has estimated that in the 1935–48 period more than 9 million tons of calcium carbonate and more than 1 million tons of silica constituing about 7 percent of the dissolved solids in the waters entering Lake Mead were precipitated out during the 14-year period. He found that a much larger quantity of salts, chiefly halite and gypsum have gone into solution within the reservoir basin in that period, the effect being a net increase in total dissolved solids discharging from the reservoir over those entering it of about 17 percent. These two phenomena counteract one another, making it impossible to fully evaluate the effects of either on the quality of water.

Transportation of water outside the natural basin of the Colorado River by means of transmountain diversions results in the physical removal of the dissolved solids carried by that water. Transmountain diversions as such have been attacked by some sources because they remove some of the better waters of the basin. The fact remains, however, that transbasin diversions remove both salts and water while in-basin uses remove only the water allowing the residual salts to be carried back to the streams to worsen the quality of the downstream supply.

In summation, consumptive use of water in the upper basin, as contemplated by and as provided for in the Colorado River compact of 1922 necessarily affects the quality of the remaining waters. Essentially, it depletes the water supply but leaves the dissolved solids behind. Certain factors, including the deposition of less soluble salts from solution and the physical transportation of salts out of the basin by transmountain diversion, tend to mitigate this condition. Base exchange occurring as a result of the irrigation process will tend to change somewhat the percentages of the several dissolved constituents.

DISSOLVED CONSTITUENTS AND THEIR SIGNIFICANCE

Natural waters vary greatly in the concentration and composition of dissolved constituents and correspondingly in their suitability for irrigation or other beneficial use. Further, the requirements for a good irrigation water may be inimical with those needed for other purposes. Domestic and industrial uses, for example, require a soft water, whereas a desirable water for irrigation uses should be hard. Waters of the Colorado River system will largely be used for irrigation purposes but there will also be a substantial demand for domestic and industrial supplies.

When used for irrigation, some of the constituents are beneficial to plants, some in moderate concentration appear to have little effect on plants or soils, while others impair plant growth or are harmful to soils.

In solution, a large proportion of the inorganic salts are ionized. The metallic elements, called cations, take a positive electrical charge while the nonmetallic elements or acid radicles, called anions, take a negative charge. The major cations—calcium, magnesium, sodium, and potassium—and the major anions—carbonate, bicarbonate, sulfate, chloride, and nitrate—constitute the bulk of the dissolved constituents in natural waters and very largely determine the quality. A number of minor constituents including boron, silica, fluoride, hydrogen measured as pH, and iron may also occur and be reported in chemical analyses of waters. These constituents usually occur in low concentrations and, with the exception of boron, are usually not of great importance in their relation to the soil or to plants.

[2] Lake Mead Comprehensive Survey of 1948–49, vol. II.

In this report it is unnecessary to discuss the relative merits or demerits of the several dissolved constituents. There is considerable body of good literature on the subject which may be consulted if desired. Many of the effects of the dissolved constituents upon plants and soils are complicated and interrelated and often the effects of several constituents are additive. It is probably sufficient to say here that the three criteria by which the quality of an irrigation water is usually judged are (1) the total dissolved solids concentration, (2) the percentage ratio which the sodium ion bears to the total positive ions, both quantities being expressed in mill equivalents, and, (3) in areas where it occurs in sufficient concentration to be important, the boron concentration. In the last few years the sodium adsorption ratio has been advanced by workers as being more reliable than the sodium percentage as an indicator of the effect of relative cation concentration on sodium accumulation in the soil. For the purposes of this report, however, the earlier criterion will be used.

Permissible limits to define the quality of waters for irrigation use have been proposed by various workers and in general the values are in good agreement. A diagram or chart has been prepared by L. V. Wilcox and others of the Rubidoux Laboratory of the Department of Agriculture,[3] which sets forth graphically the suitability of irrigation waters based upon the first two criteria. (See fig. II.)

The occurrence of boron in toxic concentrations in some irrigation waters makes it necessary to consider this element in grading water quality. C. S. Scofield[4] has proposed limits for boron that have proved satisfactory and are recommended. Investigation shows that boron concentrations in the waters of the Colorado River are too low to be significant and the details of its occurrence have not been included in the report in the quality of water tabulations. The available data, however, shows that boron concentrations at Lees Ferry, even under full development of the upper basin, will lie within that range classified as "good" waters even for boron-sensitive crops.

CHEMICAL COMPOSITION OF COLORADO RIVER WATERS

A continuous program of quality of water sampling of the Colorado River was initiated by the United States Geological Survey starting in 1925. Since that time the program has been expanded to include many of the major points of water interest along the main stem and tributaries. Table II has been prepared to show the available records at those stations which are used in this report.

Since 1940, and including some years prior to 1930, the quality of water records have been published as Water Supply Papers of the Geological Survey. A large part of the data, particularly during the 1930–40 period, is unpublished. These unpublished records have been generously supplied to the writer by the Washington office of the Survey.

After examination of the records, it was decided that this report should cover the period from 1929 to 1951, the data since 1951 being generally unavailable for analysis. For this 23-year period, the data on both quantity and quality are either available at the several river stations used or can be supplied by correlation methods with reasonable accuracy, sufficient for the conclusions drawn by the report. Summary tables showing the total quantities of dissolved solids and the quantities of the several constituents are included herein.

[3] The Quality of Water for Irrigation Use, by L. V. Wilcox, Technical Bulletin No. 962, USDA.

[4] The Qality of Water for Irrigation Use, p. 27.

TABLE II.—*Available quality of water data at some Colorado River stations*

Climatic year	Values reported [1]	Where found [2]
Colorado River at Cisco:		
1929	Complete	U. S. Geological Survey unpublished data.
1930	do	Water Supply Paper.
1931–35	do	U. S. Geological Survey unpublished data.
1936–40	T. d. s	Do.
1941–43	T. d. s	Water Supply Papers.
1944–51	Complete	Do.
Green River at Green River, Utah:		
1929	do	U. S. Geological Survey unpublished data.
1930	do	Water Supply Paper.
1931–35	do	U. S. Geological Survey unpublished data.
1936–40	T. d. s	Do.
1941–43	T. d. s	Water Supply Papers.
1944–51	Complete	Do.
San Juan River at Bluff:		
1930	do	Do.
1931–40	do	U. S. Geological Survey unpublished data.
1941–51	do	Water Supply Papers.
Colorado River at Lees Ferry:		
1929	do	U. S. Geological Survey unpublished data.
1930	do	Water Supply Papers.
1943–44	do	Do.
1945	T. d. s	Do.
1948–51	Complete	Do.
Colorado River at Grand Canyon:		
1926–30	do	Do.
1931–40	do	U. S. Geological Survey unpublished data.
1941–42	do	Water Supply Papers.
1944–51	do	Do.

[1] As used herein, "Complete" includes total dissolved solids (T. d. s.) and most major ionic constituents; "T. d. s." means total concentrations only reported as conductance or as parts per million.

[2] Yearly summaries of most unpublished data have been published in Water Supply Paper 970. The 1951 Water Supply Papers on quality of water are in process of publication at present time.

Colorado River near Cisco, Utah

[Discharges and dissolved solids tonnages in thousands]

Water year	Discharge	Calcium		Magnesium		Sodium and potassium		Carbonate and bicarbonate		Sulfate		Chloride		Total dissolved solids		Percent sodium
	Acre-feet	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	
1929	8,511	0.090	766	0.034	289	0.092	783	0.19	1,617	0.29	2,468	0.053	451	0.68	5,788	33
1930	6,097	.10	610	.038	232	.11	671	.21	1,280	.35	2,134	.075	457	.81	4,939	36
1931	2,865	.14	401	.058	166	.21	602	.25	716	.58	1,662	.15	430	1.29	3,696	42
1932	6,687	.094	629	.034	227	.10	669	.21	1,404	.31	2,073	.065	435	.73	4,882	36
1933	4,631	.10	463	.039	181	.12	556	.20	926	.37	1,714	.080	371	.84	3,890	38
1934	2,220	.14	311	.065	144	.22	488	.23	511	.64	1,421	.15	333	1.37	3,041	42
1935	4,681	.10	468	.038	178	.12	562	.20	936	.35	1,638	.082	384	.81	3,792	36
1936 [1]	5,766	.097	559	.036	208	.11	634	.20	1,153	.33	1,903	.073	421	.77	4,440	37
1937 [1]	4,664	.11	513	.044	205	.14	653	.22	1,026	.42	1,959	.097	452	.94	4,384	39
1938 [1]	7,422	.095	705	.034	252	.10	742	.20	1,484	.31	2,301	.069	512	.74	5,492	35
1939 [1]	4,252	.12	510	.047	200	.15	638	.22	935	.44	1,871	.10	425	1.00	4,252	38
1940 [1]	3,463	.13	450	.053	184	.18	623	.24	831	.51	1,766	.12	416	1.14	3,948	40
1941 [1]	6,576	.10	658	.038	250	.12	789	.21	1,381	.36	2,367	.081	533	.83	5,458	38
1942 [1]	7,706	.096	740	.035	270	.11	848	.20	1,541	.32	2,466	.070	539	.75	5,780	37
1943 [1]	5,137	.11	565	.041	211	.13	668	.21	1,079	.38	1,952	.088	452	.88	4,521	38
1944	5,903	.097	572	.033	194	.10	596	.23	1,337	.29	1,728	.076	446	.73	4,298	36
1945	5,407	.10	551	.037	202	.12	642	.23	1,232	.33	1,759	.098	532	.82	4,425	37
1946	4,062	.12	493	.044	181	.13	521	.24	994	.42	1,700	.084	343	.88	3,581	35
1947	6,051	.10	624	.033	199	.10	630	.22	1,318	.30	1,833	.085	515	.76	4,577	36
1948	6,554	.11	740	.035	231	.10	671	.25	1,616	.32	2,088	.079	522	.79	5,192	33
1949	6,287	.10	649	.034	212	.11	698	.23	1,434	.30	1,878	.097	608	.78	4,908	36
1950	4,236	.11	482	.045	189	.15	621	.24	1,002	.38	1,603	.14	584	.96	4,076	39
1951	3,921	.12	471	.044	173	.13	510	.22	863	.40	1,568	.12	471	.99	3,882	37
Average	5,352	.11	562	.039	208	.12	644	.22	1,157	.36	1,907	.086	462	.84	4,489	37

[1] 1936–43, total dissolved solids only reported; all other dissolved solids values derived by correlation curves based on 1929–35 and 1944–51 data.

NOTE.—December 1944, October and November 1949, and July 1950 values estimated from sequent months.

Green River at Green River, Utah

[Discharges and dissolved solids tonnages in thousands]

Water year	Discharge	Calcium		Magnesium		Sodium and potassium		Carbonate and bicarbonate		Sulfate		Chloride		Total dissolved solids		Percent sodium
	Acre-feet	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	
1928	5,759															
1929	6,464	0.075	485	0.029	188	0.073	472	0.23	1,487	0.21	1,357	0.030	194	0.55	3,555	32
1930	4,554	.080	364	.031	141	.081	369	.24	1,093	.24	1,093	.035	159	.61	2,778	33
1931	2,391	.084	201	.034	81	.099	237	.25	598	.27	646	.048	115	.68	1,626	37
1932	4,822	.075	362	.026	125	.068	328	.24	1,157	.18	868	.029	140	.51	2,459	32
1933	3,525	.075	264	.029	102	.077	271	.23	811	.21	740	.034	120	.56	1,974	34
1934	1,306	.086	112	.039	51	.124	162	.26	340	.32	418	.060	78	.77	1,006	40
1935	2,850	.073	208	.026	74	.066	188	.23	656	.18	513	.033	94	.50	1,425	31
1936 [1]	4,147	.077	319	.029	120	.077	319	.24	995	.21	871	.033	137	.57	2,364	33
1937 [1]	4,134	.086	356	.036	149	.10	413	.26	1,075	.28	1,158	.049	203	.70	2,894	36
1938 [1]	4,747	.082	389	.033	157	.092	437	.25	1,187	.25	1,187	.042	199	.64	3,038	35
1939 [1]	3,420	.086	294	.035	120	.10	342	.25	855	.28	958	.048	164	.69	2,360	36
1940 [1]	2,376	.086	204	.035	83	.10	238	.25	594	.28	665	.048	114	.69	1,639	36
1941 [1]	4,242	.086	365	.035	149	.10	424	.25	1,061	.28	1,188	.048	204	.69	2,927	36
1942 [1]	4,990	.083	414	.033	165	.094	469	.25	1,248	.26	1,297	.043	215	.65	3,244	35
1943 [1]	4,270	.079	337	.031	132	.083	354	.24	1,025	.23	982	.037	158	.60	2,562	34
1944	4,476	.081	365	.029	132	.080	359	.27	1,203	.22	1,005	.032	141	.58	2,612	33
1945	4,159	.084	385	.031	128	.077	320	.29	1,177	.22	898	.031	131	.60	2,490	31
1946	3,469	.087	302	.032	110	.084	291	.29	1,018	.23	800	.035	121	.63	2,192	33
1947	5,484	.080	441	.027	150	.072	395	.27	1,482	.20	1,090	.030	162	.56	3,062	32
1948	4,148	.080	333	.032	134	.078	325	.26	1,087	.23	954	.034	140	.60	2,495	32
1949	4,897	.087	426	.030	148	.080	394	.29	1,428	.22	1,098	.028	138	.62	3,014	32
1950	5,511	.088	487	.033	181	.077	423	.30	1,666	.22	1,231	.030	166	.61	3,400	30
1951	4,722	.083	392	.031	146	.069	326	.27	1,275	.21	992	.029	137	.60	2,815	29
Average	4,135	.082	339	.034	129	.083	342	.26	1,066	.23	957	.036	149	.61	2,519	34

[1] 1936–43, total dissolved solids only reported; all other dissolved solids values derived by correlation curves based on 1929–35 and 1944–51 data.

NOTE.—October and November 1949 values estimated from total dissolved solids.

San Juan River near Bluff, Utah

[Discharges and dissolved solids tonnages in thousands]

Water year	Discharge	Calcium		Magnesium		Sodium and potassium		Carbonate and bicarbonate		Sulfate		Chloride		Total dissolved solids		Percent sodium
	Acre-feet	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	
1929 [1]	3,111	0.086	266	0.018	56	0.059	182	0.20	615	0.22	698	0.013	39	0.51	1,580	29
1930	1,724	.10	172	.023	40	.073	126	.22	379	.29	500	.015	26	.63	1,086	29
1931	888	.12	107	.027	24	.097	86	.22	195	.37	328	.020	18	.77	683	33
1932	2,948	.087	257	.018	53	.060	177	.20	590	.23	678	.012	35	.52	1,533	29
1933	1,242	.10	124	.024	30	.084	104	.20	248	.33	410	.018	22	.68	845	32
1934	662	.13	86	.030	20	.12	79	.23	152	.45	298	.024	16	.89	589	34
1935	2,183	.082	179	.015	33	.056	122	.19	415	.20	437	.011	24	.48	1,048	29
1936	1,631	.10	163	.022	36	.069	113	.22	359	.27	440	.014	23	.61	995	28
1937	2,336	.094	220	.020	47	.065	152	.22	514	.25	584	.013	30	.57	1,332	29
1938	2,466	.088	217	.019	47	.064	158	.20	493	.23	567	.012	30	.53	1,307	29
1939	1,239	.10	124	.022	27	.069	86	.22	273	.27	335	.016	20	.61	756	28
1940	996	.11	110	.024	24	.093	93	.22	219	.35	349	.020	20	.73	727	33
1941	4,242	.092	390	.019	81	.062	263	.22	933	.21	891	.012	51	.53	2,248	28
1942	3,078	.090	277	.022	68	.058	179	.21	646	.23	708	.013	40	.54	1,662	27
1943	1,445	.11	159	.027	39	.069	100	.23	332	.29	419	.020	29	.65	939	27
1944	2,289	.084	192	.018	41	.046	105	.21	481	.18	412	.013	30	.47	1,076	23
1945	1,620	.10	162	.023	37	.067	109	.23	373	.25	405	.018	29	.59	956	28
1946	865	.12	104	.030	26	.090	78	.26	225	.37	320	.024	21	.78	674	29
1947	1,488	.10	149	.023	34	.078	116	.21	313	.31	461	.016	24	.65	967	30
1948	2,319	.080	171	.016	34	.049	105	.19	406	.19	406	.013	28	.46	984	26
1949	2,523	.083	209	.019	47	.049	124	.19	479	.20	505	.012	30	.48	1,211	25
1950	902	.11	99	.030	27	.072	65	.21	190	.33	298	.022	20	.68	614	27
1951	668	.12	80	.030	20	.088	59	.22	147	.37	247	.027	18	.79	528	30
Average	1,864	.094	175	.021	39	.065	121	.21	390	.25	465	.015	27	.57	1,058	29

[1] 1929 constituents estimated from correlation curves of annual values.

Colorado River at Lee's Ferry, Ariz.

[Discharges and dissolved solids tonnages in thousands]

Water year	Discharge	Calcium		Magnesium		Sodium and potassium		Carbonate and bicarbonate		Sulfate		Chloride		Total dissolved solids		Percent sodium
	Acre-feet	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	
1929	19,190	0.098	1,881	.031	595	0.093	1,785	0.22	4,222	0.30	5,757	0.048	921	0.70	13,930	32
1930	13,050	.10	1,305	.034	444	.11	1,436	.23	3,002	.34	4,437	.060	783	.78	10,179	35
1931 [1]	6,376	.12	778	.046	293	.16	997	.23	1,479	.44	2,830	.11	697	1.01	6,468	39
1932 [1]	15,250	.091	1,382	.029	438	.095	1,448	.20	3,124	.27	4,127	.053	806	.65	9,969	36
1933 [1]	9,729	.099	965	.034	331	.11	1,072	.21	2,040	.33	3,257	.071	692	.77	7,464	36
1934 [1]	4,377	.13	573	.053	234	.19	844	.24	1,063	.54	2,362	.13	579	1.21	5,288	41
1935 [1]	9,895	.090	890	.029	290	.10	1,010	.20	1,999	.28	2,739	.067	664	.68	6,734	37
1936 [1]	11,930	.099	1,185	.030	361	.10	1,218	.21	2,510	.31	3,655	.059	707	.72	8,545	36
1937 [1]	11,870	.10	1,194	.034	399	.10	1,227	.22	2,630	.32	3,800	.063	746	.75	8,930	35
1938 [1]	15,410	.089	1,368	.029	444	.092	1,416	.21	3,312	.26	4,039	.050	777	.64	9,892	35
1939 [1]	9,360	.11	1,010	.037	346	.12	1,110	.23	2,117	.34	3,221	.071	665	.80	7,505	36
1940 [1]	7,055	.12	846	.042	295	.14	981	.23	1,636	.40	2,846	.095	668	.93	6,575	37
1941 [1]	16,020	.10	1,630	.030	481	.096	1,535	.22	3,589	.29	4,702	.053	843	.70	11,162	34
1942 [1]	17,010	.083	1,419	.030	506	.084	1,422	.18	3,095	.28	4,790	.048	811	.62	10,625	34
1943	11,240	.087	978	.034	382	.097	1,090	.20	2,248	.30	3,372	.063	708	.70	7,868	35
1944	13,200	.079	1,043	.029	383	.086	1,135	.19	2,508	.25	3,300	.050	660	.61	8,052	36
1945 [1]	11,530	.11	1,246	.037	427	.12	1,369	.25	2,902	.33	3,862	.078	902	.82	9,468	36
1946 [1]	8,722	.12	1,034	.038	335	.12	1,048	.27	2,370	.34	2,957	.079	691	.85	7,408	35
1947 [1]	13,491	.098	1,322	.033	442	.092	1,245	.24	3,248	.29	3,945	.056	750	.70	9,411	33
1948	13,670	.095	1,299	.030	410	.087	1,189	.23	3,144	.26	3,554	.054	738	.67	9,159	33
1949	14,340	.097	1,391	.031	445	.088	1,262	.24	3,442	.27	3,872	.056	803	.68	9,751	33
1950	11,040	.10	1,104	.038	420	.10	1,104	.24	2,650	.31	3,422	.067	740	.76	8,390	33
1951	9,817	.11	1,080	.037	363	.10	982	.25	2,454	.32	3,141	.071	697	.79	7,755	33
Average	11,894	.099	1,171	.033	394	.10	1,214	.22	2,643	.31	3,652	.062	741	.73	8,719	35

[1] 1931–42 and 1945–47 values derived by correlation with Grand Canyon and checked against sum of values for Green River at Green River, Colorado River near Cisco, and San Juan River near Bluff.

Colorado River near Grand Canyon, Ariz.

[Discharges and dissolved solids tonnages in thousands]

Water year	Discharge	Calcium		Magnesium		Sodium and potassium		Carbonate and bicarbonate		Sulfate		Chloride		Total dissolved solids		Percent sodium
	Acre-feet	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	*Tons per acre-foot*	*Tons*	
1926	14,420	0.090	1,298	0.029	418	0.11	1,586	0.22	3,172	0.27	3,893	0.076	1,096	0.71	10,238	39
1927	17,260	.10	1,726	.030	518	.11	1,899	.22	3,797	.32	5,523	.072	1,243	.77	13,290	37
1928	15,630	.090	1,407	.030	469	.094	1,469	.22	3,429	.25	3,908	.065	1,016	.67	10,472	35
1929	19,430	.10	1,943	.031	602	.11	2,137	.22	4,275	.31	6,023	.065	1,263	.75	14,573	36
1930	13,420	.11	1,476	.035	470	.12	1,610	.25	3,355	.34	4,563	.084	1,127	.85	11,407	37
1931	6,721	.13	874	.046	309	.18	1,210	.27	1,815	.44	2,957	.15	1,008	1.11	7,460	43
1932	15,970	.099	1,581	.029	463	.11	1,757	.24	3,833	.27	4,312	.073	1,166	.72	11,498	37
1933	10,010	.11	1,101	.035	350	.13	1,301	.25	2,503	.34	3,403	.10	1,001	.86	8,609	39
1934	4,656	.14	652	.053	247	.22	1,024	.28	1,304	.53	2,468	.18	838	1.31	6,099	45
1935	10,220	.10	1,022	.030	307	.12	1,226	.24	2,453	.28	2,862	.094	961	.76	7,767	39
1936	12,320	.11	1,355	.031	382	.12	1,478	.25	3,080	.31	3,819	.083	1,023	.80	9,856	36
1937	12,410	.11	1,365	.034	422	.12	1,489	.26	3,227	.32	3,971	.087	1,080	.83	10,300	37
1938	15,630	.10	1,563	.030	469	.11	1,719	.26	4,064	.27	4,220	.072	1,125	.73	11,410	36
1939	9,618	.12	1,154	.038	366	.14	1,347	.27	2,597	.35	3,366	.10	962	.90	8,656	38
1940	7,435	.13	967	.042	312	.16	1,190	.27	2,007	.40	2,974	.13	967	1.02	7,584	41
1941	16,940	.11	1,863	.030	508	.11	1,863	.26	4,404	.29	4,913	.072	1,220	.76	12,874	36
1942	17,260	.094	1,622	.031	535	.10	1,726	.22	3,797	.29	5,005	.068	1,174	.71	12,255	35
1943 [1]	11,430	.098	1,118	.035	404	.11	1,323	.24	2,758	.31	3,524	.090	1,025	.79	9,075	37
1944	13,530	.10	1,353	.033	447	.11	1,488	.28	3,788	.27	3,653	.076	1,028	.75	10,148	35
1945	11,870	.12	1,424	.038	451	.14	1,662	.30	3,561	.34	4,036	.11	1,306	.92	10,920	37
1946	9,089	.13	1,182	.039	355	.14	1,272	.32	2,908	.34	3,090	.11	1,000	.94	8,544	37
1947	13,740	.11	1,511	.034	467	.11	1,511	.29	3,985	.30	4,122	.079	1,085	.79	10,855	34
1948	13,870	.11	1,526	.031	430	.10	1,387	.29	4,022	.27	3,745	.080	1,110	.76	10,541	34
1949	14,370	.11	1,581	.033	474	.11	1,581	.30	4,311	.27	3,880	.078	1,121	.78	11,209	34
1950	11,080	.12	1,330	.038	421	.12	1,330	.32	3,546	.31	3,435	.095	1,053	.87	9,640	34
1951	9,839	.12	1,181	.039	384	.13	1,279	.30	2,952	.33	3,247	.10	984	.92	9,052	36
Average [2]	12,211	.11	1,337	.034	416	.12	1,474	.27	3,241	.31	3,808	.088	1,071	.82	10,014	37

[1] All 1943 dissolved solids values computed by correlation with Lee's Ferry.
[2] 1929–51 used as basis for average.

EFFECT OF INITIAL-PHASE DEPLETIONS

With the data available, an operation study of Glen Canyon Reservoir for the 1929–51 period was made which included evaporation from Echo Park Reservoir and the effect of depletion due to the operation of the 12 participating projects whose authorization was sought in the bills before the Congress last year. This list may be changed somewhat in current legislation but unless substantially enlarged or reduced will have little effect upon the conclusions drawn therefrom.

The quality of river water at Lee Ferry was used in making the reservoir analysis. Since no quality of water data were taken at this station for the years 1931–42 and 1945–47, it was necessary to estimate them from records of adjacent stations. The records for Colorado at Grand Canyon are complete and the records for Colorado near Cisco, Green River at Green River Utah, and San Juan near Bluff are substantially complete for the 1929–51 period. The missing Lee Ferry record was, therefore, supplied by hydrologic comparison with the Grand Canyon record and checked against the sum of the data for the three upstream stations. The resulting figures are believed to represent with reasonable accuracy the long-time quality of the water available to Glen Canyon Reservoir. Where other necessary records were missing they were supplied from the same type of correlation curves.

In considering the effect of transmountain diversions upon the reservoir operation, it was necessary to estimate the qualities of the several waters which would be diverted. An average figure of 0.08 ton of salt per acre-foot was used in the analysis. A subsequent check of the few available data indicates that a more probable figure would be perhaps twice that concentration. In either case, the total effect of transmountain diversions on the end result is quite small.

The initial-phase operation, including the effect of currently authorized but uncompleted projects will reduce the historical water supply by about 14 percent. The reservoir-operation study indicates that the widely divergent concentrations in the natural flow of the river will be largely smoothed out. Upstream depletions will increase the present average salt concentrations from 0.73 to about 0.85 ton per acre-foot of water. Undoubtedly there will be some change in sodium percentage but because of the limited depletion of the overall water supply, it should be slight. The general conclusion to be drawn from the study is that consumption of water by the initial-phase projects will have little practical effect upon the quality of water discharged from Glen Canyon Reservoir.

Operation of Glen Canyon Reservoir

INITIAL PHASE

[Construction of Colorado River storage project (Glen Canyon and Echo Park Reservoirs plus 12 participating projects)]

Water year	In-basin uses, acre-feet [1]	Transmountain diversion		Reservoir inflow		Reservoir evaporation, acre-feet	Quality of mixed water			Releases and spills		End-of-year storage	
		Water, acre-feet	Total dissolved solids, tons	Water, acre-feet	Total dissolved solids, tons		Water, acre-feet	Total dissolved solids, tons	Tons per acre-foot	Water, acre-feet	Total dissolved solids, tons	Water, acre-feet	Total dissolved solids, tons
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1927	[2] 1,250	[2] 316	25	14,974	[2] 11,725	----------	----------	----------	(0.78)	----------	----------	----------	----------
1928	[2] 1,208	[2] 309	25	13,793	[2] 11,155	----------	----------	----------	(.81)	----------	----------	26,000	20,800
1929	[2] 1,318	[2] 330	26	17,542	13,904	639	43,542	30,704	.798	16,903	13,320	26,000	21,384
1930	[2] 1,132	[2] 283	23	12,635	10,156	639	38,635	31,540	.816	11,996	9,789	26,000	21,751
1931	902	153	12	5,321	6,456	572	31,321	28,207	.901	10,500	9,460	20,249	18,747
1932	1,224	291	23	13,735	9,946	547	33,984	28,693	.844	10,039	8,473	23,398	20,220
1933	1,175	228	18	8,326	7,446	557	31,724	27,666	.872	9,561	8,337	21,606	19,329
1934	774	103	8	3,500	5,280	452	25,106	24,609	.980	10,164	9,961	14,490	14,648
1935	1,014	177	14	8,704	6,720	343	23,194	21,368	.921	10,425	9,601	12,426	11,767
1936	1,186	296	24	10,448	8,521	323	22,874	20,288	.887	9,889	8,772	12,662	11,516
1937	1,015	272	22	10,583	8,908	330	23,245	20,424	.879	9,889	8,692	13,026	11,732
1938	1,220	309	25	13,881	9,867	380	26,907	21,599	.803	9,604	7,712	16,923	13,887
1939	954	218	17	8,188	7,488	407	25,111	21,375	.851	9,359	7,965	15,345	13,410
1940	818	173	14	6,064	6,561	339	21,409	19,971	.933	9,924	9,259	11,146	10,712
1941	1,100	205	16	14,715	11,146	344	25,861	21,858	.845	9,382	7,928	16,135	13,930
1942	1,210	296	24	15,504	10,601	483	31,639	24,531	.775	8,576	6,647	22,580	17,884
1943	1,015	295	24	9,930	7,844	566	32,510	25,728	.791	8,831	6,985	23,113	18,743
1944	1,029	282	23	11,889	8,029	587	35,002	26,772	.765	9,937	7,602	24,478	19,170
1945	1,005	258	21	10,267	9,447	597	34,745	28,617	.824	10,235	8,434	23,913	20,183
1946	899	252	20	7,571	7,388	548	31,484	27,571	.876	10,543	9,236	20,393	18,335
1947	1,187	329	26	11,945	9,385	522	32,338	27,720	.857	10,192	8,735	21,624	18,985
1948	[2] 1,134	[2] 291	23	12,245	9,136	556	33,869	28,121	.830	[3] 10,000	8,300	23,313	19,821
1949	[2] 1,167	[2] 297	24	12,876	9,727	603	36,189	29,548	.816	[3] 10,000	8,160	25,586	21,388
1950	[2] 1,062	[2] 253	20	9,725	8,370	618	35,311	29,758	.843	[3] 10,000	8,430	24,693	21,328
1951	[2] 1,017	[2] 228	18	8,572	7,737	585	33,265	29,065	.874	[3] 10,000	8,740	22,680	20,325

[1] In-basin depletions includes evaporation from Echo Park Reservoir (from USBR study).
[2] Estimated from relationship curves based on water supply.
[3] Estimated

ULTIMATE PHASE

[Construction of Colorado River storage project]

Climatic year	Transmountain diversions present authorized plus future		Historical total dissolved solids, tons	Reservoir inflow		Reservoir evaporation, acre-feet	Quality of mixed water			Releases and spills		End of year storage	
	Acre-feet	Tons		Water, acre-feet	Total dissolved solids, tons		Water, acre-feet	Total dissolved solids, tons	Tons per acre-foot	Water, acre-feet	Total dissolved solids, tons	Water, acre-feet	Total dissolved solids, tons
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1926												19,320	19,320
1927	[1] 2,046	164	11,523	9,510	11,359	620	28,830	30,679	1.06	8,150	8,639	20,060	22,040
1928	[1] 1,957	157	9,079	9,820	8,922	640	29,880	30,962	1.04	9,280	9,651	19,960	21,311
1929	[1] 2,180	174	13,930	12,500	13,856	630	32,460	35,167	1.08	11,760	12,701	20,070	22,466
1930	[1] 1,766	141	10,179	8,300	10,038	640	28,400	32,504	1.14	7,690	8,767	20,070	23,737
1931	1,081	86	6,468	4,869	6,382	600	24,939	30,119	1.21	7,488	9,060	16,851	21,059
1932	1,784	143	9,969	8,442	9,826	566	25,293	30,885	1.22	7,462	9,104	17,265	21,781
1933	1,512	121	7,464	5,971	7,343	542	23,236	29,124	1.25	7,483	9,354	15,211	19,770
1934	757	61	5,288	4,644	5,227	481	19,855	24,997	1.26	7,481	9,426	11,893	15,571
1935	1,510	121	6,734	6,365	6,613	404	18,258	22,184	1.22	7,483	9,129	10,371	13,055
1936	1,893	151	8,545	7,247	8,394	382	17,618	21,449	1.22	7,465	9,107	9,771	12,342
1937	1,542	123	8,930	7,721	8,807	375	17,492	21,149	1.21	7,473	9,042	9,644	12,107
1938	2,051	164	9,892	9,556	9,728	396	19,200	21,835	1.14	7,474	8,520	11,330	13,315
1939	1,607	128	7,505	6,502	7,377	401	17,832	20,692	1.16	7,466	8,661	9,965	12,031
1940	1,008	80	6,575	6,178	6,495	355	16,143	18,526	1.15	7,474	8,595	8,314	9,931
1941	1,774	142	11,162	10,589	11,020	377	18,903	20,951	1.11	7,472	8,294	11,054	12,657
1942	1,988	159	10,625	11,121	10,466	483	22,175	23,123	1.04	7,480	7,779	14,212	15,344
1943	1,762	141	7,868	6,971	7,727	484	21,183	23,071	1.09	7,481	8,154	13,218	14,917
1944	1,579	126	8,052	8,345	7,926	479	21,563	22,843	1.06	7,481	7,930	13,603	14,913
1945	1,624	130	9,468	7,445	9,338	476	21,048	24,251	1.15	7,483	8,605	13,089	15,646
1946	1,370	110	7,408	6,046	7,298	442	19,135	22,944	1.20	7,477	8,972	11,216	13,972
1947	1,803	144	9,411	8,291	9,267	418	19,507	23,239	1.19	7,476	8,896	11,613	14,343
1948	[1] 1,823	142	9,159	[1] 8,700	9,017	[1] 440	20,313	23,360	1.15	[1] 7,480	8,602	12,393	14,758
1949	[1] 1,880	150	9,751	[1] 9,260	9,601	[1] 450	21,653	24,359	1.12	[1] 7,480	8,379	13,723	15,980
1950	[1] 1,578	126	8,390	[1] 7,000	8,264	[1] 480	20,723	24,244	1.17	[1] 7,480	8,752	12,763	15,492
1951	[1] 1,458	117	7,755	[1] 6,300	7,638	[1] 470	19,063	23,130	1.21	[1] 7,480	9,051	11,113	14,079

[1] Estimated from relationship curves based on water supply.

EFFECT OF ULTIMATE DEPLETIONS

A reservoir operation study was also made for ultimate depletion of 7,500,000 acre-feet of water in the upper basin. The analysis shows that the salt concentration in the releases from Glen Canyon will increase. Neglecting the modifying factors mentioned on page 5, the salt concentrations will vary between 1.04 and 1.26 and will average about 1.15 tons per acre-foot.

BASE EXCHANGE AND SODIUM PERCENTAGE

Base exchange which occurs as a byproduct of the irrigation process results generally in an increase in the sodium percentage. In most of the western streams of the country, the waters tend to be gradually changed by base exchange from "hard" to "soft" waters.

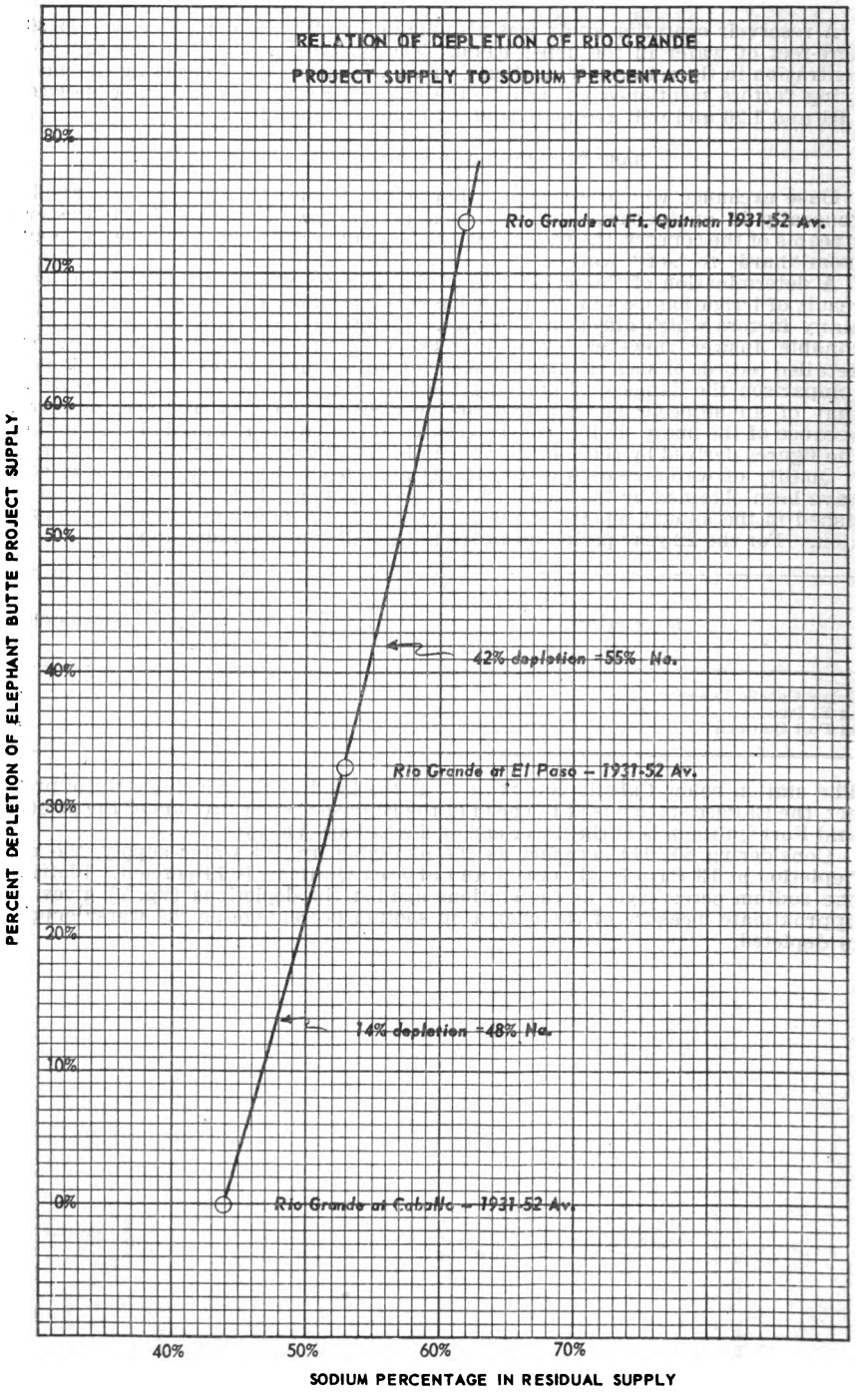
A determination of the magnitude of the increase which will take place as a result of irrigation uses in the upper basin is exceedingly difficult because of the many factors which affect such change. It may be possible to approach a reasonable answer, however, by comparison with the Rio Grande Basin where detailed records of such changes have been kept for many years. In making such comparison the dangers of applying the hydrology of one large river basin to that of an adjacent basin cannot be overlooked. In this instance, however, because of the many similar characteristics of the two basins, it is believed that the figures derived by the comparison can be adopted with reasonable assurance.

Quality of water records of the Rio Grande below Elephant Butte Reservoir have been obtained by the Rubidoux Laboratory since 1931, the data being published in the annual reports of the International Boundary and Water Commission. For the 22-year period up to 1952, the following averages appear:

River station	Discharge (acre-feet)	Total dissolved solids (tons per acre-foot)	Percent sodium
Below Caballo Reservoir	801,000	0.71	44
At El Paso	596,000	1.10	53
At Fort Quitman	209,000	2.37	62

The station below Caballo Reservoir is at the head of the Elephant Butte project, the El Paso station is at the head of the El Paso County division of the project and Fort Quitman is at the lower end of the El Paso Valley.

Considering 801,000 acre-feet as the available project water supply, the net depletion at El Paso is 33 percent and at Fort Quitman is 74 percent. Plotting the sodium percentages at the stations against the depletions (fig. 1) gives an approximate measure of the change in sodium percentage as the water supply is depleted.



For the purpose of determining the worst possible effect of depletions in the upper basin on the quality of water delivered to the lower basin, it will be assumed that the virgin flow of the river at Lees Ferry does not exceed 15 million acre-feet per year. The average discharge with present depletions will then be 13 million acre-feet, which the initial phase projects will deplete by 14 percent and ultimate development will deplete by 42 percent. Entering the curve we find that these depletions would have increased the average sodium percentage of the Elephant Butte project supply by 4 percentage points (44 to 48 percent) and 11 percentage points (44 to 55 percent), respectively. If we make the reasonable assumption that similar changes in sodium percentage will take place in the upper Colorado River Basin as a result of the contemplated depletions of that water supply, the initial-phase sodium percentage will change but slightly and the maximum change under complete development will increase the present 35 percent to about 46 percent.

LOSSES FROM SOLUTION IN LARGE RESERVOIRS

It has been pointed out elsewhere in this report that substantial quantities of dissolved solids in Lake Mead storage have been precipitated from solution but that this process is masked by the taking into solution of other salts from extensive saline beds within the reservoir basin. In the Elephant Butte Reservoir, however, there are no saline deposits such as occur in Lake Mead and it is possible to measure closely the losses of salts from solution which have occurred in that reservoir.

Complete records have been kept of the chemical quality of water entering and leaving Elephant Butte Reservoir since 1933. They have been published annually in the reports of the International Boundary and Water Commission through the year 1946, after which year the inflow data are incomplete. The data include not only the total quantities of dissolved solids but the quantities of the several ionic constituents. A determination was made of the total quantities of the several constituents in the reservoir at the start of the period January 1, 1933, and of the measured inflows to the reservoir for the 1933–46 period; also of the outflows from the reservoir during the same period and the quantities remaining in the lake as of December 31, 1946. These data do not include the unmeasured salt inflows from side streams entering directly into the reservoir, the amounts of which are but a small percentage of the total. (See table III.)

TABLE III.—*Computation of salt balance in Elephant Butte Reservoir, Jan. 1, 1933, to Jan. 1, 1947*

(Values in thousands)

	Tons							End of year storage (acre-feet)
	Ca	Mg	Na+K	HCO_3	SO_4	Cl	T.D.S.	
In storage Jan. 1, 1931 [1]	136	30	171	299	396	116	1,046	1,273
1931 inflow, Rio Grande at San Marcial	68	15	92	143	219	62	549	
1932 inflow, Rio Grande at San Marcial	139	31	170	312	396	116	821	
1931 outflow	81	15	103	99	238	59	617	924
1932 outflow	81	20	107	97	262	59	659	
In storage Jan. 1, 1933	181	41	223	558	511	176	1,140	1,395
1933–46 inflows, Rio Grande at San Marcial	1,168	241	1,319	1,456	3,094	794	9,030	
Total into Reservoir, 1933–46	1,349	282	1,542	2,014	3,605	970	10,170	
1945–46, average, Rio Grande at San Marcial	[2] .080	[2] .015	[2] .080	[2] .112	[2] .178	[2] .047	[2] .562	
1946, Rio Grande below Elephant Butte Reservoir	[2] .084	[2] .018	[2] .099	[2] .120	[2] .205	[2] .067	[2] .644	
Salt concentrations (average of above)	[2] .082	[2] .017	[2] .090	[2] .116	[2] .192	[2] .057	[2] .603	
In storage Jan. 1, 1947	65	13	71	92	151	45	476	789
1933–46 outflows, Rio Grande below Elephant Butte Reservoir	1,077	228	1,278	1,357	2,940	820	8,388	
Total out of reservoir, 1933–46	1,142	241	1,349	1,449	3,091	865	8,864	
Excess of inflows over outflows	207	41	193	565	514	105	1,306	
Percent of total inflow [3]	15.3	14.5	12.5	28.0	14.3	10.8	12.8	

[1] Average of concentrations of dissolved constituents for years 1929 and 1930.
[2] Tons per acre-foot.
[3] Equals percent loss of various constituents from solution in reservoir basin.

NOTE.—All values recorded excepting those for 1929–32 which were estimated from correlation curves based on discharge.

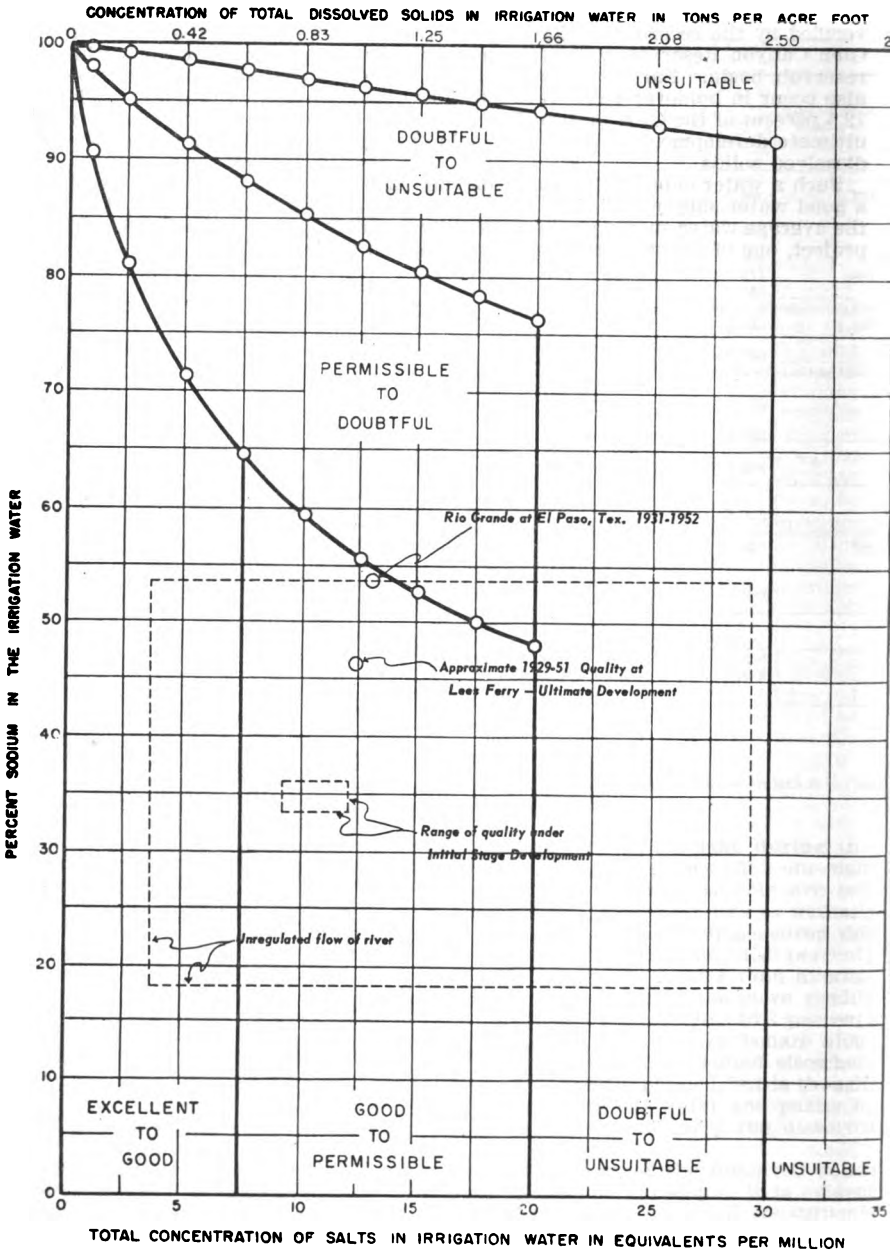
An accounting of all dissolved solids into and out of the lake during this 14-year period presents some very interesting facts. It shows that one-eight (12.8 percent) of the total quantity of salts entering the reservoir are precipitated from solution within the reservoir basin. The total loss is actually greater than the above figure by the amount of salt entering as unmeasured side inflow. The data shows that the less soluble constituents, calcium (15.3 percent) and carbonate and bicarbonate (28.0 percent) comprise a greater than average part of these precipitated salts but, rather surprisingly, that the more readily soluble ions, sodium and potassium (12.5 percent) and chloride (10.8 percent) are also lost from solution in substantial quantities. Calcium carbonate alone comprises only about 43 percent of the precipitated salts. As stated elsewhere in this report, this phenomenon has not been adequately explained, but is thought by some to result partly from temperature changes in the water and partly by the settlement of finely divided sediments which seem to carry the dissolved solids down with them.

If, as Dr. Howard has determined, over 6.3 percent of the dissolved solids entering Lake Mead have been precipitated as calcium carbonate, it is evident that precipitation of a substantial portion of the other dissolved constituents also occurred. It appears logical by comparison with the Elephant Butte data that at least twice that percentage of all dissolved constituents in the lake influent have been precipitated. There is good evidence that at least one-eight (and probably more) of the total dissolved solids which will enter Glen Canyon Resevoir will remain permanently within the reservoir basin itself. Further, there seems to be no good reason why a substantial deposition of salts from solution should not occur in each of a series of holdover reservoirs on the stream although the amounts of such depositions will undoubtedly vary somewhat with local conditions.

Effect on ultimate quality of Lees Ferry water

It can be concluded, therefore, from the Elephant Butte data, substantially verified by the record at Lake Mead, that about one-eight of the salts entering Glen Canyon Reservoir will be permanently deposited from solution within the reservoir basin. Further, there is reason to believe that similar deposition will also occur in holdover reservoirs both above and below Glen Canyon. A loss of 12.5 percent of the Glen Canyon Reservoir salts would result in an effluent under ultimate development of the upper basin of only about 1.00 tons per acre-foot of dissolved solids.

Such a water supply with a sodium content of less than 50 percent constitutes a good water supply as defined by salinity experts, being equal to or better than the average water supply used successfully for many years by the Elephant Butte project, one of the most successful reclamation projects of the West.



SUITABILITY OF WATER OF THE COLORADO RIVER AT LEES FERRY, FOR IRRIGATION PURPOSES

GRAPH PREPARED BY UNITED STATES DEPARTMENT OF AGRICULTURE, RUBIDOUX LABORATORY, RIVERSIDE, CALIF. (MODIFIED SLIGHTLY)

NOTE: IN COLORADO RIVER MAIN STREAMS 10 E.P.M. CONCENTRATION EQUALS 0.083 TONS PER ACRE FOOT OF TOTAL DISSOLVED SOLIDS (APPROX.)

THE UPPER COLORADO RIVER PROJECT AND THE COMPACT OF 1922

The States of the upper basin, by the terms of the Colorado River compact of 1922, have the obligation of not depleting the flow of the Colorado at Lees Ferry below an aggregate of 75 million acre-feet for any period of 10 consecutive years. In article VIII of the compact there is also an obligation on the part of all seven States not to impair any rights to the beneficial use of water which were perfected as of the date of the compact. This article then goes on to explain that any claims of such present perfected rights in the lower basin which might be made against water users in the upper basin "shall attach to and be satisfied from water that may be stored" in a reservoir with a "storage capacity of 5 million acre-feet" constructed "on the main Colorado River within or for the benefit of the lower basin."

Certain lower basin interests are attempting to bend the meaning of article VIII, particularly the use of the word "impair" to support their contention that the upper basin is obligated not to affect in any way the quality of the water available to the lower basin. If this contention is correct, then articles III and VIII of the compact directly contradict one another. Article III gives the upper basin states the right to physically consume 7,500,000 acre-feet of water each year. However, with the consumptive use of the first acre-foot of that amount, the chemical quality of the water at Lees Ferry will be altered to some minute extent and this effect will increase as each additional new acre-foot of water is consumed. Under the above interpretation, therefore, it would be impossible to consume any water in the basin above that appropriated prior to 1922 without violating the compact. It should be obvious, therefore, that, when agreement was reached by the contracting States and the compact was signed in Sante Fe, N. M., November 24, 1922, the compact recognized the right of the upper basin to use its full compact allotment with all of the attendant affects which such use might reasonably impose upon both the quantity and quality of the water to the lower basin.

It should be further pointed out that article VIII imposes an obligation on all seven contracting States, not on the upper basin alone, to see that the then perfected rights are unimpaired. If the contention of these lower basin interests is correct, then not only the upper basin but each and every water user in both basins whose water rights postdate the year 1922 and who by consumptive use affect the quantity or quality of the water to any user whose right antedates 1922, is a violator of the compact.

In connection with the contention of the lower basin interests that impair means quality as well as quantity, it should be pointed out that these interests now make no distinction between 1922 perfected rights and those obtained and developed since that date. In their current contention, they would require that not only 1922 and earlier rights on the stream but all lower basin rights which may eventually be perfected under the terms of the compact must also be "unimpaired" as to quality. Obviously neither the upper basin nor any upstream user properly can be saddled with such a responsibility.

Transmountain diversions are under attack by some interests as impairing the general quality of the water supply of the Colorado River since such diversions usually take waters from high in the mountains and thus are accused of removing some of the best waters of the basin. As pointed out previously in this report, such diversions actually remove both the water and the dissolved salts from the basin and thus the remaining supply is of better quality than would have resulted had the water been consumed within the basin. As a matter of fact, the only way in which the upper basin could even attempt to consume 7,500,000 acre-feet of water annually, or any substantial part thereof, without impairing the quality of the remaining supply would be by transporting that entire amount bodily out of the Colorado River drainage basin together with the salts dissolved therein and consuming it in other stream basins.

EFFECT OF HOLDOVER STORAGE ON QUALITY OF WATER

The natural flow of the Colorado River is quite variable, both from month to month and from year to year. Over 65 percent of the annual discharge at Lees Ferry usually occurs during the 4 months of spring runoff, April through July. These discharges, largely derived from melting snows are generally of excellent quality. The flows of the river during the other 8 months are usually well below the monthly average excepting for occasional floods from torrential summer storms. The concentration of the dissolved solids during these months increases substantially. The river operation study shows that under present day condi-

tions of relatively unregulated flow above the Lees Ferry gaging station, the salt concentration in the waters of the Colorado at that point from 1929 through 1951 varied from about 0.28 to 2.44 tons per acre-foot. Under regulated flow from Echo Park and Glen Canyon Reservoirs, these seasonal and annual variations would largely be ironed out. Under initial phase construction the concentrations would vary within the narrow range from about 0.76 to 1.00 ton per acre-foot. Under ultimate upstream development the concentrations would be higher but the fluctuation would still remain within a narrow range.

A record of the diversions to the Imperial Irrigation District in California through the Alamo Canal in earlier years and more recently through the All-American Canal, taken from official sources, shows that the montly diversions of water for irrigation purposes expressed as percent of the annual total, average about as follows:

	Percent		*Percent*
January	5.7	August	9.4
February	6.4	September	8.6
March	8.6	October	9.2
April	9.5	November	7.0
May	10.1	December	5.5
June	9.7		
July	10.3	Annual	100

A record is also available of the monthly average concentrations of salts in the waters of the Colorado River at the Grand Canyon Station for the years 1927 through 1934 prior to the initial filling of Lake Mead. Under ultimate development with a concentration at Lees Ferry averaging 1.00 ton per acre-foot, these data show that over 60 percent of the time (63.0 percent) the water supply for lower basin uses will still be lower in mineral content than it was during the many years of operation prior to the construction of Hoover Dam. (See table IV.)

In commenting upon the present and future quality of the water of the Colorado River, Mr. Julian Hinds, one of the most prominent water engineers of the West said: "The quantity and quality of solids dissolved in the water were carefully checked. The dissolved solids in the unregulated river varied with the flow and ranged from less than 300 parts per million during floods to about 1,000 parts per million at low flow. Lake Mead equalizes this variation to an average mineral content of about 600 parts per million (0.81 ton per acre-foot). Boron and fluorine are not present in harmful amounts. Exhaustive studies show that the mineral content under the most unfavorable future conditions will be lower than the average for water diverted and successfully used in the Yuma and Imperial Valleys prior to the construction of Hoover Dam. It is fully established that the water of the Colorado River is of high quality, except for a fairly high percentage of hardness which can be removed at a reasonable low cost."[5] The writer of this report can add little to Mr. Hinds' statement excepting to say that his findings are in complete agreement with those made by Mr. Hinds.

TABLE IV.—*Monthly concentrations of water of Colorado River at Grand Canyon*

[Total dissolved solids in tons per acre-foot]

Month	1927	1928	1929	1930	1931	1932	1933	1934
October	1.64	0.91	1.84	0.96	1.45	1.48	1.80	1.63
November	1.59	1.18	1.45	1.21	1.38	1.53	1.62	1.76
December	1.47	1.41	1.53	1.35	1.51	1.72	1.66	1.68
January	1.59	1.29	1.61	1.53	1.70	1.51	1.52	1.64
February	1.33	1.22	1.43	1.33	1.48	1.19	1.39	1.51
March	1.24	1.10	1.19	1.26	1.42	1.10	1.37	1.47
April	.78	.77	.74	.66	1.12	.69	1.20	1.15
May	.38	.44	.42	.50	.72	.44	.75	.63
June	.41	.37	.33	.44	.51	.38	.36	.85
July	.61	.52	.57	.89	.89	.55	.81	1.65
August	1.08	1.07	1.15	1.27	1.11	1.20	1.43	2.49
September	1.25	1.55	1.09	1.34	1.99	1.50	1.74	2.27
Annual	.77	.69	.75	.85	1.07	.72	.86	1.30

[5] "Colorado River Aqueduct, the Metropolitan Water District of Southern California, by Julian Hinds, general manager and chief engineer, Los Angeles, Calif., October 1950," p. 18.

Mr. ASPINALL. The committee wishes to thank you for a very comprehensive report on this study.

This concludes the witnesses, and if they will be seated in order of their appearance, first Mr. Bliss and Mr. Bolack, then Mr. Murphy, then Mr. Ball and Mr. Coury.

Unless there is a question by some member of the committee, the Chair will not attempt to allot time but will suggest that we proceed as expeditiously as possible with the thought of the possibility of other members of the committee desiring to ask questions, too.

At this time the Chair recognizes the gentleman from California, Mr. Engle.

Mr. ENGLE. No questions at this time, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Nebraska, Dr. Miller.

Dr. MILLER. Thank you, Mr. Chairman. I wanted to ask Mr. Bliss or one of the committee at the desk relative to the quality of the water. Now southern California has a good deal of apprehension and I think justly so, that the quality of their water might be changed if they run the water down through these reservoirs and eventually into Lake Mead where they get a municipal water supply.

They are apprehensive about the change in quality of water. What is the considered judgment of your group relative to the change in the quality of water that eventually reaches Los Angeles and southern California?

Mr. BLISS. Dr. Miller, I believe the conclusion is that the quality will be excellent. It is good. It is well within the range shown on the chart as good permissible water.

Dr. MILLER. Will it be as good as it is now or will it be changed somewhat?

Mr. BLISS. It will not be as good as it is now. Inevitably it cannot be.

Dr. MILLER. It will not be.

Mr. BLISS. That is right.

Dr. MILLER. In your opinion will it be as good as the average municipal water supply?

Mr. BLISS. I should have made the point in my statement—with the extreme fluctuation of the nonregulated flow of the river, of course, there were periods of flow when there was very bad water that went to the lower basin, that is relatively bad water. Under a complete development of the project over 60 percent of the time the water which they will have ultimately will be better than the water they had before the construction.

Dr. MILLER. I did not get the last statement.

Mr. BLISS. The water which they had prior to reservoir construction over 60 percent of the time was worse than what they will get under complete development.

Dr. MILLER. Since the reservoir has been constructed they have really better quality of water?

Mr. BLISS. That is right.

Dr. MILLER. Will that be true when you get the Glen Canyon and Echo Park and other dams developed fully?

Mr. BLISS. The same statement will hold; yes, sir.

Dr. MILLER. Is Mr. Julian Hinds still with the Metropolitan Water District of Southern California?

Mr. BLISS. I do not know, sir.

Mr. ENGLE. He has retired, Dr. Miller.

Dr. MILLER. I understand he has retired. In his statement you just read on page 14 of your report, I reread his statement, and the last sentence reads as follows:

> It is fully established that the water of the Colorado River is of high quality, except for a fairly high percentage of hardness which can be removed at a reasonably low cost.

Do you interpret his overall statement as to the effect that the water in the future will not be changed to such an extent that they can correct, maybe, the hardness and some of the other qualities present in the water?

Mr. BLISS. Yes, sir. I might point out that the use of water for municipal purposes is different. In fact, the use for municipal and for irrigation purposes are actually inimicable. The domestic water should be soft; irrigation water should be hard.

Dr. MILLER. I think that is all the questions, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from New York, Mr. O'Brien.

Mr. O'BRIEN. No questions, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Chairman, the committee has had with regard to the State of Colorado a presentation of the amount of waters which they are allocated. In reading the statements of the gentlemen who have appeared from the great State of New Mexico, there is no reference thereto. Therefore, I would ask the committee's indulgence until I can ask either the State engineer, Mr. Bliss, or some other member of the committee if he will give us at this point the statement of the amount of water to which the State of New Mexico is entitled under the upper Colorado River Basin compact.

Mr. BLISS. Eleven and one-fourth percent, sir.

Mr. SAYLOR. Eleven and one-fourth percent?

Mr. BLISS. Yes.

Mr. SAYLOR. Can you tell us, Mr. Bliss, in acre-feet what that amounts to?

Mr. BLISS. Roughly 835,000 acre-feet, I believe.

Mr. SAYLOR. How much water does the State of New Mexico now put to beneficial consumptive use of that 835,000 acre-feet which they are allocated?

Mr. BLISS. About one-tenth.

Mr. SAYLOR. About one-tenth?

Mr. BLISS. Yes, sir.

Mr. SAYLOR. If the Navaho Reservoir and storage project, together with the Navaho participating projects, and the San Juan-Chama project are authorized, how much water will the State of New Mexico be able to put to beneficial consumptive use?

Mr. BLISS. I do not know, sir. Those reports are not complete. The studies of the 2 projects contemplate the use, I believe, of about 250,000 acre-feet in the case of the Navaho project and about 225,000 acre-feet—I am informed 235,000 acre-feet—for the transmountain diversion.

Mr. SAYLOR. Do you know, Mr. Bliss, what percentage of that water will be lost by evaporation in storage at the Navaho project or

in the dams built with regard to the participating projects of the Navaho and San Juan-Chama?

Mr. BLISS. That includes evaporation from those reservoirs.

Mr. SAYLOR. What is that?

Mr. BLISS. That includes all losses, Congressman.

Mr. SAYLOR. In other words, the 250,000 acre-feet for the Navaho and the 235,000 acre-feet for the San Juan-Chama, those two figures includes all of the losses that could be charged to the State of New Mexico?

Mr. BLISS. Yes, sir; those are the net consumptive uses.

Mr. SAYLOR. Now will you tell this committee from where or what tributary this 485,000 acre-feet will be taken?

Mr. BLISS. From the main stem of the San Juan River.

Mr. SAYLOR. I believe you were here in the room the other day when one of the witnesses from the Department stated that as far as the Navaho project was concerned, if several tunnels were built, that practically all of the lands to be irrigated in the Navaho project could be irrigated by gravity flow. Is that correct?

Mr. BLISS. The largest part of it could be irrigated by gravity flow. There is a pumping unit, however.

Mr. SAYLOR. That is right. But the water that would be diverted from the river could be put on the land by gravity?

Mr. BLISS. That is correct.

Mr. SAYLOR. Now I have noticed that in the bill which Mr. Fernandez introduced there is contained a provision which says:

> That with reference to the San Juan-Chama project, it shall be limited to a single offstream dam and reservoir on a tributary of the Chama River to be used solely for the control and regulation of water imported from the San Juan River, that no power facilities shall be established, installed, or operated along the diversion or on the reservoir or dam, and such dam and reservoir shall at all times be operated by the Bureau of Reclamation of the Department of the Interior in strict compliance with the Rio Grande compact as administered by the Rio Grande Compact Commission.

Can you tell the members of this committee, or one of you gentlemen, why there was a limitation upon the San Juan-Chama project that it be limited to a single off-stream dam and reservoir to be used solely for the control and regulation of water, and no power facilities shall be erected?

Mr. BLISS. I think I can. The objection of the State of Texas was this: They felt that if the transmountain water were mixed with the natural supply of the Chama River or other waters in the Rio Grande Basin that they would lose control of their supply, which is the natural flow, or their part of the natural flow. Therefore, they insisted upon those restrictions.

Mr. SAYLOR. And, therefore, am I correct that the proviso which is in Mr. Fernandez' bill is a result of meetings between representatives of the State of New Mexico and the State of Texas since the last hearings were held upon this bill?

Mr. BLISS. That is correct.

Mr. SAYLOR. Also, I notice that the bill provides:

> That no appropriation for or construction of the San Juan-Chama project or the Navaho participating projects shall be made or begun until coordinated reports thereon shall have been submitted to the affected States, including the State of Texas, pursuant to the act of December 22, 1944—

which is the Flood Control Act.

Can you tell us why the State of Texas has asked that they be permitted to approve something which lies wholly within the State of New Mexico?

Mr. BLISS. That is a standard provision of the Flood Control Act of 1944, I think, Congressman, and any State which is affected or may be affected has a right to comment.

Mr. SAYLOR. Now the State of Texas has placed no objection to the erection of the Navaho project; is that correct?

Mr. BLISS. That is correct.

Mr. SAYLOR. And that any power facilities that could be erected upon that project could be used to help for the lands which receive some benefit?

Mr. BLISS. That is correct.

Mr. SAYLOR. Without the storage projects which you have heard referred to, how much water of the 835,000 acre-feet to which New Mexico is entitled could the State of New Mexico put to beneficial consumptive use?

Mr. BLISS. I do not have any figure in mind, Congressman. It would be very limited because of the physical situation there on the streams. We have to have a very substantial storage reservoir on the main San Juan to ever get the water out of the deep entrenched channel there out onto the available land.

Mr. SAYLOR. Would your State be in the same condition essentially that Colorado was, that they could put 50 percent of the water to which they are entitled to beneficial consumptive use without these storage projects?

Mr. BLISS. I think not, sir. I am sure we could not.

Mr. SAYLOR. Mr. Bliss, do you know how much of the water you could put to beneficial consumptive use with the participating projects as distinguished from the storage projects?

Mr. BLISS. The only 2 participating projects which we now have in the bill irrigate a total of 4,000 acres in the State. It has very little participating project development.

Mr. SAYLOR. Where are those 4,000 acres located?

Mr. BLISS. A small project on the south side of the San Juan River of 3,500 acres, the Hammond project, and a small amount of acreage at the lower end of the Pine River extension project, which is largely in Colorado. There are about 1,000 acres that extend into our State.

Mr. SAYLOR. I believe I am correct that the Hammond project was one of those which the Department had in its bill last year and which it has again appeared before this committee and approved?

Mr. BLISS. That is correct.

Mr. SAYLOR. In the bills which you have heard referred to as bills presented by Mr. Rogers of Colorado and Mr. Aspinall, which call for additional participating projects, are there any of those which add new acreage in New Mexico?

Mr. BLISS. None.

Mr. SAYLOR. So that the benefits which the State of New Mexico would get are not increased at all by the new approach that has been made by the Governor of Colorado; is that correct?

Mr. BLISS. That is correct.

Mr. SAYLOR. That is all, Mr. Chairman. I thank the witnesses for their testimony.

Mr. ASPINALL. The Chair recognizes the gentleman from Florida.

Mr. HALEY. No questions.

Mr. ASPINALL. The gentleman from Utah, Mr. Dawson.

Mr. DAWSON. I just want to take the occasion to compliment you, Mr. Bliss, for the most exhaustive study which you have made on this question of the quality of water. I think it is one of the best reports we have had.

Mr. ASPINALL. The gentleman from North Carolina, Mr. Shuford.

Mr. SHUFORD. No questions.

Mr. ASPINALL. The gentleman from Washington, Mr. Westland.

Mr. WESTLAND. No questions.

Mr. ASPINALL. The gentleman from California, Mr. Sisk.

Mr. SISK. No questions, Mr. Chairman.

Mr. ASPINALL. The gentleman from New York, Mr. Pillion.

Mr. PILLION. No questions.

Mr. ASPINALL. The gentleman from Texas, Mr. Rutherford.

Mr. RUTHERFORD. No questions.

Mr. ASPINALL. The gentleman from California, Mr. Hosmer.

Mr. HOSMER. No questions, in the light of the policy I announced at the last meeting.

Mr. ASPINALL. The gentlewoman from Oregon, Mrs. Green.

Mrs. GREEN. No questions.

Mr. ASPINALL. The gentleman from Arizona, Mr. Rhodes.

Mr. RHODES. I have no questions.

Mr. ASPINALL. The gentleman from Colorado, Mr. Chenoweth.

Mr. CHENOWETH. I have no questions. I just want to welcome my neighbors from New Mexico. I consider myself almost a resident of New Mexico, since I live in Trinidad which is only 12 miles from the State line of New Mexico, so I assure you they are welcome here as far as Colorado is concerned, and Colorado will give their hearty support to anything New Mexico wants. Thank you, Mr. Chairman.

Mr. ASPINALL. The gentleman from California, Mr. Utt.

Mr. UTT. No questions.

Mr. ASPINALL. At this time the Chair will give the gentleman from New Mexico, Mr. Fernandez, an opportunity to make a statement or ask a question if he so desires.

STATEMENT OF HON. ANTONIO M. FERNANDEZ, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW MEXICO

Mr. FERNANDEZ. Thank you, Mr. Chairman. I also have no questions at this point, but I will put my statement in the record at this point.

(The statement referred to follows:)

Mr. Chairman and members of the committee, it is not necessary for me to go into detail in support of the Colorado River project as a whole, as well as in support of the projects in New Mexico, to wit, the Navaho Dam and Navaho Shiprock project, the San Juan-Chama transmountain diversion project, and the small Hammond project, all of which are a part of the overall plan of the Bureau of Reclamation. All the members of the New Mexico delegation both in the House and in the Senate are agreed in our complete support of the entire upper Colorado project and the New Mexico participating projects. The details respecting the New Mexico projects have been presented to the committee.

Unlike a year ago, we now have feasibility reports meeting the standards of feasibility provided by the reclamation laws, and those reports are now in the process of being circulated to the affected States in accordance with reclamation law, preparatory to formal submission to the Congress. The details with respect to the Navaho projects and the San Juan-Chama project are included in the detailed report made a part of the record by the Commissioner of Reclamation during the hearings.

As to the overall project, this committee is now fully familiar with the fact that for purposes of orderly development this great river, running from the high mountains of Wyoming down to the Gulf of Mexico, was by compact divided into the upper and lower basins. The lower basin has been fully developed at a cost of many hundreds of millions of dollars. Hundreds of thousands of people from New Mexico and other States have poured into California to operate irrigation farms or to work in irrigation farms and in the vast industrial plants which were made possible by that development. We do not begrudge California any of it, but rejoice with it in its phenomenal growth.

All we ask is that we be given the same opportunity and the same assistance from the Federal Government, which alone can make such development possible. It is true that it will cost hundreds of millions of dollars, a sum that seems vast when you look at the entire upper basin proposal; but the only sensible way to direct its development is by an orderly planning for the entire basin now.

Men of little faith and of limited vision and faint hearts are awed by the vast sums of money necessary for this orderly development of an entire basin; but these amounts will be expended not now but through many decades in the future, on plans which we are asking Congress to make now, in the interests of efficient and orderly development. We are asking the Congress to plan not for ourselves of this generation, but for all posterity and for many generations to come. None of us will live to see all of these projects completed and put into operation. These plans are for the future of our country, and those future generations will bless the courage and the vision of this Congress or whatever Congress does authorize such plans.

As these waters and the power development are put to beneficial use, and even as the work progresses, millions and eventually billions of dollars will be returned in taxes to the Treasury in the years to come, over and above direct repayments on the sums advanced.

We from New Mexico urge the authorization of the plans for the entire basin, as an overall guide on which to proceed, and which of course may be modified by future Congresses as experience is gained from its development and construction.

Just one word about the Navaho project as it affects the Indians. On the basis that only 100 to 200 families live in the Navaho Indian area to be developed within the reservation, and based on a per capita allocation of the cost, it has been stated that the results are fantastic. Such a view overlooks the fact that this unproductive land on which these few families now barely exist, is not owned by those few families, and will not be operated only by them. It is owned by the tribe. It is estimated that the land will be divided into 1,500 family farms. Let me, at the risk of repetition, quote from the testimony of Sam Ahkeah, the then chairman of the tribal council, given at the hearings last year before this committee. Mr. Ahkeah said:

"We were promised many things, a good many of which have never come to pass. It makes no difference now where the blame may be placed; what is important is that through this great irrigation project many of those promises can at last be kept. We do not wish charity. We do not wish to be supported on a dole. We wish to assume our rightful place as self-supporting citizens of this great country. We think we have amply demonstrated our ability and willingness to assume the responsibilities of citizenship when we have the chance and means to do so, both in peace and in war. We know the project will cost a great deal of money, but we feel it will be money well spent for all of the taxpayers of this country. It will be less than may be spent if the project is not built, to support and maintain us over the years; and in addition, it will enable us to support ourselves with the dignity and human satisfaction to which every citizen is entitled. It will enable us to take our rightful place in society.

"Suppose that the lands of the Navahos in an amount of 125,000 acres are irrigated, both on and off the reservation. They will be concentrated in one agricultural area and bring the Navaho people closer together in their living. There are now about 100 Navaho families living on the lands which will be irrigated, all of whom make for themselves only a substandard living because the land cannot support them. When the land is irrigated, it will make about 1,500 farms of a size to support Navaho families. This means 1,500 families supporting themselves directly from the project, or as near as we can figure it will be about 7,800 people. These people will become self-sufficient and can live with dignity. They will become taxpayers, because even though we do not now pay taxes on our lands, when we make money we pay income tax, and whenever we buy things with money we have earned we pay taxes on those things.

"In addition to the people who live on the farms, there will be many other Navahos who will indirectly make their living out of the project. It will create villages with stores, filling stations, and all kinds of service businesses. We are told that at least 7,800 people not living on the project will be supported by the project. This means a total of about 15,600 of our people will be taken care of. I hope you will realize what a wonderful thing this will be for us, but it will also be wonderful for the United States. It will mean 15,600 more really useful citizens living as we all want United States citizens to live.

"Let me point out some additional results. One of the things we were promised in the 1868 treaty was schools and education for all our children. This promise has never been kept. It is a difficult promise to keep in some ways, and expensive, because our children are so widely scattered. It is very difficult to build day schools because enough children cannot get there, and boarding schools are very expensive and are not satisfactory to us. We want our small children to live at home and have a family life just as you do. With this irrigation project a great many of our children will be living in a concentrated area and it will be much easier to provide schools and much less expensive for the taxpayers. The more our children are educated the better they will be able to compete in society and in general, the better citizens they will make, and you will no longer hear of an Indian problem. Our people, and especially our children, are one of the great resources of this country and this resource should not be wasted any more than any other resource."

I call special attention to the plight of the Indians and their share of the potential resources of the San Juan River, a tributary of the Colorado, because we owe them a special responsibility. One of the few shameful aspects of our otherwise proud history is the treatment which America has given the original inhabitants of this great land of ours—the American Indian.

Too often the Indian was dispossessed of his land without any adequate compensation, and far too often the promises made him by the white man have not been kept. We have made some progress in recent years toward repairing some of the historic wrongs, but a very great deal remains to be done.

We are at this moment in a position to remedy one of our more serious injustices to our red brothers in the presently proposed Navaho project as a part of the Colorado River project. It would provide more than a benefit; it would provide the Indians with an opportunity to work effectively for their own prosperity, to lead lives of dignity and achievement—to live the lives of true American citizens which they most certainly are.

In the bitter Indian wars of the last century, the famous scout, Kit Carson, tells how the fields and the crops and the orchards of the Navahos were burned and destroyed in order to starve the tribe into submission. When the Navahos were allowed to return to their homes in 1868, it was with the idea that they could farm at least some of their lands and be self-supporting. Many promises were made, most of which have been distinguished more in the breach than in the observance. Without adequate water, the Navaho lands provide at best a precarious and substandard existence.

I join with my colleagues from New Mexico, and my colleagues from the other Western States involved, in urging that this Congress do what eventually has to be done if the upper Colorado River Basin is to have a comparable development to that already provided with Federal funds to the lower basin. To make an about face in these policies would be patently unfair and inequitable to the States in the upper basin.

Mr. ASPINALL. At this point, without objection, the gentleman from New Mexico, Mr. Dempsey, will be given the opportunity to extend his remarks.

(Mr. Dempsey's statement is as follows:)

STATEMENT BY HON. JOHN J. DEMPSEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW MEXICO

Mr. Chairman, members of the committee, your committee is most indulgent in granting further hearings on this legislation in view of extensive testimony and evidence that you have heard concerning it in the past. I am deeply appreciative of this opportunity to present my views and will endeavor not to tax further your patience, which I know is being sorely tried because of your conscientious desire to give this proposal serious and careful consideration.

This upper Colorado River development program contemplates conservation and beneficial use of waters now being wasted for the most part. The entire development has been carefully and thoroughly planned with a view to derive from it the great possible benefit for all of the Colorado River upper basin States on an equitable basis. It is a fine example of interstate cooperation in the upper basin, which is certain to be highly beneficial to the economy of each of the States and to the Nation as a whole.

I would like particularly to reimpress upon the minds of the members of this committee that until the purposes of this legislation are carried out in full, the intent of the Colorado River compact made in 1922, are approved by the Congress soon thereafter, is being frustrated.

The legislation you are considering would authorize the Navaho Dam as one of the initial New Mexico units and the Hammond project, as well as the Pine River extension in Colorado which includes a small area in New Mexico. This bill gives provisional authorization for the participating Navaho project, made up of 2 irrigational areas, the Shiprock and South San Juan, comprising about 137,000 acres to be irrigated with water from the Navaho Dam and Reservoir. Provisional authorization also is proposed for the construction of the San Juan transmountain diversion project for making available to the Rio Grande Valley of New Mexico such Colorado River waters from New Mexico's allotment as would be surplus to the needs in the San Juan area.

Today New Mexico can utilize barely 100,000 acre-feet per year of the 838,000 acre-feet to which it is entitled under existing compacts. Yet the entire State has been suffering from a drought condition for the past 6 years—a condition so aggravated that virtually all of New Mexico has been declared a drought distress area by the President of the United States and its economy and development are being dangerously retarded. It should not be difficult to understand why the annual loss of nearly three-fourths of a million acre-feet of water, due to lack of facilities to store and conserve it, is of such great concern to the State. That amount of water properly utilized in accordance with the careful planning already done by Federal and State agencies means the difference between poverty, want, and destitution for thousands of New Mexico citizens, both Indian and non-Indian, on the one hand, or an adequate livelihood on the other.

It is manifestly the obligation of the Congress to enact legislation which will help to insure important national defense installations in New Mexico, such as the atomic energy plants at Los Alamos and Sandia Base as well as the large Air Force Base at Kirtland Field, an adequate water supply. Those installations are dependent on the now inadequate surface and ground waters in the Rio Grande Valley. They can obtain their requirements from no other source, so their continued successful operation is contingent in so small degree upon passage of this legislation.

The added fact that the Federal Government owns about 40 percent of the State of New Mexico is further reason why the Congress should feel obligated to enact legislation that will help to prevent serious deterioration in the millions of acres of national forests, public domain, and other Federal properties. It is a further Federal Government obligation to do its part in providing equitable distribution of water in order to maintain the integrity of its agreements with the Indian population of the State, which has established water rights under the terms of treaties made with the various tribes. Failure to recognize this obligation, which the Colorado River compact itself acknowledges, will postpone indefinitely the day when this Indian population can become self-sustaining and cease to be a continuing heavy burden upon the Nation's taxpayers.

In order to understand the motivation for a large part of the opposition to this legislation it is necessary only to refer to the records of the Bureau of Reclamation concerning the distribution of the waters of the Colorado River. Under the Colorado River compact the lower basin States are entitled to an allocation of 75 million acre-feet in 10 years, or 7½ million acre-feet per year on an average. The same allocation is made to the upper basin States on the basis of presumptive flow. Because of a lack of facilities for conservation and utilization of their share of the water the upper basin States have been using less than 2 million acre-feet a year. The lower basin States, however, have been receiving an average of approximately 12 million acre-feet per year in actual river flow at Lee Ferry, the measuring point for water flowing from the upper basin.

The total amount of water that has passed Lee Ferry in the 15 years from 1940 to 1954, inclusive, is 180.4 million acre-feet. In only 2 of those years,

1940 and 1954, has that flow of water been less than 7.5 million acre-feet. In 1952 it was 18 million acre-feet. Proper storage capacity in the upper basin States would equalize that year-to-year flow and prevent waste.

Simple arithmetic shows that during the 15 years between 1940 and 1954 the lower basin States had available for their use approximately 150 million acre-feet of water more than were utilized by the upper basin States. The lower basin States had an excess of 67.5 million acre-feet of water from the Colorado River over their allotment under the compact during those 15 years.

Southern California is the most favored beneficiary of this surplus, both in water and in the electrical power generated at Boulder Dam. Southern California will continue to be the preponderant beneficiary so long as the upper basin States are unable to utilize their fair share of the waters, something that they never will be able to do until this legislation is enacted and the development it authorizes becomes an actuality.

Even a most superficial study of the benefits southern California has derived from the generation of electrical energy at Boulder Dam in the 17 years from 1938 to 1954, inclusive, cannot fail to lead to the conclusion that the opposition and the delaying tactics that have been and are now being resorted to in regard to this legislation are predatory and selfish.. Not only the upper basin States but California's neighbors in the lower basin, Arizona and Nevada, have been the victims of this avarice. That is borne out by the record of continuing controversy between California and the other two lower basin States.

The Colorado River compact has been an electrical energy bonanza for southern California since 1938. In the 17 intervening years until now that area has received the bulk of 63.5 billion kilowatt-hours of electricity from Boulder Dam under firm contracts at an average cost of 1.89 mills per kilowatt-hour. In addition, during the same period southern California has received 16.5 billion kilowatt-hours of so-called nonfirm or secondary supply, produced by use of surplus water, at the absurdly low average rate of four-tenths of a mill per kilowatt-hour.

The so-called nonfirm power—the power produced from the water that belongs to the upper basin States under the compact—is the windfall that the power interests in southern California are battling so hard to keep. It makes the much publicized FHA windfalls look like peanuts by comparison. Based on records of the Federal Power Commission the cost of this nonfirm Boulder Dam-generated electrical energy—the energy produced by upper basin water—to such utility companies as Southern California Edison and California Electric Power delivered to the consuming areas in which they operate is about one-half the cost of that produced in their own steam plants. Southern California Edison's steam-plant electricity costs the company about 5.05 mills per kilowatt-hour delivered, while the nonfirm generated at Boulder Dam costs approximately 2.5 mills per kilowatt-hour, also delivered. The cost of steam-plant energy to other distributors in the southern California areas is slightly more than California Edison's but the 2.5 mills differential applied in all cases reveals that the Nation's taxpayers have contributed about $41 million thus far to the southern California utility companies, private and public. The upper basin States have, in actuality, been forced to donate the water that has put $41 million into the southern California utility companies' tills.

Reclamation Bureau records show that up to date more than $57 million has been paid in interest on the Boulder Dam construction indebtedness, while only $16 million has been paid on the principal. In 1940 the interest rate was but from 4 to 3 percent and the contract price per kilowatt-hour of electrical energy was accordingly reduced. And the windfall for southern California was increased; the pocketbooks of the utility companies grew fatter and those of the taxpayers, particularly those in the upper basin States, grew leaner. In view of that, it isn't hard to see why the opposition to the upper Colorado River development project by southern California is so bitter. But it should be crystal clear to the Congress that this injustice should not be allowed to continue.

The records of the Bureau of Reclamation show that 1 acre-foot of water has produced in excess of 400 kilowatt-hours of electricity at Boulder Dam on an average. In 1951, for instance, 413 kilowatt-hours were produced per acre-foot and in 1952 the production per acre-foot was 449 kilowatt-hours. Assuming that under increasingly efficient operation the average production per acre-foot would be 450 kilowatt-hours, it is not difficult to reach the conclusion that the surplus water flowing through Boulder Dam plants—water which rightfully belongs to the upper basin States—is bringing the ridiculously low return of $1.80 per acre-foot. The loss thus suffered by the upper basin States and by the taxpayers

of the Nation as a whole is further aggravated by the fact that this surplus water is not used beneficially below Boulder Dam, but is permitted to flow wastefully into the Pacific Ocean. Its use in irrigation of upper basin States land would increase the return to our economy at least a hundredfold.

The economy of this Nation has not been built on waste. We are strong and great because we have devised ways in which to utilize our resources that prevent the wanton waste which prevailed when our Nation was young. Water is the veritable lifeblood of the semiarid Southwest. To permit its waste is so culpable as to amount to almost criminal negligence. Yet powerful interests are exerting every possible pressure on the Congress to prevent action which will result in curing this deplorable waste of resource and allow utilization beneficial to thousands of people in New Mexico and the other upper basin States who have endured untold privation and hardships because of the lack of water.

Let me assure you, however, that neither envy nor enmity motivates the effort of New Mexico—or of any other upper basin State, for that matter—to avail itself of the water resources to which it is entitled. We are not resentful of the progress made in southern California because of the Colorado River development in the lower basin and the installations made. We seek only to be afforded a like opportunity, which is rightfully ours, to develop the economy of our own States. We are justly resentful of the efforts of southern California to deny us that opportunity while she continues to fatten on our heritage.

Nor are we envious of the fact that California—mainly the southern part of the State—has benefited from a lion's share of the Federal Government's expenditures for such civil works as flood control, navigation, rivers and harbors, and associated projects. The records of the Corps of Engineers of the Army show that Federal expenditures for such purposes in the State in the past 6 years, 1949 to 1954, inclusive, are $233 million. Of that amount it is roughly estimated that between $60 million and $80 million are reimbursable, leaving a net Federal expenditure of more than $150 million. The 1954 Omnibus Flood Control Act carried authorization for about $25 million on projects for southern California alone.

It is high time, I believe, that we extend the good-neighbor policy north of the Mexican border. It has been flowing south with the Colorado River for a long, long time.

It is inconceivable that the 84th Congress would yield to the same pressures they were able to prevent passage of this legislation in the House and concurrence with the Senate in the 83d Congress, notwithstanding the approval given it by this committee. I am firmly convinced, however, that justice and commonsense will prevail and that we will enact this long overdue legislation in this session.

Mr. ASPINALL. The Chair recognizes the gentleman from Utah, Mr. Dixon, if he wishes to ask any questions.

Mr. DIXON. No questions. Thank you.

Mr. ASPINALL. Again the committee wishes to thank you gentlemen for your presentation, the expeditious manner in which you presented it, and the thoroughness with which you have gone about it.

Mr. BLISS. Thank you.

Mr. ASPINALL. At this time the committee will listen to witnesses from the State of Utah.

Mr. HOSMER. Mr. Chairman, I have a unanimous-consent request. I understand that Senator Barrett this morning introduced a letter from the Atomic Energy Commission.

Mr. ASPINALL. May the Chair correct the gentleman. It was Senator Bennett.

Mr. HOSMER. Excuse me. Senator Bennett. I would ask unanimous consent to insert at the conclusion of his testimony my own statement with respect to the progress on atomic energy toward generating electric power.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

(The statement will be found following Senator Bennett's statement. See p. 486)

Mr. ASPINALL. Before we begin the presentation by the witnesses from the State of Utah, the Chair would like to advise that we will be able to have a committee meeting this afternoon. At this afternoon's hearing we will finish with the testimony of the representatives from Utah and will then listen to a presentation from the REA and from the private utilities of the area.

The gentleman from Utah, Mr. Dixon, will now be recognized for a brief statement.

STATEMENT OF HON. HENRY A. DIXON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF UTAH

Mr. DIXON. In my native State of Utah, one of our finest organizations is the Sons of the Utah Pioneers. This organization is composed of men who are descendants of our forefathers who traveled across the plains to colonize and settle Utah. I do not believe there is a group who could be more sincerely interested in the welfare of the West and its people.

They have submitted to my office a resolution memoralizing the Congress of the United States to approve the upper Colorado River storage project. In this resolution they have called attention to the fact that the project will benefit millions of Americans.

For this reason I would like to call this resolution to the attention of my colleagues in the House for their careful consideration.

(The resolution is as follows:)

RESOLUTION

Whereas the waters of the Colorado River and its tributaries have by compact, approved by the Legislatures of the States of Arizona, California, Utah, Colorado, New Mexico, Nevada, and Wyoming, been allocated to these several States, and said compact having been approved by the Congress of the United States in 1922; and

Whereas the agricultural and economic future of the States of the upper Colorado River Basin are in great measure dependent upon the wise use and conservation of water; and

Whereas certain allotments of water in the Colorado River have been made to the various States so entitled, and including the State of Utah; and

Whereas the upper basin States, consisting of Colorado, New Mexico, Utah, and Wyoming, through the Upper Colorado River Commission and the legislatures of said States and with the approval of Congress, have allocated their proportional share of the water of said river among themselves; and

Whereas the conservation and wise use of water of the Colorado River can only be made possible by the construction of strategic storage facilities on the Colorado River and its tributaries, and it seems advisable in the conservation of such water to erect a storage dam at Echo Park on the Green River, and the construction of which dam is an integral and necessary part of the upper Colorado River Basin project; and

Whereas the construction of Echo Park Dam will not adversely affect any part of the Dinosaur National Monument as originally constituted, since the enlargement of the Dinosaur National Monument in 1938 was made expressly subject to the development of the upper Colorado River Basin; and

Whereas the Upper Colorado Commission, working in conjunction with the Federal Bureau of Reclamation, has developed a plan, known as the Colorado River storage project, and said project has been determined to be the most economical and feasible method of storing and using said waters of the Colorado River for the benefit of both the upper and lower basin States; and

Whereas the construction of the Echo Park Dam will make the beauty of this area available to millions who otherwise would never see it; and

Whereas the conservation of water and water resources is a crying need in all Western States and the United States; and

Whereas the members of the National Society of the Sons of Utah Pioneers, whose forebears began irrigation in modern times in the valley of the Great Salt Lake, are earnestly concerned to advance the economic well-being of Utah and neighboring States: Now, therefore, be it

Resolved by the Executive Committee of the National Society of the Sons of Utah Pioneers, That the immediate enactment of legislation authorizing the Colorado River storage project, including construction of Echo Park Dam and participating projects, is most urgently needed; and be it further

Resolved, That in our opinion such construction will promote and advance the best economic interests and will be for the benefit of both the upper and lower basin States: and be it further

Resolved, That copies of this resolution be sent forthwith to the President of the United States and members of the Utah congressional delegation.

[SEAL] HORACE A. SORENEZ, *President.*

WARD W. CASE, *Secretary.*

Attest:

ELIAS L. DAY.

Dated at Salt Lake City, Utah, this 23d day of March A. D. 1955.

We are very glad to have with us at this time representatives from the State of Utah, and leading off for the State is the Commissioner for Utah, George D. Clyde, engineer of long service in water matters, who has appeared before this committee heretofore. We are glad to have you with us again, Mr. Clyde.

STATEMENT OF GEORGE D. CLYDE, COMMISSIONER OF INTERSTATE STREAMS FOR UTAH

Mr. CLYDE. Thank you, Mr. Chairman and members of the committee.

I have, Mr. Chairman, an extended statement which has been passed to the committee members. In the interest of saving time again, I will proceed to brief that statement to get out the kernels which I think should come before the committee for their reconsideration. So with your permission, I will proceed on that basis.

Mr. ASPINALL. You may proceed and then we will ask the committee to include the full statement at the end of your statement.

Mr. CLYDE. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, my name is George D. Clyde. I am a civil engineer and commissioner of interstate streams for Utah and appear here as a representative of the State of Utah to present a brief statement relative to the upper Colorado River storage project and participating projects.

UTAH'S INTEREST IN THE COLORADO RIVER

Utah, 1 of the 4 upper Basin States, is an arid land.

Its total land area is some 52 million acres, of which only 6 percent is arable, 3.2 percent cropped and 2.2 percent irrigated. Of the 1,165,000 acres of currently irrigated land, less than 40 percent has an adequate water supply. Under full development Utah can never irrigate more than 1,800,000 acres or an increase of some 600,000 acres. This can be done only if all the State's water resources are developed and put to use.

Utah along with Wyoming, Colorado, and New Mexico is a storehouse of raw materials. It contains all the elements necessary to chemical and fertilizer industries. Coal, oil, gas, oil shale, hydrocarbons, phosphate rock and potash occur in great abundance. Ferrous and nonferrous minerals are found in great quantity. Precious metals,

strategic minerals, uranium, and inorganic raw materials abound throughout the area.

Utah's hope for an agricultural and industrial development necessary to provide opportunity and homes for its people and to establish and maintain a stable economy, lies in the full development and efficient use of its water and power resources.

Utah's share of the Colorado River is its last remaining major water resource. Its future depends upon the development and use of this water and power resource in the Uinta and Bonneville Basins. Utah's share of the upper Colorado River proposed for development under pending legislation will provide water for an estimated 32,170 acres of new land, supplemental water for 168,690 acres and hydropower essential to the development of its industrial resources and municipal water for a rapidly growing population.

Utah officially endorsed H. R. 270 which is now before this committee and which includes among other projects, the central Utah (initial phase), Gooseberry, and Emery County participuating projects in Utah, by passing a concurrent resolution of the Senate and House of Representatives of the 31st Legislature of the State of Utah, memoralizing the Congress of the United States to authorize the Colorado River storage project, including the Echo Park Dam and participating projects. The details of these projects are carefully described in the United States Bureau of Reclamation testimony before this committee and will not be repeated here.

The State of Utah believes the proposed project to be feasible, both economically and physically, and that its immediate authorization and construction is in the best interest of the upper basin States, the western region and the Nation and that the immediate authorization and construction of this project will in no way place in jeopardy the water rights and interests in the lower basin as determined by the Colorado River compact. In support of this belief it submits for your consideration the following comments:

THE COLORADO RIVER COMPACT

The Colorado River is a wild river. Its seasonal and annual flow fluctuates widely. Without regulation by storage the safe utilization tion of the stream is limited to the low water flow and in addition the control and other works are subject to damage by floods and silt deposits.

By mutual agreement among the seven Colorado River States, the Colorado River compact became the law of the river. The intent of the compact is clear. It recognized (1) that each State in the Colorado River Basin was entitled to an equitable share of the river resource in perpetuity; (2) the absolute necessity of river regulation before the river could be safely and fully developed; (3) that the lower basin would develop first because of easier access to arable lands, and proximity to centers of population and power markets; (4) that the projects required for the development of the river would have to be constructed under the reclamation law; (5) that the upper basin States, due to more difficult topography, greater distances, scattered arable land, fewer people, and generally slower industrial development would develop more slowly, but that when the time came and a feasible project was proposed, it would have the same whole-

hearted support from all the States of the basin that the lower basin States have enjoyed. This intent, it would appear from the vigorous opposition to this project, has been abrogated by southern California, who, having received its benefits from the Colorado, now declares that a new set of intentions and interpretations apply to the compact.

The compact is predicated upon the regulation of the river by storage. Such regulation has been accomplished in the lower basin. Similar regulation must be provided in the upper basin. The reservoir capacity, proposed in the pending legislation, will provide for river regulation, water for consumptive use by exchange or direct diversion and power generation, the revenues from which will be used in part to pay for the project.

The water supply studies show conclusively that there is sufficient water in the river to build up and maintain the holdover storage required for river regulation and at the same time meet all compact requirements in the lower basin, and that after the regulating reservoirs are once filled, the terms of the compact, under any interpretation that might be placed upon it by the Supreme Court, can be fully met. To do this, however, the storage reservoirs must be built and filled as soon as possible.

MAIN STEM RESERVOIRS REQUIRED FOR RIVER REGULATION

The Boulder Canyon Project Act specifically states that no part of the cost of the Hoover Dam and appurtenant works were to be charged to irrigators in the Imperial or Coachella Valleys. The entire cost of these works were allocated to flood control, river regulation and power, and all are now being repaid out of power revenues. The power rates were fixed as low as possible and still provide for payout in 50 years. Southern California and the Southwest get irrigation water from the Colorado without paying 1 cent for storage and river regulation, get domestic water at their intakes for 25 cents an acre-foot, and power at rates not fixed by competition with other power sources, but by the net revenue needed to pay off the cost of the dam and appurtenant works at 3 percent interest in 50 years: a gift of cheap water, and cheap power made possible by the use of Federal funds under the reclamation law.

Now let us look at the Colorado River storage project which southern California is so vigorously opposing. This project provides for river regulation by building Echo Park, Glen Canyon, and other storage dams for the same purpose as Hoover Dam in the lower basin. These storage dams must be built and at least partially filled before they can function in regulating the river. The second requirement is water for consumptive use. The Imperial Valley and the Metropolitan Water District did not need all the storage provided in Lake Mead at the time the Hoover Dam was built to provide water for consumptive use. So also, it is true that the upper basin States do not need at once all the storage capacity in the reservoirs at Echo Park, Glen Canyon and the other sites at the time these dams are built. The third requirement of storage is for power generation. At the time Hoover Dam was built it was said that there was no market for the power that would be generated at the Hoover Dam. In the upper basin, the market already exists. Power utilities in the upper basin have testified that they will buy all the power from these plants as

fast as it becomes available, not at the minimum rate that will pay the power facilities off in 50 years, but at a competitive rate in the area served.

The Colorado River storage project and participating projects should be authorized under the same rules as those governing the lower basin development, namely, interest-free money for irrigation and use of power revenues to pay costs of regulation and power facilities and to help pay costs allocated to irrigation.

AVAILABILITY OF WATER SUPPLY (UPPER BASIN STATES—CALIFORNIA)

The Colorado River is the only remaining major undeveloped water source available to the upper basin States. This is not true with respect to California, where the major opposition to the Colorado River storage project is originating. It is reported that approximately 50 million acre-feet annually discharges into the Pacific Ocean from the great central valley and northern California. This is approximately 7 times the net water supply available to the upper basin States from the Colorado River under the compact. Physically, much of this water could be moved south into the area now served by the Colorado River. It seems hardly fair to take from the upper basin States their last remaining major water resource, when so much fresh water is now discharging into the sea from California.

INTEREST-FREE MONEY FOR IRRIGATION FEATURES—WHAT DOES IT COST?

The United States throughout its history has followed a policy of making expenditures of Federal funds when such expenditures resulted in general public benefits even though some individuals, or groups received direct benefits. For example, Federal financial assistance, in one form or another in highway, canal, railroad, airport, shipping, river and harbor, flood control, defense plant, and strategic metal mining development, none of which is ever returned to the Federal Treasury and none of which pays interest, is an accepted national policy and has been such since the country was founded. In 1902, in recognition of a need for assistance in bringing water to the land in the arid West, the Reclamation Act was passed. It provided for interest-free money for the irrigation features of reclamation projects. The cost of the interest-free money was the price the Federal Government was willing to pay to get settlers established on the arid lands. Bringing water and land together created wealth and new wealth added to the Nation's strength and prosperity.

The only difference between the assistance to reclamation and the other programs mentioned above was the fact that the construction costs of reclamation projects had to be paid back with interest except for the irrigation features. For more than 50 years this has been national policy. Now, in the minds of some people in the lower basin and many people in other States who have for years been the beneficiaries of extensive financial aid from the Federal Government, in aiding transportation, providing protection from floods, making river and harbor improvements, and aiding special businesses, the cost of the interest free money for the irrigation features of reclamation is too great a burden for the taxpayer to bear, even though the very construction of these reclamation projects creates national wealth,

broadens the ad valorem tax base and increases income taxes. Furthermore, such projects provide jobs, homes, investment opportunities in the project area and greatly increases the purchasing power for goods produced or manufactured in other States. Contrary to the statements recently made by the Colorado River Development Association of California in their piece of Red journalism, interest-free money for irrigation development is not a cost to the taxpayer, it is public investment which pays dividends in perpetuity because of the new wealth created.

ECONOMIC JUSTIFICATION

The economic justification of the proposed projects has been established by comparing the benefits with the costs. Consideration is given to all project effects, beneficial or adverse, to whomsoever they may occur, locally, regionally, or nationally. In general the measurement of benefits from a reclamation project involves an estimate of the difference between future conditions with and without the project. The evaluation of benefits is made in monetary terms as far as possible. Intangible benefits are not included in the benefit-cost analyses because they are not actually subject to reduction to monetary values. They are important, however, and should be considered along with the benefit-cost analyses in a final determination of economic justification.

The cost side of the benefit-cost comparison includes all costs, construction, interest on all unpaid balances, and costs of operation, maintenance, and replacement.

All recommended units of the Colorado storage project and participating projects, collectively and individually have tangible benefits greater than costs.

REPAYMENT

The Colorado River storage project and its participating projects are self-liquidating. All power features will be repaid with interest within 50 years. The municipal features will be repaid with interest within 50 years. The irrigation features will be repaid without interest within 50 years after the 10-year irrigation development period. The cost of this interest-free money is more than offset by the indirect and public benefits.

The sources of income from which the project costs are repaid are:

(1) Irrigation water users (according to their ability to pay).
(2) Municipal water users.
(3 Ad valorem tax (water conservancy districts).
(4) Power revenues from project powerplants.
(5) Power revenues from main stream powerplants.

None of the income from these sources comes from areas outside the upper basin States.

For the central Utah project the sources and proportion of income for repayment are:

	Percent
1. Irrigators	12
2. All consumptive water users including irrigation but excluding the ad valorem tax	35
3. Power revenues from project plants	27
4. Power revenues from main-stream powerplants	38
Total	100

In spite of all the misinformation, results of dishonest arithmetic, and pure fabrication being distributed relative to the economic feasibility of the Colorado River storage project and participating projects, it still is self-liquidating and will repay all costs plus interest on all features, except irrigation, within 50 years.

HYDROELECTRIC POWER

The Bureau of Reclamation proposes to produce hydropower at project plants which can be sold at load centers for 6 mills per kilowatt-hour. No power is now available in the upper basin power market area that can be delivered to the same load centers for less than 6 mills. The Utah Power & Light Co. of Salt Lake City have testified that the cost of power production from their most efficient steamplant is between 6 and 6¼ mills per kilowatt-hour. Any policy relating to the conservation of this Nation's resources should include the full use of all its renewable resources, such as falling water, before exhausting its nonrenewable resources. As long as there is falling water it should be harnessed to provide power essential to the local and national economy. For this reason it is believed that the hydroplants on the Colorado will still be producing power a hundred years from now.

PER ACRE COSTS FOR IRRIGATION

The cost per acre for the irrigation features of the participating projects included in the pending legislation are high. Considered over the life of the project such costs are justified for the following reasons:

(1) When good land and adequate water are joined under good farm management, a new agricultural resource is created which will produce a perpetuity.

(2) The recurring profits each year soon exceed even the high cost of supplying water to the land.

(3) It is estimated that a farm is bought and paid for once every generation. This means that a given tract of land would be bought and paid for 4 times every 100 years.

High cost of joining good land and water is justified because such joining creates new wealth, provides homes, jobs, and results in a renewable source of food and fiber for a rapidly growing population.

COLORADO RIVER STORAGE PROJECT AND THE AGRICULTURAL SURPLUS

Much has been said about the agricultural surplus. Experts have estimated our population will reach 200 million by 1975. To maintain 1950 standards of diet will require 31 million acres of new land by 1975, in addition to the increased production that can be secured from improved hybrids, fertilization, mechanization, and better management of existing agricultural areas. Of this, 21 million acres can be obtained by reclaming swamp and cutover land in the South, and that is about all there is to reclaim. Six million must come from irrigated land. All the irrigable land remaining in the West does not exceed 6 million acres. It requires 25 to 40 years to bring an irrigation project into full production. The initial phase of the Colorado project will require 25 to 30 years to complete. The principal crops grown under irrigation in the upper Colorado area are not in competition with the

crops which are in surplus in the main, and furthermore, one good drought could wipe out the present agricultural surplus.

SUMMARY

The Colorado River storage project and participating projects is a valid and sound proposal, engineering and economically feasible, which can be constructed and operated within the terms of the Colorado River compact and under reclamation law. It is self-liquidating, will make possible the utilization of a portion of the Colorado River waters resource allocated to the upper basin States, will provide for a growing economy for a hundred years and establish, in usable form, water and power resources that will be of major importance to national defense.

Utah urges the passage of the pending legislation in such form as includes, among others, the Echo Park Dam, and the central Utah (initial phase), Emery County and Gooseberry projects.

I thank you.

Mr. ASPINALL. Thank you very much, Mr. Clyde.

Is there any objection to having the full statement made a part of the record at this point?

Mr. HALEY. Mr. Chairman, reserving the right to object, I would like to ask the gentleman what he means when he says "Red journalism."

Mr. CLYDE. I mean that red brochure which came out the other day. It was colored very red. I mean the red brochure that came out.

Mr. HALEY. I do not know much about it, Mr. Chairman, but it seems to me like calling this "Red journalism" has a very bad sound to it.

Mr. DAWSON. I agree with the gentleman. I suggest——

Mr. ASPINALL. Will the gentleman from Florida yield to the gentleman from Utah?

Mr. HALEY. Yes.

Mr. DAWSON. I would suggest to my friend from Utah that that statement be modified.

Mr. CLYDE. I would be willing to strike it, Mr. Chairman, but I merely referred to it because it was brilliant red and made red for a purpose.

Mr. DAWSON. I might say when it was exhibited to the committee the other day I noticed the color, and I am sure that was what Mr. Clyde had in mind.

Mr. CLYDE. That was my only purpose.

Mr. HALEY. With that understanding, I have no objection.

Mr. ASPINALL. With that understanding, the full statement will be accepted and placed in the record at this point.

(The statement referred to follows:)

STATEMENT OF GEORGE D. CLYDE, COMMISSIONER OF INTERSTATE STREAMS FOR UTAH

Mr. Chairman and members of the committee, my name is George D. Clyde. I am a civil engineer and commissioner of interstate streams for Utah and appear here as a representative of the State of Utah to present a brief statement relative to the upper Colorado River storage project and participating projects, which is the subject of the House bills now before this committee.

About a year ago, during the 83d Congress I made an extended statement on this subject before this same committee of the House. This statement was presented in the House hearings, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, 83d Congress, 2d session, on H. R. 4449, pages 353 to 377. By reference I make that statement a part of this testimony.

UTAH'S INTEREST IN THE COLORADO RIVER

Utah, 1 of the 4 upper basin States, is an arid land.

Its total land area is 52 million acres, of which only 6 percent is arable, 3.2 percent cropped, and 2.2 percent irrigated. Of the 1,165,000 acres of currently irrigated land less than 40 percent has an adequate water supply. Under full development Utah can never irrigate more than 1,800,000 acres or an increase of 600,000 acres. This can be done only if all the State's water resources are developed and put to use.

Utah, along with Wyoming, Colorado, and New Mexico, is a storehouse of raw materials. It contains all the elements necessary to chemical and fertilizer industries. Coal, oil, gas, oil shale, hydrocarbons, phosphate rock, and potash occur in great abundance. Ferrous and nonferrous minerals are found in great quantity. Precious meals, strategic minerals, uranium, and inorganic raw materials abound throughout the area.

Utah's hope for an agricultural and industrial development necessary to provide opportunity and homes for its people and to establish and maintain a stable economy, lies in the full development and efficient use of its water and power resources.

Utah's share of the Colorado River is its last remaining major water resource. Its future depends upon the development and use of this water and power resource in the Uinta and Bonneville Basins. Utah's share of the upper Colorado River proposed for development under pending legislation will provide water for an estimated 32,170 acres of new land, supplemental water for 168,690 acres and hydropower essential to the development of its industrial resources and municipal water for a rapidly growing population.

Utah officially endorsed H. R. 270, which is now before this committee and which includes among other projects, the central Utah (initial phase), Gooseberry, and Emery County participating projects in Utah, by passing a concurrent resolution of the Senate and House of Representatives of the 31st Legislature of the State of Utah, memorializing the Congress of the United States to authorize the Colorado River storage project, including the Echo Park Dam and participating projects. The details of these projects are carefully described in the USBR testimony before this committee and will not be repeated here.

The State of Utah believes the proposed project to be feasible, both economically and physically, and that its immediate authorization and construction is in the best interests of the upper basin States, the western region, and the Nation and that the immediate authorization and construction of this project will in no way place in jeopardy the water rights and interests in the lower basin as determined by the Colorado River compact. In support of this belief it submits for your consideration the following comments:

THE COLORADO RIVER COMPACT

The Colorado River is a wild river. Its seasonal and annual flow fluctuates widely. Maximum virgin flow in cubic feet per second at Yuma, Ariz., has been as much as 300 times the minimum. The maximum annual virgin flow in acre-feet at Lee Ferry has been as much as six times the minimum. Without regulation by storage the safe utilization of the stream is limited to the low-water flow and in addition the control and other works are subject to damage by floods and silt deposits.

The original law governing the rights to use the waters of the Colorado was the doctrine of appropriation, "First in time is first in right." More favorable physical conditions made it posible to divert water more easily in the lower basin. Diversions on the high tributaries during the low-water season could take the water away from the users further downstream. It early became apparent that if the principle of equity among States was to prevail in the use of the waters of the Colorado the doctrine of appropriation would have to be abandoned and, by mutual agreement between States concerned, a division of the beneficial consumptive use of the water be made by compact. This was done with the signing of the Colorado River compact in 1922. This compact circumvented

the doctrine of appropriation and divided the beneficial uses of the water between the States in perpetuity before they were put to use, recognizing, of course, rights established under the doctrine of appropriation prior to the signing of the compact.

INTENT OF THE COMPACT

The intent of the compact is clear. It is based on a regulated river.

(1) It recognized first of all that each State in the Colorado River Basin was entitled to an equitable share of the river resource in perpetuity.

(2) It recognized the absolute necessity of river regulation before the river could be safely and fully developed. In fact the first major project proposed after the signing of the compact was the Boulder Canyon Dam (Hoover Dam). This structure was required to—

(*a*) Provide for flood control;

(*b*) Provide for storage of water during wet years for use during dry years and to eliminate the last season shortages of water for consumptive uses every year;

(*c*) Provide for the generation of hydropower.

(3) It recognized that the lower basin would develop first because of easier access to arable lands, and proximity to centers of population and power markets. This intent has been carried out with the full support of the upper basin States in every project proposed by the lower basin.

(4) It recognized that the projects required for the deevlopment of the river would have to be constructed under the reclamation law; namely, interest-free money for the irrigation features and the use of power revenues to pay the cost of power features and help pay the cost of the irrigation features above the ability of the water users to pay. All the projects now constructed in the lower basin were constructed under this law.

(5) It recognized that the upper basin States, due to more difficult topography, greater distances, scattered arable land, fewer people, and generally slower industrial development would develop more slowely, but that when the time come and a fasible project was proposed it would have the same wholehearted support from all the States of the basin that the lower basin States have enjoyed. This intent, it would appear from the vigorous opposition to this project, has been abrogated by southern California, who having received its benefits from the Colorado, now declares that a new set of intentions and interpretations apply to the compact.

The construction of the Hoover Dam put the Colorado River below Lake Mead under full control and regulation. This has made possible the rapid and stable development in the lower basin since that time. Without this dam, little of this development would have been possible.

THE PROVISIONS OF THE COMPACT

The Colorado River compact apportioned to the upper and to the lower basins, respectively, a right to use benefically 7½ million acre-feet annually, with a further provision that the upper basin would not deplete the flow at Lee Ferry below 75 million acre-feet each consecutive 10-year period. In addition it provided for an additional 1 million acre-feet annually for use in the lower basin.

Approximately 90 percent of the entire flow of the river originates in the upper basin and 10 percent in the lower basin. It is quite evident therefore that the additional 1 million acre-feet annually apportioned to the lower basin would come out of the make of the river below Lee Ferry. No portion of the make of the river in the lower basin can ever be made available to the upper basin. Therefore the upper basin is limited by the compact to a beneficial consumptive use of 7½ million acre-feet annually.

FULFILLING THE TERMS OF THE COMPACT

The compact is predicated upon the regulation of the river by storage. Such regulation has been accomplished in the lower basin. Similar regulation must be provided in the upper basin. The Colorado River storage project, legislation for which is pending before this body provides for such storage. In addition it provides for the storage of silt originating above the respective reservoirs, thus greatly prolonging the life of all the storage reservoirs in the lower basin. The reservoir capacity proposed in the pending legislation will provide regulation of the river flow so that all obligations to the lower basin under the terms of the

Colorado River compact can be met. It will provide water for consumptive use on the participating projects by direct diversion or by exchange and will, at the same time, and as an incident thereto, provide for the harnessing of falling water along the Colorado River for the generation of hydroelectric power, the revenues from which will be used in part to pay for the project.

There is no way for the upper basin States to use their water consumptively without interfering with lower basin rights unless the storage reservoirs are built and filled immediately and operated within the terms of the compact.

The water-supply analyses show conclusively that there is sufficient water in the river to build up and maintain the holdover storage required for river regulation and at the same time meet all compact requirements in the lower basin and that after the regulating reservoirs are once filled, the terms of the compact under any interpretation that might be placed upon it by the Supreme Court, can be fully met. To do this, however, the storage reservoirs must be built and filled as soon as possible.

THE STORAGE RESERVOIRS MUST BE BUILT AND FILLED NOW

The present average consumptive use of water in the upper basin is estimated at 2½ million acre-feet annually. Under the terms of the compact this leaves an average of 5 million acre-feet annually flowing down the river past Lee Ferry and ultimately into the sea. In its passage through the Hoover, Parker, and Davis Dams power is generated. This water belonging to the upper-basin States under the compact is available for filling the reservoirs. As consumptive uses upstream increase there will be less and less water available to provide for the initial filling of the reservoirs. The reservoirs must be filled without interfering with the rights of the lower basin under the compact. This can be done by putting into storage in any year only that water in excess of that needed at Lee Ferry to meet the obligations to the lower basin. For example, there must be delivered at Lee Ferry during each 10 consecutive years, a total of 75 million acre-feet. Only that water in excess of that necessary to meet this requirement can be put into storage. If only 5 million acre-feet is available at Lee Ferry this year, the deficiency of 2½ million acre-feet must be made up. If there is 12 million acre-feet available at Lee Ferry in the next year, a net surplus of 2 million acre-feet would be available for storage. The objective during the initial filling would be to build up the storage required as quickly as possible without adversely affecting the rights in the lower basin. Under full regulation the upper basin could deliver to the lower basin at Lee Ferry every single year their 7½ million acre-feet and this would automatically amount to 75 million acre-feet every 10 years. In other words, after the initial filling of the storage reservoirs and under sound operating procedure, all the terms of the compact between the upper and lower basins can and will be met. The longer the construction of the regulatory storage is delayed the more difficult will be the initial filling without damage to lower users.

If the southern California claim presented by Mr. Matthew, that the upper basin cannot in any year withhold more than 7½ million acre-feet, the reservoirs, under full consumptive use development in the upper-basin States, could never be refilled.

CURRENT AND POTENTIAL WATER USES IN THE LOWER BASIN

In connection with the future development in the upper-basin States, it should be recognized that California and Mexico are approaching and may have already reached the maximum water use allocated to them under the Boulder Canyon Project Act, the California Self-Limitation Act, and the Mexican treaty, respectively. It is known that there are large tracts of land claimed to be arable in both California and Mexico under or close to existing irrigation canals diverting from the Colorado River. Under the Mexican treaty, the people of Mexico can put to use any water that is available to them at the international boundary. However, they are not supposed to be able to establish a right by such use. California also could put to use any waters passing unused into the sea and theoretically, she could not establish a right by such use. I am fearful, however, that if in either Mexico or California should such waters be put to beneficial consumptive use over a long period of time, and communities and homes were established and occupied for years, it would be much more difficult, to say the least, to get an authorization and an appropriation to build works in the upper basin which would deprive them of such water as they were and had

been using, even though they had no legal right to it. This is another reason why the storage reservoirs must be built and filled immediately and the waters belonging to the upper basin put to beneficial consumptive use. Delay in building the necessary regulatory storage means defeat of the upper-basin development and defeat of this development will constitute the grab of the century, because water runs downhill and those below, in a position to use, automatically get that which belongs to those above.

PENDING LITIGATION AND THE PROJECT AUTHORIZATION

The opposition to pending legislation urges that this project should not be authorized until after the Supreme Court rules on the *Arizona* v. *California* suit. No one knows when it will make its decision. Water litigation historically has a habit of dragging out over a long period of time, sometimes as much as 25 to 30 years. The authorization of this project can't wait that long. Even at the end of such a long period, the consumptive use of water in the upper basin will be so far below its ultimate entitlement under the compact that no one's rights will be placed in jeopardy by authorizing the Colorado River project before the decision of the court is rendered for the following reasons:

1. The upper-basin States are now using about 2½ million acre-feet of water annually.
2. The proposed project will increase the present consumptive use by 1.7 million acre-feet annually.
3. Estimated elapsed time before the project will be in full operation is about 30 years.
4. Total consumptive use in upper-basin States 30 years from now will probably not exceed 4.2 million acre-feet.
5. It is inconceivable that any possible interpretation of the Colorado River compact by the Supreme Court of the United States would reduce the upper basins' share of the Colorado River to as little as 4.2 million acre-feet annually.

There is no more reason to delay the authorization of this project now on the basis of pending legislation than there was in 1928 when the Boulder Canyon project was up for consideration. The Supreme Court had not ruled on the interpreation of the compact then, and the issues were the same then as they are now. There is absolutely no justification for delaying the authorization of this project because Arizona and California are in litigation over the interpreation of the compact.

AVAILABILITY OF WATER SUPPLY (UPPER-BASIN STATES *v.* CALIFORNIA)

The Colorado River is the only remaining major undeveloped water source available to the upper-basin States. This is not true with respect to California where the major opposition to the Colorado River storage project is originating. It is reported that approximately 50 million acre-feet annually discharges into the Pacific Ocean from the great Central Valley and northern California. If this be true, this is seven times the net water supply available to the upper-basin States from the Colorado River under the compact. Physically, much of this water could be moved south into the area now served by the Colorado River. It seems hardly fair to take from the upper-basin States this last remaining major water resource, when so much fresh water is now discharging into the sea from California.

WATER LOSSES

Evaporation losses from storage reservoirs has caused much discussion. Evaporation losses are a necesary evil in any water development requiring storage for regulation. No one objects to burning coal or gas or oil because they can't get 100-percent efficiency out of the fuel. No one objects to reasonable seepage losses in canals. Man is constantly trying to increase efficiency and reduce losses but he doesn't throw a resource away because he can't get 100-percent efficiency out of it. The evaporation loss in the upper basin reservoirs is a price we have to pay for the use of this resource. No methods have yet been developed to measure exactly the evaporation from a large body of water. The important objective in reservoir evaporation studies is to determine the relative losses. The reservoir showing the least relative loss is then chosen.

Analyses of thousands of reservoirs by many engineers over the last 50 years have demonstrated that the reservoir which has the least surface area for a given volume is the most efficient. The reservoir back of the Echo Park Dam is the most efficient of all the large reservoirs proposed. Using standard methods

for measuring evaporation, the water losses from the Echo Park reservoir are more than 100,000 acre-feet annually less than from any other reservoir that is claimed to be a substitute for it. It should be noted here that the upper basin absorbs its evaporation losses out of its share of the river.

ECONOMIC JUSTIFICATION

The economic justification of the proposed projects has been established by comparing the benefits with the costs. Consideration is given to all project effects, beneficial or adverse, to whomsoever they may occur, locally, regionally, or nationally. In general the measurement of benefits from a reclamation project involves an estimate of difference between future conditions with and without the project. The evaluation of benefits is made in monetary terms as far as possible. Intangible benefits are not included in the benefit-cost analyses because they are not usually subject to reduction to monetary values. They are important, however, and should be considered along with the benefit-cost analysis in a final determination of economic justification.

The Bureau of Reclamation benefit-cost analysis recognizes three main types of tangible benefits:

Direct benefits

Benefits derived from increased production of farm products (from detailed farm budget analysis); increased production of electric power; reduction of damage from floods, pollution, and sedimentation; recreation and conservation of fish and wildlife; provision for domestic, municipal, and industrial water and other directly beneficial effects.

Indirect benefits

Benefits derived from the increase in profits of all business enterprises handling, processing, and marketing products from the project and profits of all enterprises supplying goods and services to the project farmers.

Public benefits

Represent the increase or improvement in settlement, job, investment opportunities, community facilities and services, and the stabilization of the local and regional economy.

The construction of a reclamation project which brings together land, water, and people creates new wealth. New wealth is a benefit in any language. A good index of the value of the benefits is the broadened tax base and rise in income taxes which have followed the construction of every reclamation project in the United States.

The cost side of the benefit-cost comparison includes all costs: Construction, interest on all unpaid balances, and costs of operation, maintenance, and replacement.

All recommended units of the Colorado Storage project and participating projects, collectively and individually, have tangible benefits greater than costs. For the projects in my State the benefit-cost ratios are as follows:

Central Utah	1.23 to 1
Gooseberry	1.20 to 1
Emery County	1.38 to 1

To compare the benefits and costs on an annual basis, a construction, benefit, and payout schedule has been developed by the Bureau of Reclamation for the Seedskadee project, a typical new project. This schedule which pays out in 50 years plus a 10-year development period shows a total accumulated cost at the end of the 8-year construction period to be $33,376,000. With the beginning of the development period, benefits begin to accrue, but at the same time operation, maintenance, and replacement costs have to be met. There are no payments on the principal until the end of the 10-year development period. Beginning with the 11th year an annual payment of $667,800 will be made each year and this payment will pay off the principal of $33,376,000 in 50 years. Beginning the second ear, interest on the unpaid balance of construction cost compounded at 2½ percent is accumulated. By the end of the construction period this amounted to $2,362,000. Beginning with the first year of the development period the net benefits (direct, indirect, public) start to accumulate.

By the end of the 10th year of the development period these accumulated benefit have reduced the accumulated compounded interest on the unpaid balance to $1,222,000. By the end of the 18th year, the accumulated net benefits

have reduced the accumulated compounded interest to zero. During the remaining 42 years of the payout period the net benefits exceed the compounded interest and there is a surplus of net benefits which at the end of the payout period amount to $27,068,000. In a hundred years this cumulative surplus benefit amounted to $83,345,000 or about 2½ times the cost of the project. Had compound interest been applied to the accumulated surplus benefits, the total cumulative benefits would have been much greater. (This data taken from U. S. Bureau of Reclamation analysis Seedskadee Project Repayment and Benefit Cost Analysis, February 1955).

Similar analysis applied to each of the participating projects would show that the accumulated benefits would far exceed the construction cost including interest compounded at 2½ percent annually.

MAIN STEM RESERVOIRS REQUIRED FOR RIVER REGUATION

The Boulder Canyon Project Act, approved December 21, 1928, ratified the Colorado River compact and made possible the development of the lower basin. The purpose of the Boulder Canyon Project Act as stated in the act were (1) control of floods, (2) improvement of navigation, (3) regulation of the flow of the Colorado River, (4) the storage of water for the reclamation of public lands and other beneficial uses, and (5) the generation of electrical power. Note the priority of use: First, river regulation, improvement of navigation, and flood control; second, irrigation and domestic uses and satisfaction of existing rights; and third, power. At the time of the signing of the act, there was no need for the 26 million acre-feet of storage for consumptive uses or for power but this storage was necessary for river regulation and flood control.

The Project Act specifically stated that no part of the costs of the dam and appurtenent works were to be charged to irrigators in the Imperial or Coachella Valleys. In other words, no charge was made to irrigation users for storage facilities or river regulation which made it feasible to bring thousands of acres of new land under irrigation and to provide a dependable water supply for the lands already under irrigation. The domestic water users, principally the Metropolitan Water District paid only 25 cents per acre-foot for these regulation and storage facilities. It costs Salt Lake City $2.75 per acre-foot for its water from the Deer Creek Reservoir on the Provo River project. The municipality pays $13 to $15 per acre-foot for raw water from the Weber Basin project.

The cost of the Hoover Dam and appurtenent works are allocated to flood control, river regulation, and power and are all paid for out of power revenues in 50 years at 3 percent interest. The power rates are fixed as low as possible and still pay out in 50 years. It is therefore clearly seen that California and the Southwest get irrigation water from the Colorado without paying 1 cent for storage and river regulation, get domestic water at their intake for 25 cents an acre-foot and power at rates not fixed by competition with other power sources, but by the net revenue needed to pay off the cost of the dam and appurtenent works at 3 percent interest in 50 years, a gift of cheap water, and cheap power made possible by the use of Federal funds under the reclamation law.

Now let us look at the Colorado River storage project which southern California is so vigorously opposing. This project provides first for river regulation by building Echo Park, Glen Canyon, and other storage dams for the same purpose as Hoover Dam in the lower basin. These storage dams must be built and at least partially filled before they can function in regulating the river. The second requirement is water for consumptive use. The Imperial Valley and the Metropolitan Water District did not need all the storage provided in Lake Mead at the time the Hoover Dam was built. So also, it is true that the upper basin States do not need at once all the storage capacity in the reservoirs at Echo Park, Glen Canyon, and the other sites at the time these dams are built. The third requirement of storage is for power generation. At the time Hoover Dam was built it was said by California that there was no market for the power that would be generated at the Hoover Dam. History records it didn't take long to develop the market once the power was available. In the upper basin the market already exists. Power utilities in the upper basin have testified that they will buy all the power from these plants as fast as it becomes available, not at the minimum rate that will pay the power facilities off in 50 years, but at a competitive rate in the area served.

In the development below Hoover Dam the consumptive users are not charged with the cost of river regulation. In the upper basin a portion of the cost of

storage dams is allocated to irrigation. This allocation makes the apparent irrigation costs higher and the payments from power larger.

The Colorado River storage project and participating projects should be authorized under the same rules as those governing the lower-basin development; namely, interest-free money for irrigation and use of power revenues to pay costs of regulation and power facilities and to help pay costs allocated to irrigation.

INTEREST-FREE MONEY FOR IRRIGATION FEATURES—WHAT DOES IT COST?

The United States throughout its history has followed a policy of making expenditures of Federal funds when such expenditures resulted in general public benefits, even though some individuals or groups received direct benefits. For example, Federal financial assistance, in one form or another in highway, canal, railroad, airport, shipping, river and harbor, flood control, defense plant, and strategic metal-mining development, none of which is ever returned to the Federal Treasury and none of which pays interest, is an accepted national policy and has been such since the country was founded. This national policy has paid off, and the country has become great partly because of it. In 1902, in recognition of a need for assistance in bringing water to the land in the arid West, the Reclamation Act was passed. It provided for interest-free money for the irrigation features of reclamation projects. The cost of the interest-free money was the price the Federal Government was willing to pay to get settlers established on the arid lands. Bringing water and land together created wealth and new wealth added to the Nation's strength and prosperity. The only difference between the assistance to reclamation and the other programs mentioned above was the fact that the construction costs of reclamation projects had to be paid back with interest except for the irrigation features. For more than 50 years this has been national policy. Now, in the minds of some people in the lower basin and many people in other States who have for years been the beneficiaries of extensive financial aid from the Federal Government, in aiding transportation, providing protection from floods, making river and harbor improvements, and aiding special businesses, the cost of the interest-free money for the irrigation features of reclamation is too great a burden for the taxpayer to bear, even though the very construction of these reclamation projects creates national wealth, broadens the ad valorem tax base, and increases income taxes. Furthermore, such projects provide jobs, homes, investment opportunities in the project area, and greatly increases the purchasing power for goods produced or manufactured in other States. These indirect and general benefits have an accumulated value over the payout period of these projects far in excess of the interest cost. Interest-free money for irrigation development is not a cost to the taxpayer; it is public investment which pays dividends in perpetuity because of the new wealth created.

The statement recently made by the Colorado River Association, 306 West Third Street, Los Angeles, Calif., in their piece of Red journalism, which has been circulated during the past week, calling interest-free money a taxpayer's burden, are pure fabrication and have no foundation in fact. No State, other than Utah, Colorado, Wyoming, and New Mexico, pays any portion of the cost of this project.

REPAYMENT

All power features will be repaid with interest within 50 years. The municipal features will be repaid with interest within 50 years. The irrigation features will be repaid without interest after 50 years after the 10-year, irrigation-development period. The cost of this interest-free money is more than offset by the indirect and public benefits.

The sources of income from which the project costs are repaid are:

1. Irrigation water users (according to their ability to pay).
2. Municipal water users.
3. Ad valorem tax (water conservancy districts).
4. Power revenues from project powerplants.
5. Power revenues from main stream powerplants.

None of the income from these sources comes from areas outside the upper basin States.

For the participating projects recommended by the Secretary of the Interior, the income from the irrigation, municipal, and industrial users and the revenues from the powerplants on these projects would be sufficient to pay 54 percent of all reimbursable costs. Only 46 percent would have to be repaid from the main stream powerplant revenues.

For the central Utah project the sources and proportion of income from repayment are:

	Percent
1. Irrigators (12 percent)	
2. All consumptive water users including irrigation but excluding the ad valorem tax	35
3. Power revenues from project plants	27
4. Power revenues from main stream powerplants	38
Total	100

For all participating projects recommended by the Secretary of the Interior the sources and proportion of income for repayment are:

	Percent
1. Irrigation (18 percent)	
2. All consumptive water users	33
3. Power revenues	67
Total	100

In spite of all the misinformation, dishonest arithmetic, and pure fabrication being distributed relative to the economic feasibility of the Colorado River storage project and participating projects, it still is self-liquidating and will repay all costs plus interest on all features, except irrigation, within 50 years. Under this project, all net revenues are returned to the United States Treasury. No interest component is used as was and is still being done on the Central Valley project in California. After all the project costs are repaid, the revenues from the Echo Park and Glen Canyon plants will yield to the Public Treasury from 15 to 20 million dollars annually at power rates below rates for power from any other source.

USE OF POWER REVENUES TO HELP PAY IRRIGATION COSTS

The use of power revenues from project hydroplants to help pay for irrigation costs has been national policy for more than 50 years. Section 5, act of April 6, 1906, provided that moneys derived from the sale of surplus power generated on reclamation projects "shall be covered into the reclamation fund and be placed to the credit of the project from which such power is derived." The act of February 24, 1911, and subsection 1, section 4 of the Second Deficiency Appropriation Act of 1924 and the Hayden-O'Mahoney amendment to the Interior Department Appropriation Act of 1939 all supported this same principle. Such use of project power revenues has been made on reclamation projects which included powerplants since 1906.

POWER RATES

The Bureau of Reclamation proposes to produce hydropower at project plants which can be sold at load centers for 6 mills per kilowatt-hour. There are no other sources of power in the upper basin power market area that can deliver power to the same load centers for less than 6 mills. The Federal Power Commission in a letter to Secretary McKay dated February 26, 1954, placed the market value of power at Glen Canyon at 6.9 mills and at Echo Park 7.7 mills per kilowatt-hour, this being the cost of equivalent power from other sources in the respective areas. The Utah Power & Light Co. of Salt Lake City have testified that they can't produce power at less than 6 mills per kilowatt-hour. Hydropower from the proposed project plants can, therefore, compete with power from any other source. It has been suggested that steam power be generated using coal, oil, gas, or nuclear material. All of these are expendable fuels. The supply will diminish and the unit cost increased. Labor costs are not likely to go down. It has been suggested that efficiencies of steam generation cannot continue to increase indefinitely. In spite of Congressman Hosmer's recent news release on the use of atomic energy, an opinion is held by many eminent scientists that there are many problems yet unsolved such as disposal of residues, shielding, and cost, which will for many years eliminate atomic power from competition. In fact, it would seem that any sound policy relating to the conservation of this Nation's resources would include the full use of all its renewable resources, before exhausing its nonrenewable resources. The only conclusion that can be drawn is that as long as there is falling water it should be harnessed to provide power esseintial to the local and national economy. For this reason it is believed that the hydroplants on the Colorado will still be producing power a hundred

years from now. Quilyn A. Price, president, Westinghouse Electric, writing in the Public Utilities Fortnightly for March 3, 1955, says: "Demands for hydroelectric power in the decades ahead will be so stupendous that every resource that is practical and available will be needed and used. Atomic power will enter the picture as another major source of energy, not as a replacement but as an essential supplement."

PER ACRE COSTS FOR IRRIGATION

The costs per acre for the irrigation features of the participating projects included in the pending legislation are high. The market price of a piece of land, however, is not a good measure of the justification of such high costs. It must be remembered that when good land and adequate water are joined under good farm management, new wealth is created which will produce indefinitely. The recurring net profits year after year soon exceed even the high costs of supplying water to the land. Indirect benefits resulting from the creation of new wealth also adds to the value of the irrigated land. It is estimated that a farm is bought and paid for once every generation. This means that a given tract of land would be bought and paid for 4 times every 100 years. If the market price was $250 per acre in the beginning, at the end of 100 years its capital value would approach $1,000. But this goes on indefinitely. High cost of joining good land and water is justified because it creates new wealth, provides homes, jobs, and is a renewable source of food and fiber.

The per acre costs for the Utah participating projects are:

	Per acre
Central Utah	$627
Gooseberry	349
Emery County	276

These costs were obtained by dividing the total costs (not including interest) allocated to irrigation by the total acreage (including Indian lands) served by the project. These costs are not high. There are many areas in Utah where land sells for $500 to $1,000 per acre and $200 to $300 is widespread.

In spite of relatively high acre costs for irrigation, records show that typical reclamation projects have returned to the Federal Goverment in taxes alone more than 4.5 times their original cost.

THE COLORADO RIVER STORAGE PROJECT AND THE AGRICULTURAL SURPLUS

During World War II our farmers were urged to plant heavily. Food and forage were in high demand. Prices were high due to this demand. Thousands of acres of land were broken out of grass and planted to wheat, corn, cotton, peanuts, and tobacco. Farms were mechanized to increase production per man. Fertilizers were applied heavily to increase production per acre. New crops and hybrids were developed to increase yields and new methods of insect and disease control were introduced. In other words, the farmers of the United States pushed their farms to make them produce the maximum. It is believed by many that farm production cannot be maintained at these high levels indefinitely even with fertilizers, new hybrids, new machines, and new methods. This means that current production per unit of land may be beyond the capacity of the land to produce over the long pull. It means we may be currently mining our agricultural resources.

Agricultural production must be increased to meet the demands of population pressures and improvements in the standards of diet. Granting that production can still be materially increased by new methods, new crops, fertilization, insect and disease control, and better management, this increase alone will not provide food and fiber for the rapidly growing population. New lands must be brought into production.

Three independent reports on population trends have recently been issued: (1) Report by Byron Shaw, Administrator, Agricultural Research Service, 1953; (2) the President's Water Policy Commission (Truman), 1952; (3) Poleys study of material resources (1953). All agree that by 1975 the population of the United States will be 190 to 205 million people. To provide food at present diet standards will require 30 million new acres in addition to all the increases in production that can be obtained through scientific improvements. Where will this 30 million acres come from? It is estimated that some 21 million acres can be reclaimed from swamp and overflow land. Nine million acres of land in the

humid areas will produce about as much as 6 million under irrigation. This means that by 1975 this country will need 6 million acres of new irrigated land in addition to the 21 million acres of swampland to maintain the 1950 diet standard for 205 million people. It can be assumed that our diet standards will increase so that by 1975 many more acres will be needed.

Six million new acres of irrigated land will require that every acre of arable land within the reach of an adequate water supply will have to be put under irrigation. This means full and complete development on a basinwide basis of every river basin in the West. It will require the completion of projected reclamation programs in the Columbia, Missouri, Arkansas, White and Red, the Colorado drainage basins, and in all drainage basins in California and the great basin States.

Reclamation projects come into production slowly. Experience over the past 50 years shows that 25 to 30 years elapse between beginning of construction and full production. On large basinwide projects the time interval is even greater. For example, it has taken nearly 40 years to bring the Columbia Basin project to its present stage and it will be another 25 years before it is a full-production project. The Central Valley project in California has been under way for more than 25 years.

The Colorado River storage project which is the subject of pending legislation has been more than 25 years in the planning stage and the estimated time required to develop the first stage and bring it into production in 25 to 30 years. To completely develop the entire project will require 75 to 100 years. It therefore appears that in spite of the current apparent surplus that reclamation of new land must be accelerated if this country is to remain self-sufficient in its food and fiber supplies for its population.

It must also be remembered that only about 10 percent of the total agricultural production comes from irrigated land. This production is stable because it is not subject to drought to the same degree as nonirrigated land. A good drought year such as 1934 or a series of dry years such as occurred in the 1930's could completely wipe out the current agricultural surplus which is estimated at about 7 percent of the total production. Such droughts occur suddenly and on nonirrigated lands and there is no defense against them.

This country has become great because it has great natural resources but also because its people looked forward. They did not wait for crises to develop. They anticipated them and prepared for them. We must anticipate our agricultural needs and prepare for them. The future needs are evident, the way of meeting it is clear. Begin now to develop the means of production of food and fiber to meet our needs 25 years from now.

This is the reason why, in spite of a current temporary surplus of agricultural crops, wheat, cotton, tobacco, peanuts, few of which are grown on irrigated lands, the Colorado River storage project and participating projects, a basinwide development which will require at least 25 years to bring into full production the lands in the initial phase, should be authorized and construction started as soon as posisble. It is a self-liquidating project and an investment in the Nation's future.

VALIDITY OF ENGINEERING INVESTIGATIONS

Engineering investigations on the Colorado River and its tributaries have been going on since early in the 20th century. The La Rue and Wooley reports were intensive. Many private investigations for power have been made. Since the signing of the Colorado River compact in 1922, these investigations have been accelerated by the search for a feasible project which would provide the regulation, control, and conveyance structures necessary to the utilization by the upper basin of its share of the Colorado River. During the last 20 years and at a cost of about $10 million, intensive studies have been made of reservoir dam sites, accessible lands, irrigation, municipal, and industrial water requirements and power potentials, and the control conveyance and power facilities necessary to the consumptive uses of the water allocated to the upper basin by the compact.

These investigations have largely been made by the Bureau of Reclamation. Its staff of engineers are among the best in the world. They have established an enviable record. No dam designed and built by the Bureau of Reclamation has ever failed. They are competent, sincere, and honest. Their professional ability is beyond question. Their conclusions are sound and speaking for Utah, we have complete confidence in them.

SUMMARY

The Colorado River storage project and participating projects is a valid and sound proposal, engineering and economically feasible, which can be constructed and operated within the terms of the Colorado River compact and under reclamation law. It is self-liquidating, will make possible the utilization of a portion of the Colorado River water resource allocated to the upper basin States, will provide for a growing economy for a hundred years and establish, in usable form, water and power resources that will be of major importance to national defense.

Utah urges the passage of the pending legislation in such form as includes the Echo Park Dam, and the central Utah (initial phase), Goosebery and Emery County participating projects.

Mr. ASPINALL. At this time the Chair would like to call to the witness stand Mr. Stringham. At the conclusion of Mr. Stringham's testimony we shall have interrogation of the two witnesses. We shall leave Mr. Untermann's testimony until later because it has a different approach to the problem.

Mr. Stringham is a long-time resident of Vernal, Utah, very much interested in water development and in this program. Mr. Stringham, we have had you before the committee before and we are glad to have you with us again.

STATEMENT OF BRIANT H. STRINGHAM, VERNAL, UTAH

Mr. STRINGHAM. Thank you very much.

Mr. Chairman, because of being called ahead of when I figured I would be, I have not copies for all committeemen. I have only one to submit for the record. They will be available within 15 minutes, the rest of them.

Mr. ASPINALL. The one that you have to submit for the record, could you give to the committee at this time so they can follow it a little bit and read it as you are giving your other statement?

Mr. STRINGHAM. I regret that is not on hand.

Mr. ASPINALL. Then just read your statement in full.

Mr. STRINGHAM. May I read the brief instead of the statement?

Mr. ASPINALL. No. The committee would like to have before it. the whole statement. If it is not too voluminous, we would like to have you read the full statement.

Mr. STRINGHAM. Thank you very much.

Mr. Chairman and gentlemen of the committee, my name is Briant H. Stringham. I have lived near the area of the Echo Park Dam site, in Vernal, Utah, all of my life. My chief business is stockraising and farming. I am presently chairman of the Colorado River Development Association, an organization representing 21 counties, containing a population of 400,000 people. These counties are directly affected by the Colorado River storage project and participating projects.

It is an honor and a privilege to appear before this very important legislative committee. Knowing to some extent how fully your time is occupied with important matters of state, I shall be brief.

We of the 21 counties are concerned about the development of potential resources in the West for provision must be made to assimilate the population that is moving westward and at the same time provide for our own best crop, our children.

Opponents of the project, most of whom are well-intentioned citizens, base their chief argument on the false premise that the building

of Echo Park Dam within the Dinosaur National Monument will set a precedent for the commercial invasion of all parks and monuments. This argument is not based on facts as the following official documents will show. These instruments also prove that it was definitely understood by officials and the people at the time the monument was enlarged that power and reclamation projects were to be constructed inside the monument at some future time, and that the area would be subject to several other existing rights.

For purposes of brevity, I shall refer frequently to the record as set forth in the hearings before Subcommittee on Irrigation and Reclamation of the House of Representatives, serial No. 11, dated January 18 to 28, inclusive. Hereafter I shall refer to this document as the House hearings.

On June 10, 1920, the Federal Water Power Act was passed creating the Federal Power Commission. This Commission was given authority to grant licenses to construct dams in national monuments according to the opinion given by Councilor Abbott representing the House Subcommittee on Reclamation and Irrigation.[1] However, on March 3, 1921, the Congress amended the Federal Water Power Act taking from the Power Commission and giving to the Congress authority to grant licenses to construct dams within parks and monuments, but in doing so, the Congress added these significant amendments: "As now constituted or existing." Thus leaving the authority in the Federal Power Commission to grant licenses for construction of power dams in newly created monuments such as Dinosaur. President Roosevelt recognized this fact in his proclamation enlarging the monument.[2]

On June 6, 1935, Harold L. Ickes, at that time Secretary of the Interior, addressed a letter to Hon. Frank R. McNinch, Chairman of the FPC, suggesting that the Commission release the power withdrawals in the proposed Dinosaur Monument area. In reply to this letter, Chairman McNinch had this to say:

> The Federal Power Commission believes that the public interest in this major power resource in the proposed monument area is too great to permit voluntary relinquishment, but the Commission will not object to the creation of a monument if the proclamation setting aside the area contains a specific provision that the development will be permitted.[3]

Mr. DAWSON. A point of order, Mr. Chairman. We now have the written statement, and in the interest of time, I wonder if the witness could go back to the brief he was going to present.

Mr. ASPINALL. Is there any objection?

Mr. SAYLOR. I would like to object. The idea of having a written statement beforehand was that we have an opportunity to examine them.

Mr. DAWSON. I withdraw my request.

Mr. SAYLOR. I will not say it is not possible to try to listen to the witness and read the statement, but——

Mr. DAWSON. I withdraw my request, Mr. Chairman.

Mr. ASPINALL. The statement is not too long, I think. Mr. Stringham, if you will continue.

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[1] P. 77, House hearings.
[2] See pp. 722 and 723, House hearings.
[3] See p. 731, House hearings.

Mr. STRINGHAM. President Roosevelt granted this request when he issued the proclamation enlarging the monument using these words:

> The Director of the National Park Service, under direction of the Secretary of the Interior, shall have the supervision, management, and control of this monument as provided in the Act of Congress * * * except that this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920, as amended, and administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904, for the Brown's Park Reservoir site in connection with the Green River project.

The proclamation reserves the Brown's Park power site and also the Green River project, the latter no doubt referring to Echo Park Dam, as this site had been investigated and recommended by the Department of the Interior under power site classifications Nos. 87 and 93 and withdrawn by the Federal Power Commission under power site reserves Nos. 121 and 721 some years prior to the proclamation enlarging the Dinosaur National Monument.[4]

In the Interior Department's USGS water-supply paper 618, entitled "The Green River and Its Utilization," by Ralph R. Woolley, which was released from the United States Government Printing Office in 1930, 8 years before the Dinosaur was enlarged, maps, cross-sections and area and capacity curves are given on reservoir sites along the Green River from the city of Green River, Wyo., to the city of Green River, Utah. Echo Park Dam is included in these investigations as one of the desirable storage and power projects, and had been contemplated for a long period of time, but not until 1930 was the design and specifications made available through the USGS to the public.

The two important power sites, namely, Echo Park and Blue Mountain, the latter now called Split Mountain, were recognized specifically by the National Park Service and the Federal Power Commission as set forth in a letter addressed to the Federal Power Commission dated at Washington, D. C., August 9, 1934, and signed by A. E. Demaray, Acting Director, and a specific reservation for additional protection of these rights was written into the Roosevelt proclamation to further distinguish them as an existing right and leave their control with the Federal Power Commission.[5]

On June 11, 1936, at Vernal, Utah, and at Craig, Colo., on June 13, 1936, in mass meetings, both of which I personally attended, David H. Madsen, then acting superintendent of Dinosaur National Monument, made in substance the following statement in my presence: "If you people will not resist the enlargement of the Dinosaur Monument, I will promise you in the name of the National Park Service that the right to graze the area and the right to construct reclamation and power projects within the area will not be interfered with." Grazing by both cattle and sheep still continues on the monument under 22 separate permits.

In an affidavit, dated March 27, 1950, Mr. Madsen reaffirms his statement made earlier and the attitude of the Park Service toward dams within the monument, stating in part as follows:

> I was authorized to state, and did state as a representative of the National Park Service, that grazing on the area would not be discontinued and that in the event it became necessary to construct a project or projects for power or

[4] See p. 728, House hearings.
[5] Letter, p. 727, House hearings.

irrigation in order to develop that part of the States of Colorado and Utah, that the establishment of the monument would not interfere with such development.[6]

Copies of five supporting affidavits of citizens who attended the meetings mentioned above appear in House hearings on pages 441, 442, 443.

In a letter to the late Dr. J. E. Broaddus, one of Utah's outstanding conservationists, under the date of May 2, 1946, the then Director of the National Park Service, Newton B. Drury, had this to say:

I am intensely interested in your statement about the possible beneficial effect of the proposed Echo Park Reservoir in Dinosaur National Monument as a means of access for visitors to see the Green and Yampa Canyons. Dinosaur is one of the few areas in the system established subject to a reclamation withdrawal and this may have some bearing on the proposed Echo Park project * * * we are pleased to have your expression as to the possible beneficial effects.[7]

In his decision regarding the Dinosaur National Monument controversy, dated June 27, 1950, former Secretary of the Interior, Oscar L. Chapman, stated:

Weighing all the evidence in thoughtful consideration, I am impelled in the interest of the greatest public good to approve completion of the upper Colorado River Basin report, including the construction of the dams in question, because: (*a*) I am convinced that the plan is the most economical of water in the desert river basin and, therefore, is in the highest public interest; and (*b*) the order establishing the extension of the monument in the canyons in which the dams would be placed, contemplated use of the monument for a water project, and my action, therefore, will not provide a precedent dangerous to other reserved areas.[8]

January 22, 1936, Governor Blood, of Utah, wrote Senator King requesting that reservations be made for the development of power, water, and minerals in the proposed monument. May 20, less than 2 months before the monument was enlarged Congressman Taylor, of Colorado, was notified by the Park Service that the Secretary had approved the monument enlargement, subject to water-power provisions and reclamation withdrawal. May 24, 1938, Senator Johnson, of Colorado, was likewise notified.

The present Secretary of the Interior, Douglas McKay, after thorough investigation by his Department, recommended to the 83d Congress the construction of Echo Park Dam. (Thus two Secretaries of the Interior under two different administrations have made the same decision.) The Bureau of the Budget and President Eisenhower followed Secretary McKay's recommendation and approved authorization of the Colorado River storage project, including Echo Park Dam. The Interior and Insular Affairs Committees of the House and Senate in the 83d Congress passed favorably on the project. Again President Eisenhower voiced his strong approval of the Colorado River storage project by specifically recommending its passage in his state of the Union message to the 84th Congress.

The purpose and intent of the development of the upper Colorado River Basin to include the Echo Park Dam was evidenced by the formal execution of the subsequent ratification as follows:

By Arizona on the 21st day of January 1949.
By Colorado on the 2d day of February 1949.

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[6] P. 732, House hearings.
[7] P. 445, House hearings.
[8] Complete p. 446, House hearings.

By New Mexico on the 2d day of February 1949.
By Wyoming on the 25th day of January 1949.
By Utah on the 31st day of January 1949.

The upper Colorado River Basin compact was consented to by the Congress in a bill approved by the President of the United States of America on the 6th day of April 1949. Article XIII of the compact apportions the water of the Yampa River and provides Utah from this source, and I quote:

> * * * 5 million acre-feet for any period of 10 consecutive years * * *.

Obviously a dam to store water from the Yampa River must be built at the Echo Park site if that water is to be used as stipulated in the compact. It was, no doubt, definitely understood by the four upper basin Commissioners that Echo Park Dam would be built and that Utah's part of the Yampa River water would be used in the central Utah project. This understanding is set forth in a report to the Governor and General Assembly of the State of Colorado by the late Judge Clifford H. Stone, that much admired commissioner from Colorado. Judge Stone, who played a prominent part in the negotiating of the upper Colorado River Basin compact commented on article XIII of the compact, as follows:

> This article pertains to the Yampa River, a tributary of the Green River. A compelling reason for the apportionment between Utah and Colorado of the use of the Yampa River water was the fact that Utah desired assurance of a water supply for its central Utah project.

Thus the above ratifications and approvals of the upper Colorado River Basin compact have in effect already authorized the construction of the Echo Park Dam.

The statements and official action by highly placed Government officials gave every reason for public confidence that water development would go forward within the monument and that no precedent would be established and because of this reliance placed upon such clearly stated agreements, much money has been spent in the belief that they would be honored. On July 10, 1939, a year after the establishment of the enlarged monument, the Colorado River Great Basin Water Users Association, a Utah corporation financed by public funds, made filings in Dinosaur National Monument at a cost of $1,000 per filing. This association filed on six reservoir sites in the area including a location called the Island Park Dam, which dam, if constructed, would back water up the Green and Yampa Canyons approximately the same distance as the Echo Park Dam will when it is constructed. Also in 1939, the State of Utah appropriated $62,500, matching Bureau of Reclamation funds, for the resumption of studies and investigations of dam sites in the monument and elsewhere. Studies in the monument, or rather what is now the monument, had begun in 1917, and were accelerated in 1939 after the appropriation by the State of Utah.

I have here before me a photostatic copy of water filing to submit for your information, No. 12934, to appropriate 2,170,000 acre-feet of water for irrigation and a photostatic copy of filing No. 12935 for 11,200 second-feet of flow for power purposes as they appeared in legal notices of the Salt Lake Tribune in 1939.

The Federal Government, through two of its agencies, the Bureau of Reclamation and the National Park Service, along with the people

and the State government of Utah, demonstrated complete reliance on the broad promises made by the National Park Service, when that Service gave consent to the Bureau of Reclamation to drill and dig test holes and do other work in the monument over the years preparatory to the construction of dams. The ladders up the sides of the cliffs and walls of the canyons still stand as mute evidence of this complete reliance. The National Park Service was fully aware of these activities, and would not have permitted this had it not been in agreement with the allowances made for future development of the area.

I have before me a photostatic copy of a front page of the Salt Lake Tribune, dated July 29, 1938, carrying an article dated out of Washington, D. C., entitled "United States Enlarges Dinosaur Area in Utah." The following paragraph appears in this article:

> Under the order enlarging the monument, grazing will continue in areas which previously have been used by stockmen, and power and irrigation rights will be recognized.

I have before me photostatic copies of front pages from three different issues of the Vernal Express, a local paper published weekly at Vernal, Utah. On July 21, 1938, at the time the monument was enlarged, the Express stated:

> In bringing the 318 square miles into the national monument, which heretofore covered only 80 acres, the Park Service agreed to permit the Division of Grazing to continue operating on the land and recognized power and reclamation rights.

On July 28, 1938, the Vernal Express printed:

> J. A. Cheney, cashier of the Uintah State Bank, has worked on the enlargement and the development of the Dinosaur National Monument for a number of years, representing the Vernal Lions. It was through the efforts of Mr. Cheney that the power and grazing rights were protected in the opening of the new scenic region.

And then again on August 4, 1938, the Vernal Express announced in another article:

> Under the order enlarging the monument, grazing will continue in areas which previously have been used by stockmen, and power and irrigation rights will be recognized.

Surely all agree that monuments and parks should not be invaded promiscuously. We appreciate the fact that there are two sides to this controversy, but in this case it was definitely understood by all concerned that development within the Dinosaur would some day go forward.

Since the establishment of the original monument in 1915, citizens have listened to glowing predictions of what was going to be done to develop the area to make it one of the most attractive in the entire Park Service system. After 39 years of waiting for something to happen, the monument is still in such an undeveloped condition, that it is embarrassing to direct visitors to the headquarters, which is composed of a few lumber shacks. A United States Congressman on a recent visit declared: "This is a national disgrace." The building of Echo Park Dam would create one of the most useful and attractive recreational areas in the United States. Something that is needed badly in this day of population pressure.

Our confidence that dams are to be constructed in the monument area is based upon many well-documented declarations. There is no precedent set for invasion of parks and monuments in this case, because the

record is replete with documented evidence that Government officials and the people were fully aware that water development would go forward someday in the enlarged Dinosaur National Monument. In asking the United States to break its agreement with its citizens, the wilderness groups are asking the Government, knowingly or not, to stoop to a dishonorable act. In their eagerness to uphold one principle the conservationists are asking their Government to violate another, one that is much more sacred—and this is, the honoring of an agreement, made in good faith to citizens of the United States. We considered the promises made by our Government a sacred trust and we would have opposed the enlargement by every known means at our command had we thought for a moment that the great potential resources of power and water given to us by a gracious Providence were to be sealed up forever in the confines of a monument, in a semidesert land where water and its products are the lifeblood of the area.

We have implicit faith in the promises made by our Government and decisions and orders given over the years by highly respected officials as enumerated above, and we firmly believe that our good legislators will see to it that the matter is dealt with honestly and honorably and in such a manner that we may proceed with the development of our potential resources, which are so vast that they were referred to by an eastern Congressman after visiting the area recently, as a "Yawning giant, ready to arise." Echo Park Dam in action will contribute to decentralization of industry, add strength to the West and contribute to a stronger Nation.

Mr. ASPINALL. Thank you very much, Mr. Stringham. As one of the sponsors of the bill, I wish to state that I think yours is the most logical, complete statement presenting your particular interest that we have had before the committee.

The Chair at this time recognizes the lady from Idaho, Mrs. Pfost.

Mrs. PFOST. No questions.

Mr. ASPINALL. The gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Chairman, I will reserve my time at this time, until I have a chance to read the statement placed in the record by Senator Bennett.

Mr. ASPINALL. Without objection, the gentleman from Pennsylvania will reserve his right for questioning.

The Chair recognizes the gentleman from Florida, Mr. Haley.

Mr. HALEY. No questions.

Mr. ASPINALL. The gentleman from Utah, Mr. Dawson.

Mr. DAWSON. Mr. Clyde, will you explain to the committee what you mean by consumptive use of water?

Mr. CLYDE. Congressman Dawson, consumptive use of water means that the water is used up entirely and is not available for any other purposes.

Mr. DAWSON. What do you refer to by "consumptive use by exchange?"

Mr. CLYDE. Consumptive use by exchange means the situation where a right has become established to a given volume of water, and that water, instead of being delivered directly to the owner of that water, that particular acre-foot, if we might use that unit, is diverted to another use and another acre-foot of water is used to supply the original owner.

To illustrate: The Colorado-Big Thompson diverts water from the west slope of the Colorado to the east slope. The Green Mountain Dam and Reservoir was constructed in order to provide water for existing rights so that waters from streams formerly furnishing that right could be diverted from the west slope to the east slope by exchange.

Mr. DAWSON. What analogy would you make to the existing project now under discussion?

Mr. CLYDE. In the central Utah, for example, the only water that can be diverted from the Colorado to the Bonneville Basin in Utah has to be obtained from the high Uinta Mountains. The rights to the streams draining the south slope of the Uinta Mountains during the low water season are now fully appropriated. In order that that water which is fully appropriated may be diverted into the Bonneville Basin, additional water supplies must be developed by storage to replace those waters so that the given acre-foot of water coming out of Paradise Park, for example, on White Rocks Creek will go to the Great Basin, and another acre-foot of water coming into the stream below that point of diversion will be put in storage and used at the time necessary to fulfill the existing prior rights.

Mr. DAWSON. Then do you agree with the statement made by Mr. Dexheimer and Mr. Larson that, as a practical matter, it would be impossible for us to get consumptive use of our water with the participating projects without the use of these storage reservoirs on the main stem of the river?

Mr. CLYDE. That is right.

Mr. DAWSON. There has been some reference made to the fact that we could use 58 percent of our water without the use of the main storage reservoirs. I call your attention to the statement of Mr. Saylor directed to Mr. Larson:

> Mr. SAYLOR. That is the important thing. In other words, you can build participating projects in the upper basin States and put to beneficial use 58 percent of the water that is allocated to the upper basin; is that correct?
>
> Mr. LARSON. If you build reservoirs with the participating projects and suffer more severe shortages in dry cycles and dry years, that might be possible.

Also the further statement:

> Mr. LARSON. That is correct, you could, but you would have trouble ever filling the reservoirs in participating projects if you build them.

Do you agree with that?

Mr. CLYDE. I confirm what Mr. Larson has said.

Mr. DAWSON. You have been engaged in water problems for a good many years, have you not, Mr. Clyde?

Mr. CLYDE. Yes, sir.

Mr. DAWSON. How many years?

Mr. CLYDE. About 33 years. since I started to work in this field.

Mr. DAWSON. And during that period of time you had a long experience with the Bureau of Reclamation. Would you care to explain your opinion of the Bureau and their capacity to construct dams and projects of this type?

Mr. CLYDE. Mr. Chairman, I was born and raised on one of the first reclamation projects, the Strawberry project in Utah. I have been closely associated with the personnel of the Bureau since 1923. I am personally acquainted with their program on most of the projects

that they have built. I have full and complete confidence in their professional ability, and I think the record that they have made over the years has been extraordinary. I think there has been no single failure of a dam in the reclamation program. I do not know of any, and I am pretty close to the record.

Mr. DAWSON. And do you agree with the testimony of your colleague from Utah, Mr. Stringham, that the Echo Park Dam is absolutely necessary to this project?

Mr. CLYDE. Mr. Chairman, I think the Echo Park Dam is absolutely necessary to this project. The Echo Park Dam, in my opinion, occupies the same position that I would, for example. I am pretty good with both arms and both legs. You can cut one arm off and I can still live, and you can cut two arms off and I can still live, and you can cut both legs off and I can still live, but I am not much good. And Echo Park Dam is an essential unit in this thing because it is a basinwide project, and it must be considered in terms of the series of storage dams, their operation to provide for water for consumptive use, provide the water to meet the obligation to the lower basin, and to provide for power generation. All of those three are inextricably tied together.

Mr. DAWSON. In other words, you are saying you could still walk, but you would be limping badly; is that it?

Mr. CLYDE. Very badly.

Mr. DAWSON. Do you feel that the cost per acre of putting water on the lands are unreasonable in this project?

Mr. CLYDE. No; I do not think they are unreasonable, Mr. Congressman. If I understood your question correctly.

Mr. DAWSON. Would you care to give your reasons why?

Mr. CLYDE. I think these costs are high in terms of the market price of a piece of irrigated land, but that does not mean necessarily that they are unreasonably high or that they would make the project infeasible. I think that for this reason: That the joining of good land and good water creates a resource which produces in perpetuity. At the present time those desert lands without water have a very, very low productive capacity. By joining water with those good lands and operating them under good management so that they will continue to produce in perpetuity makes them a renewable resource which will produce in perpetuity.

Now, I pointed out, I think, in my statement that a farm is usually bought once every generation, bought and paid for, and in 100 years it will be bought and paid for 4 times, assuming 25 years to a generation.

Supposing that land had a market value of $250 an acre——

Mr. DAWSON. Let us take an example. Assume now you are putting $500 worth of water on land that is worth $250 an acre. Would you say that is unreasonable?

Mr. CLYDE. That is the point I was coming to. Supposing the land has a market value of $250 and I pay $500 to put water on it, and at the moment that that water becomes available it can still be sold for probably somewhat in excess of $250, but not $750, which would be $500 plus $250. But if that land and water will produce a net income of $100 or $200 per acre as soon as it gets into production and the economy around it becomes stabilized, as it does as the project ap-

proaches completion and the economy that follows become stabilized, that land will sell sometime for $750.

Mr. DAWSON. Are you not overlooking the fact, too, that if you put $500 of water on $250 land, you are not paying for that $500 all in 1 year and charging it all as a capital gain on that land. That is spread over a period of 50 years, which would have a chain reaction, would it not, and build additional wealth and the charge per year would not amount to too much?

Mr. CLYDE. That would have a chain reaction and improve the situation I just described very materially.

I am assuming that you paid for it at the moment, but this thing will be paid out over a 50-year period, which makes it that much more favorable.

In other words, I believe in this fundamental philosophy in respect to our agricultural resources: If we have good land and good water and good people and we can join them in such a way that they produce sufficient to pay the operation and maintenance and replacement so that that resource will keep producing in perpetuity and provide an amount in addition which will build up an inheritance, it is a good investment for the country.

Mr. DAWSON. Are not you fearful of the agricultural surplus further complicating our agricultural problems?

Mr. CLYDE. Mr. Chairman, as I have seen these reclamation projects develop over the last 30 years, I am not fearful of the agricultural surplus. It is true we do have at the moment an irritating agricultural surplus, and it is true that we will be able to increase our production from agricultural areas by means of improved varieties of crops, fertilization, mechanization, improved management. But if we take all of those things, it will be far from meeting the demands as indicated by the Department of Agriculture, which recently said that by 1975 we would have to have the production from an additional 115 million acres of land, and their best estimates of the production which can be secured from the existing arable lands as a result of those improvements will be the equivalent of about 71 million acres.

I am giving these figures from memory and I am subject to some slight modification, perhaps. But that leaves a margin of some 45 million acres that we have not met.

Now some figures which Dr. Shaw from the Agricultural Research Service gave us in 1950 and again in 1953 indicated that this margin was only about 31 million acres. In that short period of time from 1950 to now, the estimate has gone up with respect to the need for production. So that at the present time the need is for 45 million instead of 31 million.

Now if we took all of the land in the United States that could be reclaimed by bringing in cutover and swamplands and clearing up all the marginal areas and bringing into production all of the irrigable land remaining in the United States, we could not get enough acreage to meet that 45 million by 1975.

Now this project, if it were authorized today, it would be 10 years before any material amount of that area could be brought into production in sufficient amounts to have much of an impact.

Mr. SAYLOR. Will the gentleman yield for a parliamentary inquiry?

Mr. DAWSON. Yes; I will yield.

Mr. SAYLOR. Will the gentleman from Utah ask the witness what pamphlet or material from the Department of Agriculture he got those figures from? I am very much interested in them because they do not agree with some information that was furnished to me last week by the same Department.

Mr. CLYDE. This is from Dr. Byron Shaw, the Administrator of the Agricultural Research Service.

Mr. ASPINALL. Just a minute. May the chairman state that is not what you call a parliamentary inquiry, but it is a request of the gentleman.

Mr. DAWSON. It is an inquiry, Mr. Chairman, and I will incorporate it in one of my questions, and I will ask him where he gets this information.

Mr. CLYDE. As I say, I got my information from the Agricultural Research Service, from a paper delivered by Sherman Johnson, all of the Department of Agriculture, and from the Truman Cook Commission report which had essentially the same thing in it. Those are the three sources that I recall.

Mr. DAWSON. That is all, Mr. Chairman.

Mr. ASPINALL. The House is in session or will be in just a moment. We shall adjourn this meeting until 2 o'clock this afternoon, at which time we shall have before us the witnesses who are now in the witness chairs and the gentleman from North Carolina will be recognized at that time if he so desires.

The committee is adjourned.

(Whereupon, at 12 noon, the subcommittee recessed to reconvene at 2 p. m., of this same day.)

AFTERNOON SESSION

The subcommittee reconvened at 2 p. m., upon the expiration of the recess.

Mr. ASPINALL. The committee will be in order for further consideration of the legislation before this committee.

The Chair recognizes the gentleman from New York, Mr. Pillion.

STATEMENTS OF GEORGE D. CLYDE AND B. H. STRINGHAM—Resumed

Mr. PILLION. Mr. Clyde, I note from your statement that you are a civil engineer.

Mr. CLYDE. Yes, sir.

Mr. PILLION. And you have spent a great deal of that time in that field, I suppose?

Mr. CLYDE. Better than 30 years, Congressman.

Mr. PILLION. Do you consider yourself to be an expert in the field of economics?

Mr. CLYDE. No, sir; I am not an economist, Mr. Pillion.

Mr. PILLION. I ask that question because both your written statement and your oral statement contained a number of economic statements and economic conclusions. Are you an agricultural expert?

Mr. CLYDE. I am an agricultural engineer first and civil engineer second, as such I am familiar with farming practices and in terms of economy related to agriculture. I am not an economist in the true sense of the term.

Mr. DIXON. You were dean of the school of engineering of the State agricultural college for how long?

Mr. CLYDE. I was dean for 10 years, and 15 years prior to that time I was on the staff during the entire period during which I was a member of the agricultural experimental station in charge of irrigation research work.

Mr. PILLION. On page 12 of your statement, Mr. Clyde, you state:

> In spite of all the misinformation, dishonest arithmetic, and pure fabrication being distributed.

Would you care to make a more particular statement as to who has been handing out misinformation and dishonest arithmetic and pure fabrication in connection with these hearings?

Mr. CLYDE. Mr. Congressman, I wish to refer again to the document which was presented before this committee, namely, the red publication which I designated by color because I do not know what the title is. That statement, as I remember, that says it cost $5,000 an acre to build these projects is, in my opinion, pure fabrication and the arithmetic they used to get it—I don't know how they did it. I can't follow their arithmetic and, therefore, I question the validity of that arithmetic. That is my reference.

Mr. PILLION. This reference is purely to that publication?

Mr. CLYDE. That is the specific reference I have to it.

Mr. PILLION. Perhaps that statement would not be too far out of line, Mr. Clyde, if you had been here at one of these hearings recently, in which it was estimated that the Navaho project would cost somewhere in the neighborhood of $211 million and it was intended to relieve 1,100 Navaho families at a cost of approximately $200,000 per Navaho family.

So based upon that little red pamphlet that we are talking about, that would not be too much of a fabrication; would it?

Mr. CLYDE. Yes; I still think it would be a very marked fabrication.

Mr. PILLION. But you do not say that the figures submitted by the Commissioner of Indian Affairs in which he estimated the cost of that project at $211 million to resettle or to irrigate farms to take care of the 1,100 families, you would not say that that was a fabrication; would you?

Mr. CLYDE. I am not familiar with the figures there, Mr. Pillion. I do know that it is an expensive project.

Mr. PILLION. At $200,000 per family it is a rather expensive project; is it not?

Mr. CLYDE. I would not wish to substantiate that in my testimony. I would like to figure it first.

Mr. DAWSON. Would you yield to me?

Mr. PILLION. Surely.

Mr. DAWSON. I think we totally agree that we are going to have another look at the Navaho project and we are not authorizing it with this legislation. We are simply giving provisional approval and it would have to come back to Congress again for an authorization.

Mr. PILLION. Of course, you are aware of the fact, Mr. Clyde, that the budget of the United States Government is not in balance and that we are running somewhere about $5 billion deficit in the current years.

Mr. CLYDE. Yes, sir; I am aware of that.

Mr. PILLION. You are also aware that the deficits have been with us for a number of years and that there appears to be no firm program for balancing the budget.

Mr. CLYDE. That appears to be the case.

Mr. PILLION. And I think you will agree, will you not, that every time the United States Government runs a deficit it must borrow that money by the issuance of bonds and those bonds in turn are taken by the banks and money issued against them and as we continue to do that, why, the purchasing power of the dollar is reduced. That is a correct statement; is it not?

Mr. CLYDE. Yes.

Mr. PILLION. In view of that continuing deficit financing and prospective deficit financing of the United States Government, do you have any idea what the purchasing value of the dollar might be that would be returned to the United States Government in the course of 25, 30, 40, 50 years?

Mr. CLYDE. I suppose, Mr. Congressman, that if the trend continues downward, it will soon reach a vanishing point and the only way we can prevent it from continuing downward is to create new wealth and one of the best ways I know of to create new wealth is to join land and water when they can be made to produce in perpetuity.

I don't think the first cost of that joining, provided you have good people and good management, makes any difference.

This country became great not because it was hesitant and asked for certainty in the future, but it became great simply because the Federal Government was willing to advance Federal funds when public benefits would result therefrom, and we can recite case after case from the beginning of this country's history to verify that.

I think we have to go ahead on that same basis. We cannot stop, otherwise we cannot make up this deficit and get back in the black.

Mr. PILLION. Of course, however, the wealth of this country, the real wealth of this country, Mr. Clyde, was created by the accumulation of surplus and that surplus being put to work to give improvement by private business and private individuals rather than by government itself.

When you look over the course of history, back in the history of our economic development, our sound economic development——

Mr. CLYDE. By and large this country has developed by private enterprise. But let us take a look at the railroads when they were pushing across the country and they gave every other section 20 miles on each side of the railroad. Let us look at the rivers and harbors program where we have better than $3 billion of authorization on the books.

We have to protect our resources from encroachment. We have to develop our rivers and harbors. We have to have flood protection and we have to have reclamation.

Mr. PILLION. Of course, if the same analogy applied, if the Government were to go out and build steel plants regardless of whether we have a surplus of steel or not, build automobile factories, build all types of industries regardless of the competition of existing privately-owned industry, you create the same type of wealth that you are advocating that we created under your arguments right here, Mr. Clyde.

Mr. CLYDE. That is true, Mr. Congressman, but——

Mr. PILLION. Of course, you will admit, I think, Mr. Clyde, that we are running into a considerable surplus and have been for a number of years in the past in agriculture products; is that correct?

Mr. CLYDE. Mr. Congressman, no, I think that is not correct. May I explain further my belief in that?

The crops that are in surplus are principally wheat and cotton and tobacco and peanuts. New crops that are grown in these reclamation areas are by and large not those crops. It is true there are some of those crops raised, but it takes from 20 to 30 to 40 years to bring a reclamation project into production and the reports which have been issued since 1950, first by the agricultural research administration of the Department of Agriculture; second by the Cook Commission, which made a very exhaustive study and by a report by Mr. Paley—I don't remember now to whom that was made—and since that time the Department of Agriculture in more recent statements they have indicated not only is the population increasing much faster than they expected it to increase, but that the agricultural production of this country, which has been running in high gear since 1940 and in many areas at a rate which is beyond the ability of that land to continue to produce, cannot continue to meet this increased demand.

And it behooves this Nation to provide for that increased demand before it is upon us.

Mr. PILLION. Would you say that this is true, Mr. Clyde, that the wonderful agricultural economy that we have in this country, which is so different from the collectivized and socialized economy of the Iron Curtain countries, is due to the fact that it was developed by private industry, private economy, whereas in those areas where the government pretty well runs the agricultural economy they have not been doing so well.

And the tremendous production we have in this country is due to the fact that it is developed through its own economy, that of the tremendous market system and that of the development of each farm by the particular owner and the production individually of these crops and, of course, letting the marginal land go out of production and the more productive land going into production.

I would like to refer you to Mr. Larson's statement, which is this thick book here, Mr. Clyde, to the summary data. I cannot tell you what sheet it is, but it is the summary data of the Gooseberry project in Utah.

Now, it states there that the principal agricultural production of that land that is supposed to be irrigated is grain and dairy cows.

Now, grain, of course, is surplus in this country, as you well know, and in fact, we have more than a whole year's supply stocked up supported mostly by loans by the United States Government. Is that true?

Mr. CLYDE. That is true, but the grain produced in these areas goes into livestock and does not compete in the market with the grain that is in surplus.

Mr. PILLION. Of course, the grain goes into dairy production. Of course, dairy products, milk, and other dairy products, better, are surplus production also.

In fact we are having a difficult time getting rid of it.

Mr. CLYDE. Yes.

Mr. PILLION. So you still maintain that your statement is true, that none of these products in these lands proposed to be irrigated will go into surplus production?

Mr. CLYDE. Mr. Congressman, may I refer again to not a published quote, but a statement made by Byron Shaw, the Administrator for the Agricultural Research Service, who permitted me to make this statement. He says that by 1962 if the consumption of red meat continues at the present rate, namely, 150 pounds per person, which is the average of the 1952–53 and 1954 years, with the present population increase, we will have to have 20 million acres of additional land by that time.

Now, it will take 17 million of those acres to provide the food for the stock to produce that meat, 17 million out of the 20 million.

Now, he says further, if the meat consumption continues at 156, which is the rate at the present moment, we will need 35 million acres.

In other words, he sums it up by saying that in 1962 the agricultural surplus in this country will be balanced against the production in this county. That is in 1962.

Mr. PILLION. Of course, that is based on certain assumptions that one would have to check into.

Mr. CLYDE. That is right.

Mr. PILLION. I do not know the gentleman, but I do know there are a lot of marginal lands in the East that are being forced out of production, and the Middle West, due to the fact that they do not have the subsidies that some of the other areas do have and that those marginal lands could very well, very easily be put into production, but they are being forced out of production on a marginal basis because of certain competitions with other areas that are subsidized.

You take sugar beets or the other areas of subsidies, there is a question of sectional subsidization rather than a true economic picture.

By the way, Mr. Clyde, do you know whether or not the State of Utah has a balanced budget?

Mr. CLYDE. Yes; the State of Utah is in the black.

Mr. PILLION. Which is quite different from that of the United States Government. Its credit, I am sure, is very good.

Mr. CLYDE. I am not interested in wasting any money, as you can see.

Mr. PILLION. I appreciate that. Most engineers are efficient people.

In the Central Utah project, the initial phases, as shown again, Mr. Clyde, by Mr. Larson, there is an item there of $46 million for power development and the fourth item down from the top is an item "Municipal and industrial water, $45,500,000."

Mr. CLYDE. What page is that on, Mr. Congressman?

Mr. PILLION. I am sorry. I cannot give you the page because these pages are not numbered. But it is about 12 pages back.

Mr. CLYDE. I have it now. Thank you.

Mr. PILLION. Of course, under this proposal the municipal and industrial water would be paid for or financed out of the United States Treasury to the extent of $45 million—$45,500,000.

Now, the financing of municipal water supply in the rest of the country pretty much is a local and State responsibility. Do you believe that the Federal Treasury properly should finance the development of municipal and industrial water?

Mr. CLYDE. Mr. Congressman, I believe that should be done only when it is an incident to the development of the rest of the project, not as a primary objective.

Mr. CHENOWETH. Did I understand you to say that is without interest?

Mr. PILLION. No.

Mr. CHENOWETH. All money advanced to municipal water is returned with interest.

Mr. PILLION. I appreciate that. The question is who shall develop it, who shall furnish credit for it?

Do you suppose the State of Utah might be interested in helping to finance that phase of this particular project, Mr. Clyde?

Mr. CLYDE. You mean the municipal phase?

Mr. PILLION. Yes.

Mr. CLYDE. The State of Utah is interested in helping to finance the whole thing by organizing conservancy districts within which ad valorem taxes are assessed against all beneficial risks of that project.

That is a practice which is followed on many reclamation projects because we believe we should pay for the benefits we get.

Mr. PILLION. No further questions.

Mr. ASPINALL. Mr. Sisk, of California.

Mr. SISK. I wish to commend the gentleman from Utah on a very able presentation of their case. I commend the gentleman.

That is all, Mr. Chairman.

Mr. ASPINALL. Mr. Chenoweth.

Mr. CHENOWETH. Mr. Chairman, I also wish to compliment Mr. Clyde and Mr. Stringham on their very fine statements.

Mr. Clyde, you are recognized as an authority on reclamation. I am interested in the cost per acre that Mr. Pillion asked you about. It seems that opponents of reclamation are using the cost per acre as one of their principal weapons in their efforts to defeat the authorization of all reclamation projects. What is your theory in figuring the cost per acre? Should our thinking be revised? Is there some loophole here? Are the costs actual and factual, and can they be defended?

Mr. CLYDE. Congressman Chenoweth, the costs are high. That is a part of the price we have to pay.

Mr. CHENOWETH. I am not thinking now about these Utah projects you referred to in your statement. I am thinking about the situation generally as it comes up in every project.

Mr. CLYDE. The cost of putting water on irrigated land is high, regardless of where you go.

Now, the history of this country indicates the following:

That some 18 million acres out of the 25 million that are now under cultivation, irrigation, were developed through private enterprise. Those are round figures. It may be a little higher than that if you take out the land that was provided with only a partial supply for which reclamation project came in and provided a supplemental supply.

If we took that, the net equivalent would probably be 22 million or 23 million acres instead of 18 million, but 18 million acres were devel-

oped by the sweat of the brow of these people who dug out the original ditches out from these streams, with their own initiative.

Now we come to the point where the people in and of themselves cannot develop the remaining undeveloped resources because these streams are too far away and they are too deep down in the canyons.

Furthermore, the original developments were based upon the natural flow of the streams in the main, and they were limited to the yield of the streams as determined by the low waterflow of that stream.

Then we came along and, in order to utilize the balance of that stream, we had to put in storage and regulate the flow and the storage cost money.

But, regardless of the cost, as I said this morning, if we have good land—I mean land that has all the attributes of a good productive soil—and we put good water with it, and we add good people under good management, we produce a resource which is good in perpetuity.

And the food and fiber that people will have to have will have to come from those lands, not only the irrigated land but the agricultural land, and if you look back through history, you will find that the breadbaskets of the world historically have been on the irrigated areas.

They are the only areas from which you can depend on an assured supply. They are not subject to drought the same as nonirrigated lands, but they are stabilized.

For that reason, it seems to me that it is good business on the part of the country to help people to help themselves with the full knowledge and realization that those people will return to the Federal Government, and their local government, the entire investment, and in addition have developed a resource which is good in perpetuity.

Now, that is my philosophy of reclamation.

Mr. CHENOWETH. That is a very fine statement on reclamation. What I was interested in was the initial cost. In your case you mentioned that you divide the cost of the project by the number of participating acres.

Mr. CLYDE. That is right.

Mr. CHENOWETH. Do you feel that this is a proper yardstick to use? Is this a fair method to evaluate the cost per acre on these projects?

Mr. CLYDE. That is not a fair method for this reason, that the results come out with a figure per acre too high.

Mr. CHENOWETH. What could we do to change that formula?

Mr. CLYDE. I think we cannot change the formula. I think we have to admit that there are indirect benefits which are not measured in the dollar cost.

You take, for example, central Utah. If you take the cost of that project of $127 million, as I remember the figures, and divide it by some 240,000 acres which includes the Indian lands, you get a figure of $624 an acre.

Mr. CHENOWETH. You show $627?

Mr. CLYDE. $627, thank you.

Now, that $627 is the figure you get by dividing that $127 million by that number of acres.

Mr. CHENOWETH. That does not include interest?

Mr. CLYDE. That does not include interest. But look at the benefits coming to the community, the State, and the Nation as a result of that.

Every time a farm family is established on an irrigated area, and I think this is true equally on any other area, there is another family established to service it.

That means two families. Those two families will earn an income under a stable economy which will enable them to buy an automobile out of Detroit and a tractor out of Peoria, and a pair of shoes out of St. Louis and a watch out of Connecticut.

Those are the indirect benefits that I think are not reflected in these acre costs.

Mr. CHENOWETH. What is the formula that these opponents of reclamation use in their figures to convince the country that reclamation is not a worthwhile program?

Reference has been made to some fantastic figures as to the cost per acre. How are these figures arrived at?

Mr. CLYDE. As near as I can come to it, they do this and I cannot satisfy my own self how they do it, but it looks like they take the first cost of the irrigated project and assume that the entire cost is spent the first year.

So supposing we take the central Utah area again and spend $127 million the first year, which in itself is preposterous, and they say we won't pay any of that back for 50 years, and then they say we will compound the interest at 2½ percent on $127 million from the first year to the 50th year, and that is the cost.

Now, they won't spent $127 million the first year; they may spend $5 million. It may be 15 or 20 years before the $127 million is spent and maybe 50 years.

Therefore, they should not be charging that.

Now that is the way they figure the cost as I understand it. Now, they do not credit against that cost the benefits which accrue the minute that that land or a portion of it goes into production.

For example, there are 10 years allowed for the development period on an irrigation project. After the first year there may be 40 acres under irrigation. The 2d year, 500 acres; the 10th year 60,000 if it is a 60,000-acre unit.

Now, the benefits which accrue, the indirect and public benefits begin to accrue the minute that land goes into production.

Now, if you take this analysis which was referred to in the testimony of the Bureau of Reclamation, wherein they figured the cost of the project and then deducted each year an amount sufficient to pay off the total cost in 50 years without interest, and then they figured the benefits, the value of the benefits, direct, indirect, and public, and they have reasonably good ground on which to establish those monetary values, you add those up as the years go on, but offsetting that there are 4 costs, the cost of operation, the cost of maintenance, the cost of replacement, and then the cost of interest compounded at 2½ percent.

You add all of those up and deduct them from these benefits and about the 18th year on the Seedskadee project in Wyoming, as I remember it, the benefits accumulated less the cost have exceeded the accumulated interest compounded at 2½ percent and from the 18th year on that project is producing a net revenue to the country in terms of indirect benefits.

Mr. PILLION. Will the gentleman yield for a question?

Mr. CHENOWETH. Yes.

Mr. PILLION. Mr. Clyde, if I were to go to a small village that had unemployment and invested $100,000 in a factory to make aluminum doors and I employed 200 people in that village, besides giving them a paycheck each week these people would go out and be able to support the churches, increase the laundry business; is that correct?

In other words, there would be many indirect benefits flowing from that investment; is that correct?

Mr. CLYDE. That is correct.

Mr. PILLION. Now, do you propose here that I, or any other investor, should receive from the United States Government an additional sum of money besides what he receives from his customers by reason of the sale of his doors because of the indirect benefits that flow out of the investment which I am making, and furnishing the service by supplying aluminum doors? Do you think the Federal Government ought to return to me some of the taxes I paid because of the indirect benefits that flow from the investment and from the production of aluminum doors? Is that your theory?

Mr. CLYDE. My theory there, Mr. Congressman, is this: That if the indirect and public benefits are material there might be a cause for that. If you will look at some of the defense industries which have been built, they have had such things happen to them.

Take the aluminum company out in the Pacific Northwest, take the Geneva Steel Co. in Provo, Utah. Take some of the airplane industries which have been subsidized because in the interest of the country we have felt it was good business. Let us go down the Mississippi River, for example, where the railroads parallel that river through Kansas City and the railroad yards and airports are below the level of the river. Uncle Sam comes along and builds the revetments and the channel changes and the railroads and airports and others who occupied land in private ownership pay nothing.

Mr. PILLION. I can understand your theory, but you are trying to establish this problem, I think, that you wish to make this investment another exception to our system of private economy.

You cite other exceptions such as war effort where we have to subsidize a quick production and fast writeoffs, for instance, tax writeoffs, which, of course, again are for a particular purpose such as getting quick production in defense, but I would like to point out that if we were to carry your theory out throughout the country to its ultimate conclusion, we would have nothing but plain unadulterated socialism.

Mr. CLYDE. I would not like to rest on that as an exception because I don't believe it is an exception. I think it is national policy which has been accepted over the years.

May I bring one additional point in, because it has a bearing on this? That has to do with the use of power revenues to help pay these costs. These power revenues result from energies of falling water which comes from the tops of those mountains to the valleys, and if they are not utilized they go unused into the sea and that energy is dissipated and lost.

Now, we would like, and we think it is national policy, again, to use such revenues and power as can be developed again as an incident to the development of these basinwide projects.

Mr. PILLION. I would like to say to you, Mr. Clyde, that it hurts me as much as it hurts you to see power go undeveloped. I, too, be-

lieve that the development of power is proper and a matter that we should pay attention to and develop as rapidly as possible.

I do not, however, altogether agree, as you can see, with the method of financing or that it be financed purely on a national basis.

I would like to see some cooperation by local units such as the States. In fact, if there is any profit to be made on the investment, I would be happy to have the State of Utah receive them.

Mr. ASPINALL. May I call to the attention of those who are taking the time of the committee talking about generalities, that we are not going to get through in time today.

Go right ahead.

Mr. PILLION. I am all through, Mr. Chairman. Thank you.

Mr. CHENOWETH. I think the colloquy with the gentleman from New York, Mr. Clyde, is good proof of what I am trying to bring out.

Those of us who believe in reclamation and those like yourself who have seen the benefit of reclamation closehand and observed them over the years, are going to have to be prepared now to defend reclamation and to evaluate these particular cost per acre figures which are being juggled with great dexterity. There is no more honest or capable gentleman from Congress than the gentleman from New York, Mr. Pillion, but he does not believe in this type of program that you and I are trying to authorize in this legislation.

We have to take a fairly direct responsibility here to make certain we can convince Mr. Pillion and others who want to do what is right, are anxious to help us, but they are not convinced that the figuring is sound.

I think we should give and you, as a reclamation expert, should give great consideration and thought to how we can best defend these reclamation figures and in particular the cost per acre figures. I think that is very important to our cause. I think that is all, Mr. Chairman.

Mr. ASPINALL. The gentleman from Arizona, Mr. Udall.

Mr. UDALL. I have no questions other than to comment I do feel the presentation in this particular of Mr. Stringham was a very thorough and very effective piece of work.

I would like to yield my time, if he cares to use it for questioning, to Mr. Dixon, however, Mr. Chairman.

Mr. DIXON. Thank you. I do not want to take too much time. I hope my question will be answered rather sharply and quickly.

First, Mr. Clyde, how long have you known Mr. Larson?

Mr. CLYDE. I have known him for nearly 40 years.

Mr. DIXON. What has been your association with him as an engineer?

Mr. CLYDE. He and I were classmates together in an engineering school in Utah State College. Since he joined the Bureau of Reclamation I was at the college for 25 years and we worked very closely in all reclamation projects in Utah.

Mr. DIXON. What is his reputation as an engineer in reclamation projects?

Mr. CLYDE. Mr. Larson has a very excellent reputation as an engineer.

Mr. DIXON. Has he ever had a failure?

Mr. CLYDE. None to my knowledge. I am sure that is true because I know of his work.

Mr. DIXON. Do you concur in his statement made before this committee that the Glen Canyon dam has been scientifically determined to be safe and feasible?

Mr. CLYDE. Mr. Congressman, I have no reservations in my belief that that analysis is a valid one and that the foundation is a solid foundation and will support the structure as designed for it.

Mr. DIXON. You concur in his testimony that there is no substitute equal to Echo Park as a dam site.

Mr. CLYDE. Yes, sir; I am convinced in my independent analysis as well as review of many, many reports, that there is no substitute for Echo Park.

Mr. DIXON. Thank you, sir.

Mr. Stringham, what is your business, please?

Mr. STRINGHAM. I am a woolgrower and farmer.

Mr. DIXON. You are also a State senator from Uinta and Duchesne Counties?

Mr. STRINGHAM. Yes.

Mr. DIXON. How long have you lived at Vernal?

Mr. STRINGHAM. Do you want me to tell my age? I have lived there since I was born.

Mr. DIXON. That is enough. You say you are a woolgrower. Where is your ranch located with regard to Echo Park Dam site?

Mr. STRINGHAM. Presently it is almost adjacent to it, on the north and west.

Mr. DIXON. You are acquainted with the whole region from your boyhood?

Mr. STRINGHAM. That is correct.

Mr. DIXON. Now, is Echo Park a real park as viewed by most people in the United States?

Mr. STRINGHAM. Not in the sense that it is land of beautiful trees and clear waters and grasslands, no. It is a canyon area with very few roads into it. The canyons themselves are steep canyons of sheer, steep walls, perpendicular walls, with shallow slopes at the foot of some of them, with cedar and sagebrush on them.

Mr. DIXON. Have there been any improvements to make it a park?

Mr. STRINGHAM. I would say very little.

Mr. DIXON. There is one campsite there and a few cottonwood trees?

Mr. STRINGHAM. That is right.

Mr. DIXON. That is a long way from the dam site, is it not?

Mr. STRINGHAM. It is about 3 miles from the dam site.

Mr. DIXON. Now, is the scenery in the neighborhood of the Echo Park Dam any more beautiful than below the dam or above the dam?

Mr. STRINGHAM. We have many miles of scenery similar to it in various areas, particularly in what we call Jones Hole, which is a tributary to the Echo Park Dam canyons.

Mr. DIXON. Can't those who want to shoot the rapids get just as much thrill out of many other stretches as the stretches where you put me in a boat and I got wet to the gills going down through Echo Park?

Mr. STRINGHAM. I would say yes.

Mr. DIXON. There is plenty of area for that?

Now, what about the accessibility of Echo Park Dam site today? Is it easily accessible?

Mr. STRINGHAM. No; it is quite difficult. You can reach Pats Hole by automobile, preferably a jeep.

Mr. DIXON. You cannot get to the dam site at all?

Mr. STRINGHAM. No.

Mr. DIXON. Except down the river in a boat?

Mr. STRINGHAM. That is right.

Mr. DIXON. How many people visit the area, approximately?

Mr. STRINGHAM. Which year?

Mr. DIXON. Say a 10-year average.

Mr. STRINGHAM. I cannot answer that. It is stated that there were about 2,000 the last few years, but prior to that about 120, I think it was, the average, prior to, say, 3 years ago.

Mr. DIXON. Do sportsmen catch any trout in the Glen River to any extent?

Mr. STRINGHAM. No trout, trash fish, carp and suckers and some catfish.

Mr. DIXON. What about fishing in the clear streams that come into the Green River, like Jones Hole?

Mr. STRINGHAM. It is very excellent, as you know. You saw it demonstrated there when you were there, very beautiful trout and a lot of them.

Mr. DIXON. When the dam goes in, the river below the dam will be clear, will it not?

Mr. STRINGHAM. I would presume so.

Mr. DIXON. In all likelihood it will be just about the same fishing as it is in Jones Hole, or any other clear streams that come into the Colorado?

Mr. STRINGHAM. It should be, and when the dam is put in there that would make that entire area accessible to many more people; that is very true.

Mr. DIXON. Another question. You have given us very fine testimony to show that when the Dinosaur Monument of 80 acres was expanded in 1938, prior to that time agents of the Government went to your country and held mass meetings. We have testimony of one at Craig, Colo., where you attended and David Madson told the people that their grazing rights would not be taken away and their reservoir rights and privileges would not be taken away and their power rights would not be taken away. Is that not true?

Mr. STRINGHAM. That is true.

Mr. DIXON. Had the Government not promised those people those things what do you think would have been the reaction of the people in that area toward expanding the Dinosaur Monument?

Mr. STRINGHAM. We would have opposed it strenuously.

Mr. DIXON. You did not oppose it on account of the promises made by the representatives of the Government?

Mr. STRINGHAM. On the contrary, we cooperated with Mr. Madson and the Park Service.

Mr. DIXON. Do you graze your sheep anywhere on the Dinosaur Monument?

Mr. STRINGHAM. I have, but not at the present time.

Mr. DIXON. Do other men raise sheep and cattle there?

Mr. STRINGHAM. Yes.

Mr. DIXON. Do you know any other national parks where they graze cattle and sheep?

Mr. STRINGHAM. No, I do not, myself.

Mr. DIXON. It is not a park, is it, it is a monument, not a national park?

Mr. STRINGHAM. That is right.

Mr. DIXON. The mere fact that cattle and sheep men graze their flocks on that monument is concrete evidence that it is different from other national parks and that grazing rights are respected?

Mr. STRINGHAM. The majority, I would say, at least.

Mr. DIXON. Thank you.

Mr. SAYLOR. Mr. Chairman, I would like to say in the beginning I appreciate the views of Mr. Clyde and Mr. Stringham as representatives of the great State of Utah, I respect them for coming here and giving us the benefit of their opinion.

I will defend their rights to their opinion anywhere, but I also reserve the right to disagree with them most violently. I might say that I think the presentation was a great deal better than it was a year ago.

However, it reminds me of a famous hymn of the Evangelical reform service saying, "Almost, but not persuaded." The more important thing I want you gentlemen to remember is that almost is not persuaded.

Mr. CHENOWETH. Why do you not quote the rest of that hymn? It says, "Almost, but lost."

Mr. SAYLOR. Mr. Clyde, on page 7 of your statement which you did not read, but you analyzed the assumptions, I think this committee should sit up and pay attention to it because it is very enlightening. It is entitled "Water Losses."

Mr. CLYDE. Page 7?

Mr. SAYLOR. Yes. In that I read this sentence:

> No methods have yet been developed to measure exactly the evaporation from a large body of water.

Do you stand on that statement?

Mr. CLYDE. Yes, sir.

Mr. SAYLOR. Therefore, there is no exact measurement of evaporation studies from large bodies of water?

Mr. CLYDE. That is no method of measuring exactly the evaporation.

Mr. SAYLOR. Right. And if there is no method of measuring exactly the evaporation from a large body of water, would you care to comment as an engineer on how you can measure the evaporation on a nonexistent body of water.

Mr. CLYDE. Yes, sir; I will be glad to discuss that subject.

The principal factors involved in the evaporation from a free water surface are temperature, wind velocity, and vapor pressure from the water to the blanket of air immediately overlying the body of water, whether it be in a pan, a can, or a lake.

The reason I say there is no method yet devised which will exactly measure that evaporation is because no one has yet developed methods of measurement which will measure either of those factors, nor put them together in a combination which will give you the exact determination.

Now, the measurement of evaporation has been a matter of concern for more than 50 years. The early experiments on evaporation from pans started around the early part of the 20th century. The only device they could use at that time was to put water in the pan and

let it evaporate. They could measure the amount of water they would have to put back in to bring it up to the zero point again.

There has developed as a result of that procedure a series of measurements which have grown to be voluminous throughout the country and those measurements have been used to establish relationships between the evaporation from pans of given diameter and exposure.

The objective, of course, being to find a plan which would most nearly duplicate the conditions found in a large body of water.

Now, there is no way in which we can measure exactly again the evaporation from a nonexistent body of water, and the only thing we can do is to take the basic information that we have and the relationships which have been established as the result of research and apply those to these bodies of water that are projected.

Mr. SAYLOR. Now, sir, would you again mention, so that I will not misquote you, the three factors which you said were important in determining the evaporation?

Mr. CLYDE. I said three main factors, wind exposure, temperature of the air, temperature of the water, and the vapor pressures.

There are other minor factors, such as viscosity of the fluid, the amount of salt in it, but those others are the important ones.

Mr. SAYLOR. Now, the wind velocity, therefore, will be on the surface of the water; is not that correct?

Mr. CLYDE. That is correct.

Mr. SAYLOR. In order to make a study, therefore, would it not be necessary to have some studies made of the wind velocity at 700 feet above the floor of the canyon in Echo Park?

Mr. CLYDE. No, I think that would not be necessary. I think I might recite some of the experiments that have been conducted for pans of 5 diameters, up to 50 feet in diameter, 1 at Fort Collins, Colo., with anemometers placed at the surface, 2 feet above the surface, and various other distances above the surface, the objective of these researches to determine the wind velocity at a given horizon and evaporation of the free water surface down below.

Now, it is true that none of these conditions under which the researches were carried out are exact duplicates of the conditions you will find at Echo Park where you have a surface of the water some 2,000 to 3,000 feet below the plateau where the sweep of the wind domes. One of the reasons why the Echo Park Reservoir is believed not to have a high evaporation rate, as high as one if it were exposed out on the plane, is because the wind cannot get at that water and that vapor blanket remains over the water down in the bottom of these canyons.

Until that vapor blanket is removed by the wind, the water from the surface cannot push up into that vapor blanket which contacts the water surface.

Mr. SAYLOR. Let us move on downstream to Glen Canyon. What is the situation there?

Mr. CLYDE. In Glen Canyon, in those portions of the canyon where the condition remains the same, the difference would be in the mean temperatures because the temperatures down there are considerably higher than they are up at Echo.

Mr. SAYLOR. Both the temperature of the water and the temperature of the air?

Mr. CLYDE. Yes, sir.

Mr. SAYLOR. Now, I also notice here on page 11 where you state:

> No State other than Utah, Colorado, Wyoming, and New Mexico pay any portion of the cost of this project.

Mr. CLYDE. That is correct.

Mr. SAYLOR. Would you care to tell us on what you base that?

Mr. CLYDE. I base that, Mr. Congressman, on my statement on page 12 under "Repayment," which says:

> The source of income from which these projects are repaid.

First, that paid by the irrigation water users according to their ability to pay;

Second, that paid by the municipal users, including interest.

Third, that which is collected as a result of the ad valorem tax in the water conservation district.

Fourth, revenues from power project plants, and, fifth, power revenues from the main stream plants and no portion of that money comes from any other State.

Mr. DAWSON. Except for the fact other States, particularly the lower basin States, are requesting that they be given permission to use this power. There has been some complaint that the rate is too high, yet they all want to be hooked to the powerlines and if they are, I assume there would be some revenues coming from the other States who wanted to purchase power.

Mr. CLYDE. I suppose that is true.

Mr. SAYLOR. Now, I was very much interested in your statement which you gave us in regard to the growth of this country, what you expected in the way of food, fiber, because it is a matter which is of great concern to many of us, whether we come from that area or whether we do not.

I would like you, therefore, as an engineer, and as an economist connected with farming, to forget for the moment that you come from the State of Utah. I would like to ask you as an engineer and economist, if it becomes necessary to produce food and fiber to maintain the standard of living that we have in this country, whether or not it would be your policy to spend your money where you can get the greatest return?

Mr. CLYDE. In terms of calories per unit of water, I would say, yes.

Mr. SAYLOR. Now, sir, if you found that it was possible to take more land, not in the 11 Western States which are semiarid, but if you found areas in the humid and southeastern end of this country that could be placed under cultivation for a fraction of the cost—by that I mean probably 1 or 2 percent of the cost of this project—and could produce more food, then where would you invest your money?

Mr. CLYDE. Mr. Congressman, in answer to that question I would like to recite the statement I made a moment ago, namely, that the Department of Agriculture as late as of today has indicated that it will require the increased production from 71 million acres of currently cropland, the maximum increased production, to meet a portion of the increased demand for food and fiber by 1975, and that at least

31 million, and the most recent figure is not 31 million, it is 46 million acres.

Now, if we take all of the land that is available in the Southern States, in the Middle West, and in the Eeastern States, that is not now in production and reclaim that by drainage and land clearing and fertilization and put all of that into production, we still cannot catch up with the demand by 1975.

Then if we went west and put all of the land that remains in the 17 Western States that is irrigable, some 6 million acres, and put all of it under production between now and 1975, we still would not have enough to meet this potential demand as set forth by the Department of Agriculture.

Mr. SAYLOR. As I said to you this morning, I am interested because the Department of Agriculture has recommended that I read, in order to familiarize myself with the great needs of the food and fiber of this country, a statement which was prepared by Rudolph Fullrig in the United States Department of Agriculture and published in the Journal of Farm Economics in February 1953 entitled "Relative Cost and Benefits of Land Reclamation in the Humid Southeast and Semiarid West," wherein they indicate that there is available sufficient land in this country that can be put under production and more production for approximately 1 percent of the cost.

I would incorporate, Mr. Chairman, by reference, this article by Mr. Fulrig, of the Department of Agriculture.

Mr. ASPINALL. Is there any objection?

Hearing none, the request is granted.

Mr. SAYLOR. Now, Mr. Stringham, you were in the room, I believe, when Mr. Elmer Bennett, of the Office of the Solicitor of the Department of the Interior was here and testified.

Mr. STRINGHAM. I don't recall particularly his testimony or the gentleman; I am sorry.

Mr. SAYLOR. In regard to the question which you have covered so completely in volume 1 of the hearings we had March 9, Mr. Bennett testified that the act of 1921 was specifically limited at the time of passage in 1921 to existing national parks, that in 1935 that the reference to existing national parks and monuments was stricken out, making it clear that the policies were not limited now to parks and monuments in existence in 1921 or in existence in 1935, but to apply to all parks and monuments.

I would like to have you comment on that testimony.

Mr. STRINGHAM. The only way I can comment on it, not being a lawyer, but just a sheepherder, the only way I can arrive at a conclusion is by reading the opinions of different men.

Mr. SAYLOR. You will notice very carefully, and I call the Chair's attention to the fact, that the report which the counsel made in no way reflects his opinion whatsoever as to what the bill meant.

Mr. Abbott, as the counsel for our committee, did not attempt to report in his brief which he filed what the law was. He merely recounted the record as he found it. That is very important to remember.

Mr. STRINGHAM. May I, Mr. Congressman, read what Mr. Abbott says on that page 729 of the House hearings? Down near the bottom in italics, the sentence there in italics, page 729. Should I read that, Mr. Chairman?

Mr. ASPINALL. Yes.

Mr. STRINGHAM (reading):

Provided, That nothing in that Act as amended shall be construed to repeal or amend the provisions of the amendment to the Federal Water Power Act approved March 3, 1921, or the provisions of any other Act relating to national parks or national monuments.

Mr. SAYLOR. Now, Mr. Stringham, is it my understanding of your contention that because of the upper Colorado River compact, the upper Colorado Basin compact approved the 6th day of April 1949, Congress has given its consent to the invasion of a national monument?

Mr. STRINGHAM. Indirectly, I should say yes; because the Congress approved that compact; did it not? It is not an invasion.

Mr. SAYLOR. Is it your contention that nowhere on the Yampa River could there be any dam built to store water other than Echo Park?

Mr. STRINGHAM. It is my contention there is no place on the Green River that can store Yampa River water to use it for the purpose that the Commission intended it should be used for within reason.

Mr. SAYLOR. I have heard about this business of exchange.

That has been all the basis on which these departments have come up here and testified to. They went down and built these storage projects and they got down to Green Canyon; they cannot tell where it is Yampa water, Green water, or any other tributaries. It is all Colorado water.

What would be wrong with building Green Canyon and allocating the 5,000 acre-feet for any period of 10 consecutive years, to which the State of Utah is entitled under that basin compact, to them in the Green Canyon Reservoir?

Mr. STRINGHAM. Mr. Congressman, if I go to the map a moment, I can show you what I mean.

This is the Echo Park Dam site right here.

Mr. ASPINALL. Mr. Stringham, will you first identify the map.

Mr. STRINGHAM. This is a map of the Bureau of Reclamation Colorado storage project and participating projects.

This is the Echo Park Dam site. This is the Yampa and this is the Green River. Now, the compact states, as I stated in my testimony, that the Yampa River water, it was the understanding of the Commission after 2 years' study, could be, and was, set aside for use in the central Utah project, which would be this project right here, waters in this area right here, because they proposed to cut all of our water off now which we now use in the basin headquarters and put in the Wasatch.

Taking our water and substituting the fresh water out of the Yampa, that is what the commission proposed at the time the compact was signed, according to Judge Stone's interpretation.

You could not use, by exchange, even water down in the Glen Canyon under these conditions because you can't get it back up here, across here.

Mr. SAYLOR. What if there were a storage project built at Cross Mountain?

Mr. STRINGHAM. Then we would be able to get it into the central Utah project, which starts about here. You cannot get it around there.

Mr. SAYLOR. You are tunneling everything else. What would be wrong with a tunnel there? They talk about these transmountain diversions all around. I want to know what is wrong with some

transmountain diversions up around Cross Mountain to get you folks in Vernal some water.

Mr. STRINGHAM. We would have a terrifically long tunnel as you know. It would have to cross the Green River Canyon and come out this way somewhere.

Mr. SAYLOR. Now, what about Gray Canyon? Is that too far below you?

Mr. STRINGHAM. That is way beyond. If you build a dam a little above there, you are still in the mountain and you miss the Yampa River water.

If you build down below here you are still in the mountain and you could not afford to pump it up in the project.

Mr. SAYLOR. What about Flaming Gorge?

Mr. STRINGHAM. Flaming Gorge could be used for the central Utah project.

Now, you put me at the point I am going to say we refused to use Flaming Gorge water.

Mr. SAYLOR. Now, it is possible to drill a dam at the Flaming Gorge Reservoir site which would not be within the confines of any national monument, which would supply you water.

Mr. STRINGHAM. That is right.

Mr. SAYLOR. But the people of the area do not want that water?

Mr. STRINGHAM. That is right.

Mr. SAYLOR. Why?

Mr. STRINGHAM. This is not professional, this is just layman's opinion. When Wyoming uses her full share of that water, when that time arrives, we are told by engineers that the water in Flaming Gorge then will all be return flow water, practically all of it will be return flow water.

We are trading beautiful springs and clear water and putting it in the Bonneville Basin. Therefore, we like Yampa clear water over in the Yampa River, which is a fresh, clear-water stream.

Mr. SAYLOR. Therefore, that is one of the principal reasons why you say that we might invade a national monument to provide your area with water?

Mr. STRINGHAM. That is right.

Mr. THOMSON. Mr. Stringham, the effect of that Flaming Gorge site would also mean you would place the entire strain for the participating projects in Wyoming and Utah on the Green River above that site, instead of having the contribution from both rivers?

Mr. STRINGHAM. That is right.

Mr. THOMSON. Your concern is that it would not stand the strain?

Mr. STRINGHAM. That is right.

Mr. SAYLOR. Mr. Stringham, let me ask you this further question:

Were you here this morning when we had that excellent presentation by Mr. Bliss on the quality of water?

Mr. STRINGHAM. I was here only part of the time. I was trying to get ready for the hearing.

Mr. SAYLOR. Mr. Bliss is a very competent engineer and has spent the past year making a study of the effect of the storage and participating projects upon the equality of the water.

Now it is true that his analysis took place at Lee Ferry as distinguished from farther up the river where it would be necessary for

the people of your area to take water from the stream. His conclusion was that there would be an increase in the salinity and some of the other qualities of the water, but that it would only be increased by 14 percent and that that 14 percent would still leave all the water in the river as coming within the definition of good and usable water.

Now, assuming that his analysis would hold good up the stream and that the water which would be caught in Flaming Gorge Reservoir would have the same quality as the water delivered at Lee Ferry, then would you be willing to accept that water?

Mr. STRINGHAM. Our people would not be willing to accept that because we have much superior water to the water that reaches Glen Canyon. We are giving that away to the Bonneville Basin.

Mr. SAYLOR. One of the features which I have noticed in Mr. Larson's testimony is that for the central Utah project a large amount of money would have to be expended over the years to pump water from the river.

It is my understanding that if the water were taken from Flaming Gorge instead of Echo Park, a large portion of central Utah could be supplied by gravity. Is that correct?

Mr. STRINGHAM. That is correct.

Mr. SAYLOR. Is it not true that even though Flaming Gorge might not be as desirable in every respect as Echo Park, that the difference and savings to the people of the area by having their water come to them in central Utah by gravity would more than offset the losses at Echo Park.

Mr. STRINGHAM. I am not able to answer that. I am sorry.

Mr. SAYLOR. How about our engineer?

Mr. CLYDE. Mr. Saylor, there are two possibilities of bringing water out of the Yampa and the Green Rivers; one by gravity to the Uinta Basin, not to the Bonneville Basin.

There will be no water pumped from the Colorado to the Bonneville Basin in either case. The water that goes into the Bonneville Basin is intercepted on the high slopes of the Uinta Mountains. The water which will be used to replace that water will come out of the Yampa and the Green and it may come from either of two sources: the Flaming Gorge by gravity, or the Echo Park site by a relatively low-pumping lift.

At this moment I do not believe anyone knows which of those two will be the most economical. They are not very far apart apparently, but one or the other will prove to be the most economical in the long run.

Now, there are other considerations, however, which must be considered and that was the reason for this reservation in the upper Colorado River Basin compact of 500,000 acre-feet per year or 5 million in 10 years from the Yampa River, because when the Green River is fully utilized consumptively, with no storage on the upper reaches and there is no storage up there now other than the natural lakes, the only water that will get to the Flaming Gorge Reservoir site will be as testified to, essentially the only water, and particularly the low water season, will be the residual or the return flow which comes in the river channel.

Now, it may be that there will not be enough fresh water come down under that full consumptive use to sweeten that water when it gets to Flaming Gorge.

It is quite different from the situation below because we have not only the Yampa coming in, but we also have the main Colorado coming in, and we have some water from the San Juan and we have water from the Price, the Freemont, the Paria, coming in, all of which tend to sweeten up that water which is going into Lake Mead.

We have the storage in Lake Mead. We will have the storage in Green Canyon when it is built. We will have the storage in Davis and Parker, all of which tend to improve the quality of water before it gets to the point of consumptive use down below.

So the two are not comparable.

So I think it is highly essential that we not lose sight of the fact that fresh water from the Yampa is absolutely necessary to the Uinta portion of the Central Basin project.

Mr. DIXON. Mr. Clyde, the Echo Park Dam would catch the Yampa as well as the Green.

Mr. CLYDE. It catches the Green and the Yampa.

Mr. DIXON. How much water does the Yampa yield to Echo Park Dam, then?

Mr. CLYDE. I cannot give you those figures. I don't remember them.

Mr. Jacobson is here and he probably could give us that information, but I don't have it.

Mr. SAYLOR. Mr. Clyde, I have one other question. You have talked about the figures that it would cost to put water on the land. Do you feel that the figures that the bureau has presented here are near the saturation point, all that the people in the area can bear?

Mr. CLYDE. Do you mean the portion that the irrigators themselves pay back?

Mr. SAYLOR. The portion that the irrigators can pay back and the portion that is chargeable to power.

Mr. CLYDE. I feel that the costs which are set forth, the per acre costs in the project which is before this committee, are within the limits of the ability of this project to pay out and thereby be placed on a self-liquidating basis. By that I mean that there is sufficient income from those irrigators, municipalities, powerplants, to pay this thing off for the projects which are proposed in the legislation before this committee.

Mr. SAYLOR. My next question then is, If this is within their ability, how much more could they pay, if any?

Mr. CLYDE. I cannot answer that question today. I don't know how much more they could pay.

But I think it would be substantial, especially if you go into the future a little further because this is a renewable resource. It goes on and on and on.

Mr. SAYLOR. Unfortunately we are still trying to work this whole program out under the present reclamation law.

Now, under the present reclamation law, how much more per acre per year can the people in that area pay, either from farms or from power or municipal water?

Mr. CLYDE. I would not be able to answer that question, Mr. Saylor, other than to say it is substantial.

Mr. SAYLOR. The reason I ask that is that several years ago this committee made a study. They found that while a great many people in this country have lost respect for the Bureau of Reclamation,

that, unfortunately, their record indicates their original estimates and their final costs would be usually very far apart.

In the 82d Congress the Bureau's own figures indicate that in 50 years, the golden anniversary, they were only able to present to this committee one project that had ever been built within its original estimate and that some had gone up as much as 700 percent.

Now, with that record, I think the people of the area for which this project is being proposed must realize that this is not any guaranty, if it goes through, that that is what they are going to have to pay for power, for water, be it municipal water or be it farm water for irrigation purposes.

Mr. CLYDE. I think that is right. I think we cannot tell what is going to happen in the future. I agree with you that the costs have gone up and the value of the dollar has gone down.

Mr. SAYLOR. For example, right in that immediate area, a project that was just finished, the Colorado-Big Thompson, started out with a very nominal figure, but by the time they ended up they had spent about seven times as much money as they had originally anticipated.

I think that is something which the people of the area must look forward to if this project is approved.

That is all.

Mr. ASPINALL. Thank you very much.

The witnesses now before the committee are excused. We have three witnesses who will speak about certain power features of the proposed legislation. I would ask the committee for permission to permit me to call for statements: Charles J. Fain, speaking for the REA; David Moffat; and R. L. Patterson.

After they have made their presentations, they will be ready for questions. Is there any objection?

Hearing none, it is so ordered.

Mr. Fain, will you come forward?

How much time do you want, Mr. Fain, to make your oral presentation?

Mr. FAIN. I think 10 minutes would be sufficient.

Mr. ASPINALL. The Chairman would appreciate it if you could cut it down to between 5 and 7.

Mr. FAIN. All right, sir.

STATEMENT OF CHARLES J. FAIN, ASSISTANT GENERAL MANAGER, NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. FAIN. Mr. Chairman, members of the committee, my name is Charles Fain. I am assistant general manager of the National Rural Electric Cooperative Association.

This is Mr. Robinson, our engineer, who has done a great deal of work on the power features of this project.

We are here today representing the interests of the rural-electric cooperatives throughout the United States and particularly those in the upper Colorado River Basin area.

To conform with the chairman's request, we will simply highlight a few statements from the statement which we have prepared and submit it to you.

First of all, we would like to briefly comment on our interest in the project which your committee is considering at this time.

Our interest stems from the interest of the 17 rural electric cooperatives in that area. We are greatly interested in the project because of the need for power now existing in this marketing area.

We have prepared, Mr. Chairman, a chart which is found as table 1 at the back of the statement, which will give the committee an idea of the load growth that the rural electric cooperatives in that area are now experiencing.

I would like to just comment very briefly on the table, if I may. The table shows a comparison between the energy consumption in the years 1952 and 1953. You will note that in the year 1952 the rural electric cooperatives in the area used a little over 87 million kilowatt-hours in that year.

In 1953, however, this had grown to over 102 million, which is an annual increase of about 17 percent.

This is an amazing load growth in view of the fact that throughout the United States the load growth is doubling about every 7 years, but this shows that in that area it is doubling every 4 to 5 years.

Also, we are informed by the rural electric cooperatives in that area, who are being supplied by Bureau of Reclamation, that their needs can only be met to about 1956, and after that time they will face a power shortage in that area.

Consequently, on behalf of those rural electric systems, our association would like to go on record in favor of this project that the committee is considering.

It might be of interest to your committee in looking over the table to note the charges now being made to the rural electric cooperatives for their wholesale power. Generally this runs up to about 12 mills per kilowatt-hour.

Based upon the 1950 report by the Bureau of Reclamation the cost of the power flowing from the upper Colorado project would run about 6 mills per kilowatt-hour. This means that based upon the 1953 figures these rural electric cooperatives in the area would make a saving of over $400,000 alone in the cost of power to them.

Certainly we realize that you gentlemen who have been here for many days and engineers considering this project are far more familiar with the technical phases of the project than we are, but we are simply bringing these views insofar as they affect the rural electric cooperatives in the area and the power which they so sorely need.

Now, the other point that we think is important, and would like to comment on to the committee, is the transmission of the power from the upper Colorado project. We feel that the transmission of the power is interwoven with the preference clause as it is set out in the Reclamation Project Act of 1939 and as the committee knows, under the bills that are now being considered by you, as we understand it, the power would be sold in accordance with that traditional preference clause as set out in the Reclamation Act.

But we feel that preference as it is written in the law can become a sort of a hallowed sepulcher if there is no transmission, or if there is a restriction on the building of transmission by the Bureau of Reclamation.

For that reason, Mr. Chairman, we ask the committee to consider not putting anything into the bills or the reports which would tend to cripple the power of the Secretary of the Interior to build what transmission he would deem necessary in the marketing of the power.

I think it is of interest to note the progress that is being made in that area in the marketing of power, primarily from the Colorado-Big Thompson project in Colorado.

In that project there has been worked out a wheeling agreement whereby the power is wheeled by the power companies to the preference customers.

However, I think it should be emphasized that not every type of agreement is a wheeling agreement and one which the rural electric cooperatives would be in sympathy.

We are very much concerned that there be no action taken whereby the private power companies would be given title to the power or the power be sold outright, that is, a bus bar sale to the private power companies.

For that reason we would ask the committee to scan the language and any proposals that are made so that the Secretary of the Interior will not be crippled in anything which he might wish to do in the building of needed transmission for the marketing of the power.

There is one other comment we would like to make, Mr. Chairman, and that is concerning H. R. 4488. You will find on page 15 of my statement we have quoted certain language from that bill. You will note that the bill reads, beginning on line 9 of page 12:

> *Provided*, That power produced pursuant to this Act shall be sold at the highest practicable price to enhance the development of the upper Colorado River basin and operation in conjunction with other powerplants shall not deprive the basin funds of revenues which it would receive in the absence of such joint operation.

We are somewhat concerned that this language might be interpreted as an alteration of the traditional preference clause as found in the Reclamation Project Act of 1939, because you will note that it says shall be sold at the highest practicable price.

We would ask that in any event the committee might want to consider some clarification to the language that has been used in that bill.

There is one other matter. We would like to introduce for the record a resolution found in our statement, passed at our annual meeting on February 17, in favor of the upper Colorado storage project.

This will conclude my statement, Mr. Chairman, unless there are any questions.

Mr. ASPINALL. Thank you very much, Mr. Fain.

As I understand you wish to incorporate the statement in the record?

Mr. FAIN. Yes, sir.

Mr. ASPINALL. Is there any objection to the introduction and acceptance of the full statement that is before you?

Hearing none, the statement will be included and made a part of the record.

(The statement referred to is as follows:)

STATEMENT OF CHARLES J. FAIN, ASSISTANT GENERAL MANAGER, NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION, IN SUPPORT OF AUTHORIZATION FOR CONSTRUCTION, OPERATION, AND MAINTENANCE OF HYDROELECTRIC GENERATION AND TRANSMISSION FACILITIES OF THE COLORADO RIVER STORAGE PROJECTS AND CERTAIN PARTICIPATING PROJECTS

Mr. Chairman and gentlemen of the committee, my name is Charles J. Fain. I am assistant general manager of the National Rural Electric Cooperative Association, the national service organization of approximately 90 percent of all REA electric-type borrowers in the United States and Alaska.

THE INTEREST OF THE RURAL ELECTRIC SYSTEMS

The rural electric cooperatives located in and adjacent to the power-marketing area of the Colorado River storage project are hopeful that at least some of the major power-producing facilities of the upper Colorado River project may be put under construction in the very near future for two reasons.

First, the rural electric systems located in the power-marketing area to be served by the project face a shortage of available power supply from existing sources, especially for irrigation wells. Second, they are of the opinion that construction and operation of the project will permanently enhance the economic productivity of their respective service areas, thereby promoting the growth and development of the rural electrification program in that section. This statement will be confined to a discussion of the first proposition, although we recognize the second as an important factor for the consideration of your committee.

Last year, in appearing in support of similar legislation, there was presented as part of our testimony a chart containing a list of rural electric systems which lie within or directly adjacent to what has been designated by the Bureau of Reclamation by the 1950 report as the principal portion of the power-marketing area for the Colorado River storage project. These rural electric systems located in the States of Colorado, New Mexico, Idaho, Utah, and Wyoming stand to benefit directly from the low-cost abundant supply of hydroelectric energy that will become available from the project.

Some of these cooperatives purchase their energy from private utility companies at rates ranging up to 12 mills per kilowatt-hour, while others are already purchasing energy from Bureau of Reclamation facilities under the terms of the existing wheeling agreement between the Bureau and the Public Service Company of Colorado. Some of them are paying a premium to obtain service from the Bureau under the Colorado contract because of the great distance between their load centers and the Bureau of Reclamation transmission system.

The cooperatives which lie within the marketing area of the proposed upper Colorado River storage project and which are now purchasing power from privately owned utility systems would, we hope, be able to obtain Bureau of Reclamation service from the proposed project at substantially lower rates than they now pay. Our systems throughout the country pay an average of 32 percent of their total operating revenue for wholesale power, and a substantial reduction in this item of expense would be of inestimable value to our systems in the Rocky Mountain area where population is sparse and construction difficult due to mountainous terrain.

Moreover, those cooperatives that are already supplied by Bureau of Reclamation hydroelectric facilities, either directly or under the terms of existing wheeling agreements, face an acute shortage of power either this year or in 1956. Our systems in Colorado tell us that the Bureau of Reclamation, in contracting power to them from the western division of the Missouri River Basin system, with which the Colorado-Big Thompson system is integrated, will only contract for their firm power requirements through 1956.

LOAD GROWTH OF COOPERATIVES

The load growth of the rural electric systems within the marketing area of the upper Colorado River storage project is phenomenal. The chart which we presented last year showed that during the year 1952, these systems used 87.84 million kilowatt hours of energy. To establish some measure of the load growth taking place on these rural systems, we are attaching a similar chart this year showing the comparable energy use figures for 1952 and 1953. The 1953 figures

indicate sales by the same cooperatives of 102.75 million kilowatt hours of energy, representing a load growth of 17 percent within a single year. This means that the total load on these systems is doubling in about 4½ years. By contrast, it is generally estimated that total load, urban, rural, and industrial, of power companies throughout the country, is doubling every 7 to 10 years. Thus the interest of these systems in authorization and construction of the upper Colorado River storage project becomes obvious. Our chart shows that on the basis of 1953 consumption, the systems within the marketing area of this project would, alone, save $419,909 per year if they are able to purchase Bureau of Reclamation power from the project at 6 mills per kilowatt-hour, which has been estimated as the firm power rate based on preliminary cost allocations.

In addition to the benefits which will accrue to the rural electric systems within the power-marketing area of the upper Colorado River storage project itself, we are hopeful that power and energy above the needs of the preference customers in that area will be made available to preference customers in other States served by the transmission network of the western division, Missouri River Basin project of the Bureau of Reclamation. These other preference customers also face a serious shortage of power by 1956. To meet the shortage, our systems in Colorado, Nebraska, and Wyoming are planning REA-financed steam-generation facilities. The electric capability of these steam facilities can possibly be materially reduced to the benefit of the cooperatives' capital investment in the event that upper Colorado River storage power is made available to them through the integrated system of the Bureau of Reclamation in the western Missouri River Basin.

FEDERAL TRANSMISSION—THE KEY TO PREFERENCE

We are very pleased that the present bill, like its predecessors, provides for construction and operation of the project in conformance with the preference provisions of reclamation law, which affords rural electric systems and public bodies preference in the availability of energy from the project. However, we are alarmed by the implications in the proposal of the private power companies of Colorado and surrounding States that the authority of the Secretary of the Interior to construct transmission lines in connection with the project be limited to those not paralleling existing or projected lines of the companies.

Pursuant to this proposal of the power companies, the Department of the Interior, according to the report on House bill, H. R. 4449, 83d Congress, 2d session, advised the House committee that it was sympathetic to the private power company proposal. The House committee, in turn, expressed the expectation that the proposal by the private power companies for cooperation in the development would be carefully considered by the Department of the Interior, and that the electric power and energy of the project would be marketed so far as possible through facilities of the electric utilities operating in the area, provided, of course, that the proper preference laws are complied with and project repayment and consumer power rates are not adversely affected.

This language seems somewhat contradictory to the rural electric systems inasmuch as in many sections of the country our people have been stymied in their efforts to secure their share of power from Federal hydroelectric projects by the refusal of private power companies to work out satisfactory wheeling contracts. In areas where the Secretary of the Interior is not authorized or does not have the appropriations necessary to construct transmission facilities, our systems have not been able to obtain reasonable wheeling agreements for the delivery of Federal power.

It is our contention that any language in the bill itself, or in the committee report, where it would have the effect of conclusively determining Interior Department policy, which restricts the authority of the Secretary of the Interior to construct transmission lines, would be a dangerous precedent and would adversely affect the interests of all the preference customers and of the Federal Government itself.

An absence of authority for the Secretary of the Interior to construct transmission lines, not only to integrate the hydroelectric units of the project, but also to deliver appreciable quantities of the energy produced to the load centers of the preference customers, would vitiate the incentive of the power companies to enter into satisfactory wheeling agreements. Wheeling agreements are generally interpreted to mean contracts by which utility companies, acting as common carriers, transmit power to preference customers for the account of the Government and without obtaining title to it. The preference

customers remain customers of the Government and do not become customers of the utility companies. We have not been able to conclusively determine whether or not the proposals ofthe Colorado utility companies would ultimately result in wheeling agreements, or if they would mean bus-bar sale of all Federal power to the power companies, in exchange for promises to deliver a certain amount of power to the preference customers. The latter is not a wheeling contract.

The Interior Department, in at least one instance, has shown a predisposition to accept a bus-bar delvery type of contract with respect to sale of Federal power. I refer to the Clark Hill project on the Georgia-South Carolina border.

The authority and ability of the Secretary to construct transmission lines to interconnect the Colorado Big-Thompson project and other units in the western division of the Missouri Basin system has been, we feel, the controlling factor in enabling the cooperatives in Colorado and of other States within the Bureau of Reclamation service area to, in some instances, obtain satisfactory wheeling agreements in areas where the Federal transmission system was insufficient to deliver power to load centers of all preference customers.

1955 POWER COMPANY PROPOSAL

Again this year, the privately owned utility companies, in testifying on S. 500 before the Senate subcommittee, asked that the authority of the Secretary of the Interior to construct transmission lines as part of the upper Colorado River storage project, be sharply curtailed. The companies urged adoption of the following amendment to S. 500:

Proposed transmission line amendment, Colorado River storage project and participating projects

At the end of section 1 add the following:

"*And provided further*, That the authority conferred by section 1 of this Act to construct transmission lines is limited to:

"(1) Backbone transmission tie lines directly interconnecting powerplants in units of the Colorado River storage project, directly interconnecting such plants with powerplants of participating projects, or directly interconnecting plants authorized in this Act with other Federal powerplants, where such interconnections cannot be more economically and feasibly accompanied through the present and projected transmission systems of electric utilities operating in the States of the upper Colorado River Basin;

"(2) transmission lines between powerplants of participating projects which cannot be more economically and feasibly interconnected by the extension of present or projected transmission lines of electric utilities operating in the States of the upper Colorado River Basin; and

"(3) transmission lines to municipalities or other public corporations or agencies desiring to purchase electricity and having a preference thereto by law where there are no existing or projected transmission lines which may reasonably be connected with the aforementioned powerplants or interconnection transmission tie lines between said plants, and where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction."

The amendment proposes to write into the basic legislation authorizing the upper Colorado project restrictions on authorization of transmission line construction by the Bureau of Reclamation—transmission lines that will undoubtedly be essential in the proper marketing of the power and necessary to give substance and meaning to the sale of this power to preference customers.

The amendment is divided into three parts, the first and second dealing with backbone transmission tie lines interconnecting the projects with each other and also with other Federal power installations. These interconnections are vitally important in properly controlling and integrating the sale of the power. They are also vital in view of section 6 of H. R. 3384 and parallel sections of other similar House bills. The amendment language proposed by the companies casts considerable doubt on such backbone transmission ever being built, as it provides such are to be constructed only where such interconnections and transmission lines cannot be more economically and feasibly interconnected and accomplished through the present and projected transmission systems of electric utilities.

Such limitations on the Federal Government after it has built these projects at its own expense are completely unreasonable and against the public interest.

An integrated marketing arrangement for the greatest benefit to the Federal Government requires full authority to build whatever lines are needed. Proposed lines of the utilities which may or may not come into existence cannot be reasonable criteria by which to measure the need or desirability for Federal lines.

The third part of the proposed amendment deals with Federal transmission lines to preference customers. It is here that the proposal endangers the opportunity of the rural-electric cooperatives to purchase power directly from the Bureau of Reclamation as they have traditionally done in the past. First, the language as used in testimony by the companies on S. 500 a few weeks ago seems to exclude rural-electric cooperatives. In the Federal statutes where preference is given to public agencies, municipal systems, and rural-electric cooperatives, the latter have always been expressly designated as such. But in this proposal the language is "transmission lines to municipalities or other public corporations or agencies." It is clear that rural-electric cooperatives are not municipalities. Neither are they public corporations or agencies except in a few States. Therefore, they seem to be excluded by this language.

The next limitation is that lines cannot be built to serve preference customers where there are "existing or projected transmission lines." The same comment here applies as to (1) and (2) above.

There is the further limitation that no such transmission can be built to serve preference customers except "where the Secretary is unable to contract with electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction." This limitation is an unreasonable one, because it attempts to give State regulatory agencies power over the Federal Government. This is neither practical or desirable. Second, this language attempts to tie the hands of the Secretary in the enabling act, whereas he should have broad discretion to build such lines as are necessary to carry out the traditional preference clause, and at the same time, protect the Government's tremendous investment in the project, for it must ever be kept in mind that the Secretary must be able to sell the power at a rate which will pay out the projects. We contend that the enabling legislation is not the appropriate vehicle in which to restrict Federal authority.

Preference to rural electric cooperatives in the sale of power as well as the feasibility of the projects embodied in this legislation can be seriously impaired by the adoption of any restrictive language on Federal transmission facilities.

In addition to the restrictive language contained in the House committee report on H. R. 4449, which was pending before the 83d Congress last year, and the amendment to S. 500 suggested by the power company representative on March 2, 1955, during Senate hearings this year, we would like to call to the attention of the subcommittee, language contained in the Federal budget for the fiscal year 1956, with respect to Bureau of Reclamation appropriation requests:

"That no part of this appropriation shall be used to initiate the construction of transmission facilities within those areas covered by power wheeling service contracts which include provision for service to Federal establishments and preferred customers, except those transmission facilities for which construction funds have been heretofore appropriated, those facilities which are necessary to carry out the terms of such contracts or those facilities for which the Secretary of the Interior finds the wheeling agency is unwilling to provide for the integration of Federal projects or for service to a Federal establishment or preferred customer."

It is our opinion that this language emanating from the executive branch of the Government, in corroboration with expressed Interior Department predisposition toward acceptance of the proposal of the Colorado companies indicates that even with full authority to construct necessary transmission facilities, the Department would be certainly inclined to accept wheeling agreements, and it might go so far as to accept a bus bar delivery type contract with existing utility companies, as has been proposed as a means of marketing power from the Clark Hill Dam.

The rural electric systems are not adequately protected, in the sale of Federal power by agreements which convey title to the output of the project to private utility companies at the bus bar. We feel that such a policy defeats the long-established principle of preference in the sale of Federal power to rural electric systems and other public bodies and places private utility companies in at least a quasi-preferential status.

TRANSMISSION PROTECTS FEDERAL GOVERNMENT

Moreover, the Federal Government itself stands to benefit from the construction of the necessary transmission lines to integrate the separate units of this project and to integrate the entire whole with the existing Bureau of Reclamation western Missouri River Basin system. It is our understanding from an examination of the proposed cost allocations for the 6 large units of the upper Colorado River Basin project that, whereas, these allocations indicate that 74 percent of the total cost of these projects would be allocated to power and 26 percent to irrigation, the fact remains that the entire cost will actually ultimately be repaid from power-sales revenue. The ultimate payout of the project depends on the sale of the project power at the established rate, which we understand to be 6 mills for firm power.

In the absence of an adequate transmission system, the Government finds itself usually in a position of being able to sell power to only one purchaser, the existing utility company network. The resources of the rural electric systems and other public bodies are generally too small to allow them to construct the necessary high capacity transmission facilities to the Federal dams. Therefore, the Federal Government, in the absence of an adequate transmission system, must dispose of the power at the bus bar for what the company will pay. Failure to authorize and build an adequate transmission system would destroy the effect of section 6 of H. R. 3384 which provides for the sale of the maximum amounts of firm power and energy from the project.

The result of insufficient transmission could well be that the actual power-sales revenue from the project would be substantially less than what is anticipated, and whereas the project, in conjunction with an adequate transmission system, would not only be a feasible, but a profitable venture, the absence of an adequate transmission system for the disposition of power could make the project appear to be unprofitable in later years. It is our hope that the subcommittee will favorably report the bill with such language as will encourage the Secretary of the Interior to construct sufficient transmission to integrate the separate units and to assure delivery of power from the project to the load centers of the preference customers and to insure the Government of a sound bargaining position in the disposal of all of the energy from the project.

SAN JUAN CHAMA PROJECT

It was our understanding that in testifying in support of legislation authorizing the upper Colorado River project during the 83d Congress, 2d session, that plans for the San Juan Chama project in New Mexico, as considered at that time, included facilities for the installation of 145,000 kilowatts of power. We note that in the legislation now pending, the San Juan Chama project would apparently contain no power facilities. We realize that elimination of power in the San Juan Chama project is necessary at this time in view of the practical and legal questions involved between those users to the south and others. We are very hopeful that at an early date this matter can be resolved in such a way that power can then be authorized in the project. Even though there is only one cooperative in northern New Mexico, at Chama, which would be within transmission distance of the power from this project, if we assume the construction of transmission facilities to integrate the entire development, it would seem that the 145,000 kilowatt and 260-million kilowatt-hours per year originally included in the San Juan Chama project would add considerable power and energy to the system and provide the Government with revenue which would be unavailable if the power potential of this unit remains unused.

ECHO PARK DAM

We realize that there has been considerable opposition to the construction of the Echo Park Dam and that this opposition arises from persons and organizations interested in the national parks, and from sincere desires to preserve the natural beauty of such areas. This association, however, has previously gone on record in support of construction of the Echo Park Dam. Our position was, we feel, justified by a study made by the former Under Secretary of the Interior, Mr. Tudor. The former Under Secretary concluded that it was a matter of personal opinion as to whether or not the natural beauty would be harmed by the reservoir inundation. Mr. Tudor was of the opinion that the beauty of the Dinosaur National Monument would by no means be destroyed, and he recommended that Echo Park be included in the development plan for the upper Colorado River Basin. Two members of the staff of the National Rural Electric

Cooperative Association have also visited the Dinosaur National Monument, and it is their opinion that the water would only add to the scenic splendor and would make certain portions of the canyons more accessible to visitors.

After considering all of the arguments against and in favor of the Echo Park Dam, the 13th annual meeting of members of this association, held in Atlantic City, N. J., on February 14–17, 1955, unanimously passed a resolution in support of the upper Colorado River storage project including Echo Park Dam and including traditional preference rights in the sale of power to rural-electric cooperatives and municipal systems, and including adequate transmission lines to deliver the power and energy to load centers of the preference customers. For the information of the subcommittee, I am attaching a copy of this resolution.

PROJECT POWER RATE BASE

The rural-electric systems are fearful of the implications of the language contained in section 6 of H. R. 4488, beginning on line 9 of page 12, which reads as follows:

"*Provided,* That power produced pursuant to this Act shall be sold at the highest practicable price to enhance the development of the Upper Colorado River Basin and operation in conjunction with other powerplants shall not deprive the Basin Fund of revenues which it would receive in the absence of such joined operation."

It is our understanding that power-rate schedules for reclamation projects have always been established with reference only to the cost of the project allocable to power, rather than depending on existing marketing conditions. The above language contained in H. R. 4488 would seem to authorize the Secretary, after assuring operation of the project to produce the maximum amounts of firm power possible, to effectively sell such power to the highest bidder. Therefore, should a nonpreference customer offer 8 or 9 mills per kilowatt-hour, let us assume, for firm power at the project, the Secretary would be under obligation to accept such an offer rather than to market the power first to preference customers at a lower rate based on project construction costs. The latter rate appears to be 6 mills per kilowatt-hour based on preliminary cost allocations. The utility company network, as a nonpreference customer in offering to purchase such power, would be probably limited only by the cost of producing a similar amount of power from alternate generating sources. Such limit might bear no relation to the cost of the project power to the Federal Government.

Section 3 of H. R. 4488 provides that:

"Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the Colorado River storage project and the participating projects listed in section 1 of this Act, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388). * * *"

Thus any specific language in the present bill which would specifically conflict with reclamation law with respect to the marketing of power from the project would take preference. Moreover, the Reclamation Act of 1939 in section 9 (c) provides:

"That in said sales or leases, preference shall be given to municipalities and other corporations or agencies; and also to cooperatives and other nonprofit organizations financed in whole or in part by loans made pursuant to the Rural Electrification Act of 1936 and any amendments thereof."

The same section of the act provides also, however, that:

"The provisions of this subsection respecting the terms of sales of electric power and leases of power privileges shall be in addition and alternative to any authority in existing laws relating to particular projects." (53 Stat. 1187, 43 USC 485.)

It is, therefore, our opinion that any language such as that appearing in section 6 of H. R. 4488, beginning on line 9, page 12, which would effectively authorize the Secretary to sell power from the project to whoever offered the highest price for it, would be fully effective in reversing the long-established application of preference policy.

The rural electric systems realize that this language may have been placed in the bill for the purpose of assuring that adequate revenues would be made available from the power revenues of the upper Colorado River storage project for the purpose of helping defray irrigation costs of participating projects. We feel, however, that there is a decided danger that the language used would reverse all previous interpretations of preference provisions of law, and might prevent the rural electric systems and other preference customers in the marketing area of the project from enjoying any of the benefits of low-cost power to be generated. We respectfully urge that the subcommittee give serious con-

sideration to deleting or modifying this language in such manner as would make it consistent with the existing applications of preference principles, and to the end of assuring that the preference customers will realize the benefits of low-cost power to be produced.

SUMMARY

In summary, I would like to say that the rural electric systems, nationally, and especially those in the power marketing area to be served by the proposed upper Colorado storage project, wholeheartedly support and urge its authorization provided the power is marketed in accordance with traditional principles of reclamation law, and provided that authorization for an electric transmission network capable of fully integrating the individual units of the project with each other, and the project as a whole with the existing transmission network of the Bureau of Reclamation, and capable of delivering power to the load centers of preference customers, is included. It is our opinion that it will be, as a matter of practicality, virtually impossible for the Secretary of the Interior to market the power from the project in accordance with the mandate of preference law, and in compliance with anticipated power sales revenue schedule designed to pay out the project within a 50-year period, in the absence of proper authorization for adequate transmission facilities.

We also respectfully urge the subcommittee to seriously consider the implications on power-marketing policy of section 6 of H. R. 4488, begining on line 9 of page 12. It is our opinion that this language, by superseding general-preference provisions of reclamation law, could completely reverse the long-established application of preference principles of power-marketing policy, and clothe the Secretary of the Interior with authority to sell the firm power from the project to the biggest bidder, rather than to sell it to designated-preference customers at a rate based on the cost of production. We feel that any such reversal of established policy would place the privately owned utility companies in a quasi-preferential status and would enable them to probably absorb the entire output of the project to the exclusion of the designated-preference customers, including rural electric cooperatives. Rural electric cooperatives within the power-marketing area of the project, and throughout the country, are in support of the upper Colorado River storage project primarily because they feel it will assure them of a source of low-cost wholesale energy to meet load growth for several years. If substantially all, or nearly all, of the firm-power output of the project is to be sold to private utility companies in the area, to the exclusion of the rural electric systems, it is my opinion that we cannot support construction of the project.

In view of the increasing needs of the preference customers in the area we hope this subcommittee can report favorably a bill authorizing construction of the upper Colorado River storage project, with language in the report clarifying marketing procedures in terms of traditional Bureau of Reclamation policy.

RESOLUTION ADOPTED BY THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION ANNUAL MEETING OF MEMBERS, ATLANTIC CITY, N. J., FEBRUARY 17, 1955

UPPER COLORADO STORAGE PROJECT

Whereas the upper Colorado River storage project proposed for construction in Colorado and neighboring States would bring much needed electric power to the farmers and ranchers of that area; and

Whereas only with such a system of storage and power dams will the waters of the Colorado River be impounded so that utmost use can be made of them; and

Whereas other benefits of such project would be reregulation of the present flow of the Colorado River, flood control, fish and wildlife development, improved recreational facilities, domestic, industrial, and irrigation water; and

Whereas there exists in the upper Colorado River Basin great natural resource potential which can only be developed by means of water storage and the electricity produced therefrom: Now, therefore, be it

Resolved, That we endorse the proposed upper Colorado River storage project, including Echo Park Dam and other dams with full traditional preference rights to rural electric cooperatives and municipal electric systems for purchase of electric power, together with transmission lines to take electric power from electric-generation plants on said project to load centers of municipal systems and rural electric systems within reasonable transmission distance of said project, and with transmission inter-ties to the Colorado-Big Thompson system and any other Federal systems.

TABLE 1.—*Estimated yearly energy cost savings to electric cooperatives in and adjacent to principal portion of Colorado storage project marketing area*

State	Name of cooperative		M kilowatt-hour annual energy consumption		Present average rate, mills per kilowatt-hour		Present annual cost of energy		Annual cost of energy at 6 mills per kilowatt-hour		Annual savings at rate of 6 mills per kilowatt-hour	
			1952	1953	1952	1953	1952	1953	1952	1953	1952	1953
Colorado	Grand Valley Rural Power Lines, Inc	7	6.62	7.56	8.9	8.9	$58,683	$66,937	$39,770	$45,360	$18,963	$21,577
	San Luis Valley Rural Electric Co-op	14	12.96	9.45	8.8	9.3	114,099	87,572	77,760	56,700	36,339	30,872
	Gunnison County Electric Association	18	1.10	1.12	18.0	18.0	19,780	20,177	6,600	6,720	13,180	13,457
	Delta-Montrose Rural Power Lines Association	20	5.52	6.26	10.7	12.0	59,110	74,943	33,120	37,560	25,990	37,383
	San Miguel Power Association	26	11.01	13.21	9.1	10.2	100,431	134,643	66,060	79,260	34,371	55,383
	La Plata Electric Association	32	6.14	6.92	9.8	11.0	60,310	76,018	36,840	41,520	23,470	34,498
	Empire Electric Association	33	10.51	12.10	9.8	10.8	103,282	13,728	63,060	72,600	40,222	58,128
	Holy Cross Electric Association	34	3.07	3.84	8.0	8.0	24,590	30,736	18,420	23,040	6,170	7,696
	Yampa Valley Electric Association	36	3.31	2.02	12.0	7.0	39,958	14,224	19,860	12,120	20,098	2,104
	White River Electric Association [1]	40	1.83	1.85	17.5	1.9	32,501	35,277	10,986	11,100	21,515	24,177
	North Park Rural Electric Association	42	.88	5.65	7.0	6.2	6,185	34,990	5,280	33,900	905	1,090
New Mexico	Northern Rio-Arriba Electric Co-op	15	1.87	2.08	18.3	17.8	34,200	36,964	11,220	12,480	22,980	24,484
Idaho	Raft River Electric Co-op	16	4.32	6.40	5.6	5.8	[2] 24,021	[2] 37,032	[2] 25,920	[2] 38,400	------	------
Utah	Garkane Power Association	6	4.30	4.39	14.0	14.3	60,231	62,933	25,800	26,340	34,431	36,593
	Moon Lake Electric Association [1]	8	7.81	10.80	8.4	11.0	65,627	119,066	46,860	64,800	18,767	54,266
Wyoming	Riverton Valley Electric Association	3	4.46	6.75	6.8	6.8	[2] 30,143	[2] 45,701	[2] 26,760	[2] 40,500	------	------
	Bridger Valley Electric Association [1]	9	2.13	2.35	10.9	13.7	23,261	32,301	12,780	14,100	10,481	18,201
	Total	------	87.84	102.75	------	------	802,248	957,509	474,366	537,600	327,882	419,909

[1] Generates own power—figures for calendar year 1951–52.
[2] Not included in total.

Source: Except as noted, figures are for fiscal years 1952 and 1953 from 1952 and 1953; Annual Report of Energy Purchased by REA Borrowers, and 1951 and 1952; Annual Statistical Report published by REA.

Mr. ASPINALL. The next witness is Mr. Moffat of Utah Power & Light Co., and Mr. Patterson of the Public Service Co.

These two gentlemen are appearing together. They have been before our committee heretofore and we are glad to have them back with us again.

Whoever is in charge will start and make your presentation.

STATEMENTS OF DAVID MOFFAT, JR., VICE PRESIDENT, UTAH POWER & LIGHT CO.; AND L. R. PATTERSON, PUBLIC SERVICE CO. OF COLORADO

Mr. MOFFAT. Thank you, Mr. Chairman.

Members of the committee, I am David D. Moffat, Jr., vice president of the Utah Power & Light Co., and with me is Mr. L. R. Patterson of the Public Service Co. of Colorado. We have a statement that we would like to have made a part of the record and comment briefly on that statement at this time.

Mr. ASPINALL. Your comment, first, please.

Mr. MOFFAT. This statement is on behalf of the following investor-owned electric utilities, Arizona Public Service Co., Public Service Co. of Colorado, Public Service Co. of New Mexico, Southern Colorado Power Co., Southern Utah Power Co., Southern Wyoming Utilities Co., Telluride Power Co., the Western Colorado Power Co., Uintah Power & Light Co., and the Utah Power & Light Co., all operating electric utilities rendering electric service in the upper Colorado River Basin States.

These companies which Mr. Patterson and I represent have a two-fold interest in this project. First of all, they are concerned with the need for development of the water resources for domestic, agricultural, and industrial use within their service areas. There is no substitute for water to meet these needs. The long-range growth and prosperity of their service areas is dependent upon additional supplies of water, and such water must of necessity come from the Colorado River and its tributaries.

Their second interest is in the utilization of the power produced in connection with the Colorado River storage project. These companies at the present time are the direct suppliers of electric service to approximately 835,000 electric consumers.

These companies operate 90 powerplants with a total capacity of 1,450,000 kilowatts of which approximately 1,200,000 kilowatts is steam capacity. The growth in the service areas of these companies is so great that they are adding more than 160,000 kilowatts of additional steam generating capacity per year. They presently have 6,650 miles of transmission lines interconnecting their plants and load centers with some 1,400 miles additional planned by 1960.

Principles for cooperation in the project: We believe that there is real opportunity for cooperation between private enterprise and the Federal Government in connection with the marketing of power from the Colorado River storage project. The following are deemed by us to be basic principles for such cooperation:

1. Because of the relationship of the water storage features of this project to the Colorado River compact, the vast areas encompassed, the magnitude and multiple-purpose objectives incorporated includ-

ing nonreimbursable features we believe the holdover reservoirs and powerplants should be built by the Federal Government.

2. In order to obtain the maximum amount of firm power, the greatest diversity and flexibility in operation and to make the power accessible to the greatest area, the backbone transmission tie line directly connecting major powerplants of the Colorado River storage project, such as Flaming Gorge, Echo Park, and Glen Canyon, except in cases where such interconnections can be more economically and feasibly accomplished through the present and projected transmission systems of the companies, should be an integral part of the generating system, and, therefore, should also be built by the Federal Government. The integration of other plants of the project constructed reasonably adjacent t othe present and projected transmission systems of the companies should be accomplished through these systems; the benefits of such integration would accrue to the project without additional cost.

3. In order to obtain maximum flexibility and lowest cost in transmission, it is essential that use be made of the then existing transmission systems of the companies and in addition the companies construct such new tranmission lines from the project plants or project interconnecting transmission tie lines to the various load centers of their respective systems as may be required to market project power, the Government or other agencies to construct necessary and nonduplicating transmission lines to other load centers not within the general service areas of these companies.

4. The private utilities are willing to enter into contracts whereby they will deliver project power to preference customers making such reasonable transmission charges therefor as may be approved by the local regulatory authorities; or, the private utilities are willing to contract directly with the preference customers to supply all their power requirements at rates which will pass on such savings as are obtained through the purchase of project power.

5. We believe that the financial feasibility of the project depends upon the sale to private utilities of the power output of the project plants not contracted for by such customers as may be entitled to preference, and that such sales should be made at the powerplants or along the backbone transmission tie line upon terms such that the cost of project power will not exceed the cost of power from alternate sources.

6. Each company as to its rates and charges is subject to the jurisdiction of the State utility commission in which it is funishing electric service to the public. Rates charged by such utilities for electric servce, taking into consideration the cost of power purchased from project plants, will be subject to the full jurisdiction of the appropriate State utilities commission.

To carry out successfully the foreign principles, it is essential that an understanding be reached in order that these companies may henceforth plan, design, and construct new generating and transmission facilities to coordinate with the project development. The general premises of this understanding should be incorporated in the legislation authorizing the project.

Mr. Chairman, that concludes the formal statement, but we both have some comments that we would like to add. In view of the last paragraph of the statement, we offer for your consideration the fol-

lowing proposed amendment which has been revised since the Senate hearings to obviate the objections or misinterpretations expressed at that time.

At the end of section 1 add the following:

And provided further, That the authority conferred by Section 1 of this Act to construct transmission lines is limited to:

(1) Backbone transmission tie lines directly interconnecting powerplants in units of the Colorado River Storage Project, directly interconnecting such plants with powerplants of Participating Projects, or directly interconnecting plants authorized in this Act with other Federal powerplants, where such interconnections cannot be more economically and feasibly accomplished through the then existing transmission systems of electric utilities operating in the States of the Upper Colorado River Basin or through transmission lines which said utilities are willing to provide, under contract for their use at terms and conditions deemed fair and reasonable by the Secretary;

(2) Transmission lines between powerplants of Participating Projects which cannot be more economically and feasibly interconnected by the then existing transmission lines of electric utilities operating in the States of the Upper Colorado River Basin or through transmission lines which said utilities are willing to provide, under contract for their use at terms and conditions deemed fair and reasonable by the Secretary; and

(3) Transmission lines to municipalities, cooperatives, public corporations, or other agencies where such municipalities, cooperatives, public corporations, or other agencies desire to purchase electricity and have a preference thereto by law, if there are no then existing transmission lines which cannot be more economically and feasibly connected with the aforementioned powerplants or with interconnection transmission tie lines between said plants and if the Secretary is unable to contract with the aforesaid electric utilities to deliver such electricity at charges therefor approved by him and by local authorities having jurisdiction, and if the Secretary is unable to contract with such utilities for the provision by them of such transmission lines on terms deemed by him to be fair and reasonable where there are no such then existing transmission lines.

That is the end of the amendment.

These companies we represent are installing generating capacity as fast as the present and anticipated needs of their customers require, and we can continue to do so. Electric power from this project is not a necessity—it can be used, and that is our principle for cooperation. We can contribute to the financial and economic feasibility of the project by construction of transmission lines, market the power, and through power revenues assist the project.

I do wish to reemphasize that what we need is water.

Mr. PATTERSON. I have a short statement now, Mr. Chairman, if I might make it.

My name is L. R. Patterson, and my address 900 15th Street in Denver. I am assistant vice president of the Public Service Co. of Colorado.

The companies we represent reaffirm their willingness and their ability to construct and operate the lines which Mr. Moffat has outlined.

In making this proposal, we are offering to undertake a very heavy financial responsibility. Our engineers estimate that the transmission lines we are offering to build may well cost as much as $100 million.

I want to emphasize that when we offer to make an investment of this magnitude, we need some assurance that the proposal that we are offering will be carried out. You can understand that if we start building transmission lines to harmonize with this project, and then they are not used, our investors will suffer a loss.

We offered an amendment last year, and while this committee did not accept the amendment which we proposed, we do find that the

committee, in House Report No. 1774, on H. R. 4449, 83d Congress, 2d session, did endorse our proposal, in language to be found at the top of page 10, and in the section on page 23 specifically dealing with the proposal which we offered.

Now, we do think that this was a very fine recognition on your part, but we still want to emphasize that we need some assurance on this thing.

We believe that the use of private money to construct a substantial portion of the facilities of this project is in the best interest of everyone. It is in the best interest of the general public. It is in the best interest of the taxpayers and the electric users in these upper-basin States.

The use of investment money reduces the amount of outlay that the Federal Government will have to make. It places all the facilities that we construct on the tax rolls of all the local agencies in our State, the school districts, and so on, to help support those agencies. And then a very important consideration from the standpoint of the people that use this electric energy is that these hydroplants of the project, which are in a remote area, a long way from the load center, will be integrated with the large steam generating plants, which we have right at the load centers, and in that way the user will be assured of the very highest class of service he can receive, and, by integrating the hydro with the steam, it will help to obviate any shortages during the dry years we sometimes have.

We do wish to emphasize the need to know whether or not the proposal we have made will be carried out.

Now, I live in Denver, and I could not end up this statement without saying, "We need water."

Mr. ASPINALL. Thank you, Mr. Moffatt and Mr. Patterson.

Unless there is objection, the formal statement as handed to the members of the committee will be made a part of the record at this point.

Hearing none, it is so ordered.

(The statement referred to follows:)

STATEMENT BY PRIVATE UTILITIES RE COLORADO RIVER STORAGE PROJECT

(By and on behalf of Arizona Public Service Co., Public Service Company of Colorado, Public Service Company of New Mexico, Southern Colorado Power Co., Southern Utah Power Co., Southern Wyoming Utilities Co., Telluride Power Co., the Western Colorado Power Co., Unitah Power & Light Co., Utah Power & Light Co.)

The following statement made on behalf of Arizona Public Service Co., Public Service Company of Colorado, Public Service Company of New Mexico, Southern Colorado Power Co., Southern Utah Power Co., Southern Wyoming Utilities Co., Telluride Power Co., the Western Colorado Power Co., Uintah Power & Light Co., and the Utah Power & Light Co., all operating electric utilities rendering electric service in the upper Colorado River Basin States, sets forth in general terms the factors bearing on potential markets for the disposition of electric energy proposed to be generated in connection with the Colorado River storage project, together with certain proposed principles for cooperation which we think would contribute in a substantial manner to the feasibility of the project in addition to effectuating a substantial savings on the part of the Federal Government in construction costs.

THE BASIN AREA

The upper Colorado River Basin has a drainage area of 110,000 square miles comprising the western part of the State of Colorado, the eastern part of Utah, the southwestern corner of Wyoming, the northwestern corner of New Mexico, and

the northeastern corner of Arizona. It is an area of lofty mountains, high plateaus, deep canyons, fertile valleys, and great distances.

The basin is very spasely populated. The average population density is approximately 3 persons per square mile compared to a national average of approximately 51 persons per square mile. Its largest city is Grand Junction, Colo., with a 1950 population of 14,504 inhabitants.

BASIN RESOURCES

Contrasted with its sparse population is its great wealth of natural resources. These are the measure of its future potential. Here are found large deposits of nonferrous metals and other minerals such as gold, silver, copper, lead, zinc, molybdenum, vanadium, phosphate, gilsonite, limestone, and many others.

Other resources are large forest areas with potential pulp and other forest product industries. Farming including the growing of fruit and vegetables and the livestock industry will continue to provide a basic source of wealth.

However, more important for the future than these is the fact that this basin is one of the greatest sources for thermal energy production to be found anywhere in the world. Here are located vast deposits of coal, great underground reservoirs of oil and natural gas, mountains of oil shale and, perhaps more important than all of these, are the deposits of uranium ores. The potential thermal power resources of this area stagger the imagination.

But the present need of the basin is conservation and orderly development of its most vital resource—water. Water is scarce throughout the States of the Colorado River, both upper and lower basins. More than 30 years ago a compact was signed at Santa Fe, N. Mex., making an apportionment of the waters of the Colorado River between the upper and lower basins. In 1948 the upper basin States, that is, Wyoming, Colorado, Utah, New Mexico, and Arizona, effected a compact apportioning among those States the water reserved for their use under the Santa Fe compact. In order to protect and develop its share of the water allocated under the compact, the upper basin must provide certain reservoirs for holdover storage. The Colorado River storage project, among other things, provides this storage.

These companies have a twofold interest in this project. First of all, they are concerned with the need for development of the water resources for domestic, agricultural, and industrial use within their service areas both within and without the Colorado River Basin. There is no substitute for water to meet these needs. The long-range growth and prosperity of their service areas is dependent upon additional supplies of water, and such water must, of necessity, come from the Colorado River and its tributaries.

Their second interest is in the utilization of the power produced in connection with the Colorado River storage project. These companies, at the present time, are the direct suppliers of electric service to approximately 715,000 electric consumers. Through wholesale service and wheeling service, they are indirect suppliers to an additional 119,000 electric consumers. Their interconnections with other systems further enlarge the electric service areas.

These companies operate 90 powerplants with a total capacity of 1,450,000 kilowatts, of which approximately 1.2 million kilowatts is steam capacity. The growth in the service areas of these companies is so great that they are adding more than 160,000 kilowatts of additional steam generating capacity per year. in other words, it is estimated that in 1960, the combined steam generating capacity of these companies will be approximately 2.2 million kilowatts. They presently have 6,650 miles of transmission lines interconnecting their plants and load centers with some 1,400 miles additional planned by 1960.

Furthermore, ever-growing needs for electric power in each of our States will provide a market for the power which the project will produce, provided the new generating facilities are put into production on a schedule in consonance with the growing demands for power. We have consistently kept abreast of these growing needs through the construction of additional generating capacity and the extension of our transmission systems. Our plans for the future necessarily entain continuous additions to our generating and transmission capacity so that we shall always be in a position to fill growing needs. To the extent to which project power becomes available to us at costs reasonably competitive with present or future generating costs, we would be relieved of the cost of constructing an equivalent amount of generating capacity and might be relieved from operating (except for peak and reserve generation) some of the older and higher-cost generating plants on our own systems.

We propose to absorb into our systems and to transmit to present and prospective customers in the upper Colorado River Basin States large blocks of electric power from the hydroelectric plants of the Colorado River storage project and participating projects.

We recognize the financial necessity, as an important adjunct to the Colorado storage project and participating projects, for the generation and sale of hydroelectric power. This necessity arises from the obvious need for a primary source of revenues to help return to the taxpayers of the United States the capital investment in the project as a whole. For that reason the output of these project plants should be disposed of on such basis and in such manner as will best assist the financial feasibility of the project.

PRINCIPLES FOR COOPERATION IN THE PROJECT

Careful consideration of the basic situation as outlined above suggests that there is real opportunity for cooperation between private enterprise and the Federal Government in connection with the marketing of power from the Colorado River storage project. The following are deemed by us to be basic principles for such cooperation:

1. Because of the relationship of the water-storage features of this project to the Colorado River compact, the vast areas encompassed, the magnitude and multiple-purpose objectives incorporated, including nonreimbursable features, we believe the holdover reservoirs and powerplants should be built by the Federal Government.

2. In order to obtain the maximum amount of firm power, the greatest diversity and flexibility in operation and to make the power accessible to the greatest area, the backbone transmission tie line directly connecting major powerplants of the Colorado River storage project, such as Flaming Gorge, Echo Park, and Glen Canyon, except in cases where such interconnections can be more economically and feasibly accomplished through the present and projected transmission systems of the companies, should be an integral part of the generating system, and, therefore, should also be built by the Federal Government. The integration of other plants of the project constructed reasonably adjacent to the present and projected transmission systems of the companies should be accomplished through these systems; the benefits of such integration would accrue to the project without additional cost.

3. In order to obtain maximum flexibility and lowest cost in transmission, it is essential that use be made of the then existing transmission systems of the companies and in addition the companies construct such new transmission lines from the project plants or project interconnecting transmission tie lines to the various load centers of their respective systems as may be required to market project power, the Government or other agencies to construct necessary and nonduplicating transmission lines to other load centers not within the general service areas of these companies.

4. The private utilities are willing to enter into contracts whereby they will deliver project power to preference customers making such reasonable transmission charges therefor as may be approved by the local regulatory authorities; or, the private utilities are willing to contract directly with the preference customers to supply all their power requirements at rates which will pass on such savings as are obtained through the purchase of project power.

5. We believe that the financial feasibility of the project depends upon the sale to private utilities of the power output of the project plants not contracted for by such customers as may be entitled to preference, and that such sales should be made at the powerplants or along the backbone transmission tie line upon terms such that the cost of project power will not exceed the cost of power from alternate sources.

6. Each company as to its rates and charges is subject to the jurisdiction of the State utility commission in which it is furnishing electric service to the public. Rates charged by such utilities for electric service, taking into consideration the cost of power purchased from project plants, will be subject to the full jurisdiction of the appropriate State utilities commission.

To carry out successfully the foregoing principles, it is essential that an understanding be reached in order that these companies may henceforth plan, design, and construct new generating and transmission facilities to coordinate

with the project development. The general premises of this understanding should be incorporated in the legislation authorizing the project.

Mr. ASPINALL. We will come back Wednesday morning at 9:30 and spend the time between 9:30 and 10 o'clock in cross-examination of the witnesses who have just been on the stand.

The committee stands adjourned.

(Whereupon, at 4 p. m., the hearing was adjourned until 9:30 a. m., Wednesday, March 16, 1955.)

COLORADO RIVER STORAGE PROJECT

WEDNESDAY, MARCH 16, 1955

House of Representatives,
Subcommittee on Irrigation and Reclamation of the
Committee on Interior and Insular Affairs,
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:30 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. Aspinall. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will now be in session for the further consideration of legislation having to do with the upper Colorado River program.

When we adjourned our hearings last Monday afternoon, we had before the committee at that time for questioning Charles J. Fain, representing the REA. Is he present this morning? Is anybody here for the REA?

(No response.)

Mr. Aspinall. Mr. David Moffat of the Utah Power & Light Co.; Mr. L. R. Patterson, of Public Service Co. of Colorado. Will you two gentlemen be seated before the witness table and we will hope that Mr. Fain makes his appearance in the next few minutes, in accordance with our request. Here he comes.

The time from now until 10 o'clock has been set aside for questioning the witnesses now before the committee. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

QUESTION PERIOD OF CHARLES J. FAIN, DAVID MOFFAT, AND L. R. PATTERSON

Mr. Saylor. Thank you, Mr. Chairman. The first series of questions I have I will direct to Mr. Fain since he was the first witness.

Mr. Fain, do I gather from your statement that your organization is in favor of construction of parallel transmission lines throughout this entire area?

Mr. Fain. I would not say that we would be in favor of parallel transmission lines, especially if those transmission lines were of the same size. When we talk about parallel transmission lines there are different size transmission lines to carry different loads that must be taken into consideration. And if the lines were of a comparable size, Congressman Saylor, and if proper agreement could be arranged so that the energy could be carried over the lines that are already existing, then I would say that certainly in that case we would not be in favor of duplicating those lines if such duplication meant a greater

cost to the Federal Government and a comparable greater cost to the people whom we represent, that is the rural electric cooperatives.

Mr. SAYLOR. Now the second question, Mr. Fain. I notice beginning on page 4 in your statement, you have a title, "Federal Transmission—The Key to Preference." I would like to ask you just how far you believe preference should go. Do you believe that REA should be entitled to 100 percent of all power transmitted or generated on these Federal projects regardless of how far it is from the site of the production of the energy?

Mr. FAIN. I think my answer to that would be "No," Congressman Saylor, because when you put in the phrase, "no matter how far it is from the point of production," certainly it would become uneconomical to transmit power over some great distances. Consequently, I think with that phrase in there the answer would have to be "No."

Mr. SAYLOR. Then let us assume a hypothetical case in which you have a generating plant and within 100 miles of that plant there are REA's and municipalities which control their own source of energy, and there are also private utilities. After the REA's and the municipalities are taken care of would you be in favor of supplying the public utilities with any power above that point?

Mr FAIN. I believe it has always been true, Congressman Saylor, that the remainder of that power from a project has been sold to the private utilities, if the proper sales arrangement can be worked out; and I would see no reason why that would not be true in the hypothetical case which you have just put, that is, the power over and above the amount sold to the rural electric cooperatives naturally would be sold to other consumers. However, at the same time, it must also be remembered that the rural electric cooperatives load growths are really going up fast. They are young, it is a young industry, and their load growths are increasing tremendously. So, with that thought in mind, we must always consider the future needs of that system as well as its presents needs. So that that should be taken in to consideration in any sales contract which is made for the remainder of the power above their present needs.

Mr. SAYLOR. Well, I will tell you very frankly, Mr. Fain, I am considerably concerned, and some other people in this country are concerned, with the philosophy that the private utilities are un-American, and that, in a sense, is the attitude which some of your organization has taken. In other words, this is still America, and I know of no rule or regulation that entitles you or your groups to all of what is produced from a natural resource to the exclusion of the rest of America. That is the philosophy that I am trying to find out now from you and the representative of the REA's, as to what organization stands for.

Mr. ASPINALL. If my colleague will yield, he will find extremists on the other side as well.

Mr. SAYLOR. There is not any doubt about that. I do not condone those who are opposed to all public power, and those people are just as bad, in my opinion, as those who want to make it all public power.

Mr. ASPINALL. And may I say to my colleague, just as a passing observation, that the area concerning which we are holding these hearings is one of the areas in the United States where there have been very friendly relations between private and public power interests.

Mr. SAYLOR. That is my understanding, that the private and public interests have been very friendly in this area and therefore that is why I am trying to find out what is the philosophy of the national group as to how it should be applied in this area, because the REA's in this area, and municipalities, which control their own power in this area, and private utilities have worked hand in hand, and I am trying to find out now whether or not there is a feeling that regardless of where an REA shows up that it should be entitled for all time to preference to this power.

There is the question that I have asked. That is why I have asked this series of question of Mr. Fain.

Mr. FAIN. Congressman, in answer to your first question, I would say that certainly it is not the philosophy of the people we represent, the rural electric cooperatives, that they should have all of this power, and it has never been true in the past that that is so. In fact, the rural electric cooperatives at the present time are purchasing about 6 to 8 percent of the Federal power which is being generated Now, on the other hand, the private utilities are purchasing about 18 to 19 percent. Consequently. I think that that alone shows that the argument which evidently has been made by some, and you have mentioned it, the facts simply do not bear it out, that the rural electric cooperatives are getting a disproportionate share or all of the power, and that is not our philosophy.

Mr. SAYLOR. In other words, the preference clause as it is drawn, to me, if properly applied, can serve everyone's interest.

Mr. FAIN. Yes.

Mr. SAYLOR. Provided the area in which the power is generated is completely served, so that as you move out from the center of generation, from the busbar, that all parties in the area within an economical transmission distance should be taken care of, rather than transport it outside of that area. That is the reason I ask these questions.

Mr. FAIN. It is rather difficult to make a definite answer to that, because without a specific case in point it is hard to say what is meant by an area or outside that area. The transmission of power in some instances is much more feasible over long distances than others. There are so many variable factors there it would be difficult for me to say "yea" or "nay" to your question.

Mr. SAYLOR. Now you have said in your statement that some of the lack of growth of the REA's has been due to the failure of the Secretary to work out a satisfactory transmission agreement with the private utilities. Now, what examples do you have of that?

Mr. FAIN. What page is that, Congressman, you are referring to?

Mr. SAYLOR. I am trying to find that. You stated that some of the difficulties you have had have been as a result of the failure of the Secretary to work out arrangements.

Mr. ASPINALL. While the gentleman is looking for that, would you yield to the gentleman from California, Mr. Sisk, to ask a question?

Mr. SAYLOR. Surely.

Mr. SISK. I would like, Mr. Chairman, to direct my question to Mr. Patterson, I believe. With reference to your proposed amendment and with reference to a statement that has been made here this morning, that there has been a great deal of cooperation between public and private power interests in this particular area, would you people propose under your amendment to transmit power or wheel

power over your lines and make that power available to REA's in areas in which they operate?

Mr. PATTERSON. Yes, that is right, Congressman. Our group of companies out there, several of them, at the present time have contracts of that nature, and I know there are two other wheeling contracts that are under negotiation at the present time.

Now speaking for the particular company that I am with, Public Service Co., of Colorado, I believe we have one of the older wheeling contracts. It was entered into in August 1950, and it was first activated about the first of the year 1951. We are wheeling power from the Colorado-Big Thompson project to various REA's and some other preference customers in the State of Colorado. And that contract now has been in operation since the first of 1951, and I think the REA's to whom we wheel as well as our own people, would agree that that arrangement has worked out very satisfactorily.

I might say that the REA's are not our customers. They are customers of the United States. They are customers of the Bureau of Reclamation and we merely act as a transmission agency in wheeling the power.

Mr. SISK. Actually, you just have what you would term a wheeling charge?

Mr. PATTERSON. That is right, sir. I know there has been some controversy about who has the title to the power and so on, but under our contract we do not have title to the power. The actual purchase contract is between the preference customer and the United States.

Mr. SISK. I understand you have in mind, assuming that this power was made available after the development of this project, continuing a program of that type wherein you would simply wheel this power with a wheeling charge?

Mr. PATTERSON. That is right, Congressman.

Mr. SISK. That is, at least in areas where REA's desire to purchase power?

Mr. PATTERSON. That is right.

Mr. SISK. I would like the gentleman from Pennsylvania to yield further.

Mr. SAYLOR. Yes, I will yield further.

Mr. SISK. I would like to inquire as to whether or not you have any idea with reference to the possibilities that the REA's by wheeling this power over their lines would be able to purchase it at a lower rate than they are at present. I call attention to a statement by the gentleman from the REA, Mr. Fain, at the bottom of page 2, where he mentions—

> we hope, be able to obtain Bureau of Reclamation service from the proposed project at substantially lower rates than they now pay—

and he goes on here, that

> Our systems throughout the country pay an average of 32 percent of their total operating revenue for wholesale power and a substantial reduction in this item of expense would be of inestimable value.

Now in participation of proposed rate changes for power at the dam site, would you say that in all probability this could be delivered to the REA's at a lower rate than they are now paying?

Mr. PATTERSON. I am not sure, Congressman, just what the rate between the Bureau and the ultimate consumer will be. There has been a figure talked of of about 6 mills.

Mr. SISK. That is what I understand.

Mr. PATTERSON. If that is what it works out to be, that would be lower than the area which we serve now has. The average rate from the Colorado-Big Thompson project at the present time, I believe, will average at the load factors commonly used maybe 7½ to 8 mills, somewhere in that range. So if that is what the rate from this project worked out, it would be lower.

Mr. SISK. How do you determine your wheeling charge? What is the measuring stick?

Mr. PATTERSON. Congressman, we are utilities under the regulation of the State utilities commission, so we make a study of the investment and the operating expenses and losses and all that sort of thing that enter into the wheeling activity and we then submit that to the State utilities commission for their review. After we have reached agreement with them, then we submit that to the United States. It is kind of a complicated thing, a sort of dual regulation in a way. In our other contract, after we had gotten an agreement with the State utilities commission and with the Department of Interior, the thing was buttoned up. But it was a matter of estimating as best as possible and allocating the investments and expenses to arrive at the wheeling charge.

Mr. SISK. I yield back to the gentleman from Pennsylvania.

Mr. SAYLOR. I think I have found it, Mr. Fain; on page 5, you stated that your people have been stymied in their effort to secure their share of power by refusal of power companies to work out satisfactory wheeling contracts.

Mr. FAIN. Congressman, there are two specific instances I would like to discuss in answer to your question. The first is the Clark Hill Dam controversy in Georgia.

In that area the dam has been completed, the power is on the line. The power was allotted by the Department of Interior and under the allotment 120,000 kilowatt capacity was to go to the party cooperatives in Georgia. There was 60,000 kilowatts. The remainder of the power was to go to South Carolina.

However, the utilization of the 120,000 kilowatt capacity to the party cooperatives in Georgia depended upon and now depends upon transmission. In that area, the Department of Interior has built no transmission. Neither has the present Secretary, to my knowledge, shown any disposition at all to build any transmission. Consequently, the use of that power which has been allotted to those 40 cooperatives in Georgia depends upon a proper arrangement being made between the Department of Interior, the private power companies in the area, and the cooperatives, that is a proper wheeling arrangement, or some contract worked out to bring that power to those preference customers. And there has not been any such contract worked out, although the rural electric cooperatives to my own knowledge have been up here several times to see the Secretary and try to work out a proper wheeling arrangement so that that power could be carried to them over the lines of the Georgia Power Co.

Now I think that is a specific instance of what you were asking about.

Mr. SAYLOR. That is right.

Mr. FAIN. The other instance is the John H. Kerr Dam. In that case there is 60,000 kilowatt capacity allotted to the 17 cooperatives in North Carolina. And there has been no effective arrangement worked out for wheeling or carrying that power over private power company lines.

There are two instances where there has been no transmission on the part of the Department of Interior and there has been no wheeling arrangement or no contract by which the power can be carried over the private power company's line to those fifty-some-odd cooperatives in those two States.

Mr. SAYLOR. Now if I might say this to you, Mr. Fain. If you have any other examples, we are interested in knowing about them and if you have them I would appreciate and ask unanimous consent they be permitted to file them at this point in the record.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

Mr. FAIN. Mr. Chairman, we would try to do that work for you.

Mr. SAYLOR. Now, Mr. Fain, about a year ago this committee conducted some hearings with regard to the power policy of the Federal Government and at that time the power policy was stated in the hearings, that REA's were asked to list the future needs. Can you tell us what the future needs listed by your organization were for this upper basin area?

Mr. FAIN. Not offhand, Congressman. That was a little bit before my time, but the record of the hearings may show that. However, I would have to check it. If I may, we will furnish that information for you.

Mr. SAYLOR. Mr. Chairman, I ask unanimous consent that when Mr. Fain gets the requirement which the REA has listed in accordance with our hearings, that they be permitted to be inserted at this point in the record.

Mr. ASPINALL. Without objection, it is so ordered.

(The material referred to follows:)

NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION,
Washington 6, D. C., May 5, 1955.

Hon. WAYNE ASPINALL,
Chairman, Subcommittee on Irrigation and Reclamation,
Interior and Insular Affairs Committee,
House of Representatives, Washington, D. C.

DEAR MR. ASPINALL: During hearings held on March 14 by your subcommittee with respect to authorization of the Colorado River storage project, this association was asked to furnish an estimate of the future needs of the rural electric systems in the principal marketing area of the Colorado River storage project.

Inasmuch as this represents a group of cooperatives for which historical load growth data has not been previously tabulated, it has been necessary to review the energy consumption of 17 separate rural electric systems located in this area. From statistical data published by the Rural Electrification Administration, we have compiled the attached table depicting the individual and total energy requirements of each of these systems for the calendar years 1944 through 1954.

You will note that the annual percentage increase in energy consumed by these systems has varied between 77.8 and 21.01 percent, decreasing as total energy consumption increases.

We have also indicated on the attached table what we believe to be a conservative estimate of the energy requirements of these systems through the year 1975. Our estimates are based on an annual increase of 21 percent, the smallest annual increase since 1944.

At the present time, many of our systems in Colorado are faced with a shortage of power and are unable to serve large irrigation loads. Three federated generation and transmission cooperatives have been organized to alleviate this situation. We think that if a large block of low-cost energy were made available to our ssytems in the area from the Colorado River storage project the rate of increase would rise considerably because, in many instances, the load growth of these systems is limited by the availability of low-cost energy.

Sincerely,

CHARLES A. ROBINSON, Jr.,
Staff Engineer.

Actual energy consumption of rural electric systems in the principal marketing area of the Colorado River storage project by calendar year

[Millions of kilowatt-hours]

	Number	1944	1946	1947	1949	1950	1951	1952	1953	1954
Colorado:										
Grand Valley Rural Power Lines, Inc	7	1.28	2.24	2.82	4.38	5.18	6.07	7.14	8.04	8.99
San Luis Valley Rural Electric Cooperative	14	1.33	4.50	3.80	4.29	9.55	15.25	7.81	8.04	24.30
Gunnison County Electric Association	18	.38	.44	.52	.72	.91	1.08	1.16	1.16	1.33
Delta-Montrose Rural Power Lines Association	20	1.38	1.68	2.29	3.95	4.69	5.29	5.88	6.49	6.88
San Miguel Power Association	26	.78	1.01	2.39	4.80	4.01	8.64	11.74	15.44	2.85
LaPlata Electric Association	32	.82	1.25	2.22	3.85	4.91	6.02	6.79	7.67	8.75
Empire Electric Association	33	1.71	3.20	4.52	7.77	9.10	10.16	11.20	12.89	14.83
Holy Cross Electric Association	34	.62	.90	1.11	1.90	2.24	2.85	3.46	4.93	7.28
Yampa Valley Electric Association	36	.30	.52	.56	1.40	1.99	2.88	15.68	16.05	17.61
White River Electric Association [1]	40	------	.65	.83	1.21	1.56	1.83	2.10	2.35	2.72
North Park Rural Electric Association	42	------	------	------	------	.21	.94	3.35	8.34	12.98
New Mexico: Northern Rio-Arriba Electric Co-op	15	------	------	------	------	.64	1.49	1.87	2.31	2.78
Idaho: Raft River Electric Co-op	16	.57	.97	1.28	2.03	2.94	3.34	6.05	8.06	13.91
Utah:										
Garkane Power Association	6	.73	[2] 1.28	[2] 1.74	2.92	3.62	4.60	5.38	5.56	5.84
Moon Lake Electric Association [1]	8	1.15	1.71	2.39	4.00	4.71	7.82	12.96	15.05	[3] 15.70
Wyoming:										
Riverton Valley Electric Association	3	.95	1.23	1.57	2.75	3.19	3.71	5.36	8.37	11.84
Bridger Valley Electric Association [1]	9	.67	.95	1.09	1.62	1.91	3.63	2.63	3.09	3.38
Total	------	12.67	22.53	29.13	46.07	61.36	85.60	110.56	133.84	161.97
Percent annual increase	------	------	77.8	29.3	58.2	33.2	39.5	29.15	21.05	21.01

[1] Generates own power.
[2] Estimated.
[3] Data for 11 months.

Estimate of total, 1955–75

[Millions of kilowatt-hours]

	Total		*Total*
1955	195.98	1966	1,595.36
1956	237.14	1967	1,930.39
1957	286.94	1968	2,335.77
1958	347.20	1969	2,826.28
1959	420.11	1970	3,419.80
1960	508.33	1971	4,137.96
1961	615.08	1972	5,006.93
1962	744.25	1973	6,058.38
1963	900.54	1974	7,330.64
1964	1,089.65	1975	8,870.07
1965	1,318.48		

Mr. SISK. Will the gentleman yield for a question?

Mr. SAYLOR. Yes.

Mr. SISK. Do you have reference to their needs in perpetuity?

Mr. SAYLOR. Within the foreseeable future. That was an effort to determine what the needs should be and the allocations of Federal power, the REA's together with the private utilities were asked to list their needs, first for the immediate 5-year period, and then whatever progressive growth that they expected within the foreseeable future.

Dr. MILLER. Will the gentleman yield there?

Mr. SAYLOR. Yes.

Dr. MILLER. I know they did do that in Wyoming, Nebraska, and Colorado, in the 23 REA groups there, and I think that their foreseeable needs were about four times the potential power that was being developed. So they are in real trouble in looking for new power as they are in many areas in the United States. I think their demands would be about four times, apparently, what is going to be developed.

Mr. ASPINALL. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. For a question to Mr. Moffatt and Mr. Patterson. As I understand your testimony, the utilities which you represent before this hearing are ready and willing to make the necessary installations to meet the present demand or the demand in the immediate future for power. Is that not correct?

Mr. MOFFATT. Yes, sir.

Mr. PATTERSON. Yes, sir.

Mr. ASPINALL. On the other hand, you are willing to cooperate with this program in order to see that the power which might be produced from it is sold to the advantage of the Government as well as to the advantage of the consumer, is that correct?

Mr. MOFFATT. That is absolutely correct.

Mr. ASPINALL. You both would add the service charges, whatever they might be, which will be permitted by the utilities commission of the various areas represented?

Mr. MOFFATT. And with the agreement by the Secretary of the Interior.

Mr. ASPINALL. And with the agreement by the Secretary of the Interior.

Mr. PATTERSON. That is right.

Mr. SAYLOR. One other question, Mr. Fain; on page 14, you come out and endorse Echo Park Dam and base your endorsement upon the testimony of the former United States Secretary of the Interior, Mr. Tudor.

In view of the fact that the present Commissioner of Reclamation, Mr. Dexheimer, stated that Echo Park was not an indispensable feature and that it would not render the entire upper Colorado River storage and participating projects infeasible if it were not built, would that change your position?

Mr. FAIN. No, sir; it would not change the position of our association in regard to this specific project.

Mr. SAYLOR. And then with regard to the San Juan Chama, you comment upon the fact that the differences between the bills last year and this year do constitute a loss of 145,000 kilowatts, but that you only hope that something can be worked out that that can be put back in. In other words, that is not a very serious loss as far as you are concerned?

Mr. FAIN. I do not believe I would quite express it that way, Congressman Saylor. It is a loss of power which would undoubtedly help to pay out the entire project, because after all, power is going to pay a big part of the entire projects.

However, I think for the record we should make it clear that we realize there are some difficulties of a local nature that must be worked out in regard to the San Juan Chama project and so far as we can ascertain there is no thought that power will be forever stricken from the San Juan Chama project, but that power will try to be put

into the project when these differences can be worked out. For that reason, we have commented on it, and we feel that the power is important and we are hopeful that in the future that project can be authorized for the production of power.

Mr. ASPINALL. The Chair must interfere at this time. The hour of 10 has arrived. We wish to thank you gentlemen for making your appearance before the committee and permitting questioning this morning. Thank you very much.

Mr. SAYLOR. I want to thank the gentlemen. I am sorry I didn't get a chance to question the other two men.

Mr. Chairman, might I be permitted to submit to the Chair several questions for the other two gentlemen to answer?

Mr. ASPINALL. I think that would be in order. You submit the questions to the Chair and he will submit them to the gentlemen, representing the private utilities, and then we will bring the questions and the answers before the committee, and then we will determine whether or not they will be made a part of the record.

Mr. SAYLOR. I have one or two other questions I would like to ask Mr. Fain and request the same permission.

Mr. ASPINALL. All right; unless there is objection, it is so ordered.

Mr. MOFFATT. We will be glad to answer those.

Mr. ASPINALL. Let me state that the order of the committee this morning will be to hear representatives from Wyoming. The Chair would ask permission to permit the Wyoming representatives to make their statements and then to be questioned later, as we have heretofore. Is there any objection?

Hearing none, it is so ordered.

The Chair would also express the hope that we would be able to finish the questioning of the Wyoming representatives by 11, so that we can place on the witness stand and hear the statements of the representatives from the Indians who wish to testify. However, the time is in control of the committee and the Chair will abide accordingly.

Mr. HOSMER. At that point, Mr. Chairman, that is a departure from the previous announced schedule.

Mr. ASPINALL. Only insofar as Mr. Untermann was supposed to testify at this time. We will leave Mr. Untermann until this afternoon. The business of the House is such that this subcommittee will be able to meet this afternoon at 2 o'clock.

Mr. HOSMER. Thank you.

Mr. ASPINALL. Senators O'Mahoney and Barrett are in the room. It is our custom to permit the Members of the other body to make a statement if they so desire. The Chair would like to acknowledge the presence first of the senior Senator from Wyoming, Senator Barrett, former member of this subcommittee and, a very active member, a very constructive member, a very-well-beloved member. We are glad to have you with us this morning, Senator.

STATEMENT OF HON. FRANK A. BARRETT, A UNITED STATES SENATOR FROM THE STATE OF WYOMING

Senator BARRETT. Mr. Chairman and members of the committee, I appreciate the opportunity to return to this committee room. I spent many happy years as a member of this committee. I am here today to support the upper Colorado River project bill in its entirety.

Wyoming falls like a saddle astride the top of the Continental Divide. We are blessed with an abundance of water. It flows down our mountains in all directions. The Snake River flows in a westerly direction to the Pacific, the North Platte goes down the Missouri to the Mississippi and to the Gulf of Mexico, and the Green flows into the Colorado and into the Gulf of California.

We have a very interesting body of water in the wilderness area near the Yellowstone, called Two-Ocean Lake. The western part of the lake flows into the Pacific and the eastern into the Gulf of Mexico.

The snow that is packed on our mountaintops in the wintertime and the rain that falls on the hills of Wyoming in the summertime make a great contribution to the welfare of every one of our neighboring States. Sometimes it goes down in a soft and gentle fashion for the accommodation of man; and other times it flows in terrific torrents and reeks death, destruction, and devastation on its march to the sea.

So, Mr. Chairman, it is not an unmixed blessing. Our State is an arid State, as everyone knows. We need every drop of our water to develop our State. It is one of our most prized possessions and our greatest natural resource.

God has been generous with water to Wyoming. He has given the world an abundance of water. But he intended that man should use his ingenuity to see that it is used for his benefit. He meant for man to control the floods. And so it was, Mr. Chairman, that Congress in its wisdom set up some very definite water policies. The Congress determined to control the water where there was too much, and save it, and conserve it where there is too little. So over the years, policies have been worked out to control floods for the benefit of nearly every section of the country except the Mountain States. We in Wyoming get little benefit form the appropriations for flood control. The total appropriations to date are unconsiderable. On the other hand, States such as California and Pennsylvania have had upwards of 3 or 4 hundred million dollars total appropriations for flood-control purposes. And, as everyone knows, such appropriations are on a nonreimbursable basis.

Now, when the reclamation law was put on the books, fifty-some-years ago, it was wisely provided that a considerable portion of the income from the public domain of the Western States would be used for the development of our water resources by the building of reclamation and irrigation projects on our dry lands.

So the Congress intended that a major portion of that income should go back to the States where it originated, to be used to create a continuing resource year after year to replace the mineral resources taken from the soil of those States.

So today we find ourselves in this position. The income from the public domain of Wyoming to the Treasury of the United States exceeds $206 million.

I might say to you, Mr. Chairman, that $155 million has been spent in our State by the Bureau of Reclamation for the construction of reclamation projects. But the amounts paid by the settlers on these projects, the income from the hydroelectric projects in our State, and the contributions to the reclamation fund from the income in our public lands is equivalent to all the moneys spent in our State for reclamation. So far as Wyoming is concerned, the Federal Govern-

ment has contributed little or nothing by way of flood-control appropriations and it has received complete repayment as far as the moneys expended for reclamation.

We have a right to live. We believe in the policy of live and let live.

It is true that the big and powerful States can control the House of Representatives, if they will. There is no question about that. As I said before, I served on this committee for 8 years. I know full well the numerical impotence of the western Members of Congress in the House of Representatives. I know that we have had battles, terrific battles, to develop the reclamation program in the West. We are a distinct minority in the House.

The founders of our country wisely provided a check on the power of the bigger and more powerful States by setting up equal representation in the Senate. I hope that the time will never come when the Western States will be divided on reclamation. I hope that the time will never come when the Western States will have to battle for self-preservation against these larger and powerful States that get such generous treatment as far as flood-control appropriations are concerned.

I have always supported flood-control legislation, and I expect to do so in the future. It seems to me that the people of those States interested in flood-control funds should accord to the Western States the same fair treatment which they receive on their water projects.

Now somebody said that this is going to call for a tremendous appropriation. I say to you, Mr. Chairman, that in my judgment, the development of this project will mean that the population of that area will increase by a quarter of a million people. In my judgment, Mr. Chairman, the settlers on the projects, the people in the communities near the projects, the people who will be employed by industries that will come in because of the development of power, will pay such additional taxes that in the long run the Federal Government will be better off instead of worse off because of this expenditure.

I hope that this committee in its wisdom will see fit to report this bill favorably.

Thank you very much, Mr. Chairman.

Mr. ASPINALL. Thank you, Senator Barrett, for a very excellent statement.

Senator BARRETT. Thank you again.

Mr. ASPINALL. The Chair at this time calls the junior Senator from Wyoming, Senator O'Mahoney.

STATEMENT OF HON. JOSEPH C. O'MAHONEY, A UNITED STATES SENATOR FROM THE STATE OF WYOMING

Senator O'MAHONEY. Thank you, Mr. Chairman.

Mr. ASPINALL. We are glad to have you with us this morning, Senator O'Mahoney.

Senator O'MAHONEY. I am delighted to be here.

I notice that you have before the committee a map of the upper Colorado River Basin. I would like to distribute to each member of the committee a miniature copy of this map.

Mr. ASPINALL. I can assure the Senator we do have these maps.

Senator O'MAHONEY. I know, but I would like to have them before you while I talk.

I want first to talk about a flowing river, but if I were to give a title to the talk I wish to make, I would call it "They Want To Throw Us to the Dinosaurs."

The arguments which have been made against this upper Colorado River storage project, in my opinion, are completely contrary to the policy of the Government since the Colorado River compact was signed by the authority of the Congress and approved by the Congress.

The attack rises from two sources: First, those in the lower basin, who fear that if the upper basin is permitted to use the water which was allocated to it, the lower basin will somehow be deprived of some of its rights; second, those who seem to believe that somehow or another the building of the Echo Park Dam will create a precedent for raids upon national parks and national monuments all over the United States.

The answer to the first is, Mr. Chairman, that in drawing the bill which is before the Senate, S. 500, an attempt was made to provide that what is to be done in the upper Colorado Basin would be done solely in compliance with the Colorado River compact and the various acts which have been passed since that time.

The answer to the second is that the law and the facts prove that the building of this dam cannot be a precedent. I undertake to show you today, if I do not trespass upon your time, that that is not true, and that, quite to the contrary, the expansion of Dinosaur National Park—or National Monument, I should call it, because it is not a park and never was a park—the expansion of the Dinosaur National Monument by Executive order in 1938 was an invasion of a policy already laid down by Government agencies to devote the area where the Echo Park Dam is to be built to the development of power.

Now let us take a look at the map.

The history of the Colorado River and its tributaries will never be told. The National Park Service has attempted to tell part of it in a little booklet which is entitled "Dinosaur National Monument, Past and Present," published by the Government Printing Office in 1949.

Here on the very first page I will read a few lines:

> The chain of events that produced the area comprising Dinosaur National Monument began in what is known as the Jurassic period of earth history. This period, according to the best calculations of geologists, occupied an interval of time from 127 to 152 million years ago.

At another point in this document—the paragraph escapes my eye at the moment—the statement is made that in that ancient period this area was inhabited by the dinosaur and his relatives, who, in time, gave way to more intelligent beings—oh, here is the sentence from page 18: "There did, however, come a day when the last dinosaur drew his final breath, leaving the world to new, different and more intelligent creatures."

In the belief that man is to be classified among these "more intelligent creatures," I appear before you today to beg of you to use the intelligence of the Congress to maintain the policy which was initiated after this history of over a million years of destruction.

Congress was intelligent enough, and the States of the Colorado River Basin under their governments were intelligent enough, to do something about the control of the stream which had wrought so much damage through millions of years, and to use it for a constructive purpose.

As you will see from glancing at the map, the story of the waters of the upper Colorado River Basin begins in the State of Wyoming, where the Green River has its rise—the Green River and its tributaries. It flows south past the towns of Green River and of Rock Springs, through the Flaming Gorge site, into the State of Utah, and then over into the State of Colorado.

Under the compact which was written by the Colorado River Compact Commission, of which former President Hoover was the head, and approved by the Congress of the United States, it was agreed to divide the waters of this stream, the main flow of this stream, the waters of this system, between the upper basin and the lower basin, and the delivery of the waters which the upper basin owed to the lower basin was ordered to be made at this point on the map—at Lee Ferry.

The agreement in that compact was that each basin would be entitled to use for consumptive purposes just about half of the streamflow of that system.

The work first began in the lower basin. Of course, before the Colorado River compact was approved there was private irrigation both in the lower and the upper basin, and efforts were made to irrigate and reclaim certain amounts of land. But, according to the testimony of Mr. Northcutt Ely, a representative of California in the sense that he is one of the lawyers representing the California claims, the State of California today is using about 5 million acre-feet plus of water from this system. The lower basin, all of the lower basin, is using about 6½ million acre-feet. The upper basin, Mr. Northcutt Ely acknowledges, presently is using between 2 million and 2½ million acre-feet. We place that use at 2 million, but for the purposes of this argument I accept Mr. Ely's figures.

In his testimony before the Senate committee, he also acknowledged that all of the projects in the upper basin, which have heretofore been authorized but which have not yet been constructed, might add from 4 to 5 hundred thousand acre-feet to the future uses of the upper basin.

Let us take the maximum figures mentioned by Mr. Ely, 2½ million acre-feet, his maximum estimate of present use, and 500,000 if authorized projects not yet built were constructed. Thus, according to the estimates of the California expert, we would have 3 million acre-feet. If all the participating projects included in the Senate bill (S. 500) and the Governor Johnson amendments which have been proposed were built, the upper basin use would not exceed 4½ million acre-feet.

The lower basin, on the other hand, has 6½ million acre-feet. Thus, considering present uses, heretofore authorized but unbuilt, and projects proposed by this bill, there is a ratio of almost 6 to 4 against the upper basin on the testimony of Mr. Ely, so far as California is concerned. But it is important to remember that Mr. Ely estimates the present uses in the upper basin at a half million acre-feet more than does the Bureau of Reclamation.

We have reason to believe that the lower basin may use even more than acknowledged by Mr. Ely, but the juxtaposition of these figures, it seems to me, must convince every fair mind that nothing should be done or be permitted to be done to prevent the utilization in the upper basin States of the water allocated to it by the Colorado River compact, namely 7½ million acre-feet annually.

The upper basin States are willing to be bound by the compact. The bill before you acknowledges that. Every attempt is made to avoid injurying any right, either existing or potential, under the Colorado River compact. We want only to have the opportunity of using the water as it flows through our States, while we deliver at Lee's Ferry, according to the obligation laid upon us in the Colorado River compact, 7½ million acre-feet, which is 3 million more than is now being used and proposed in the whole upper basin annually.

Now this is the simple picture, but a great effort has been made to convince those who listen to the arguments against the upper basin that this water system is almost a static business. We are asked to overlook the fact that the water moves and that it has been moving down that valley for millions of years. During all of those eons it has wrought only destruction. Man had not captured it, nor harnessed it, nor done anything to make it useful, except in a very small way, until by the authority of Congress the States in the Colorado River Basin were authorized to make a compact to bring these eternally flowing waters under control and to make this system an instrument of construction.

Fortunately for the lower basin, the lower basin States secured Federal legislation to store and divert water long before the upper basin States ever reached an agreement. Finally a percentage was allotted to each of these upper basin States, and now we are here asking authorization to begin the construction of projects which, in the bill, must be supported by the certification, not only of the Secretary of the Interior, but of the President of the United States, that the projects are feasible.

Yet you are asked to believe that this is a project which will place upon the backs of the taxpayers of the United States an intolerable burden.

My colleague, Senator Barrett, has just shown to you how the State of Wyoming alone, under the Federal Leasing Act, a law passed by the Congress, has been contributing millions of dollars ever since 1920 for the reclamation fund to build reclamation projects most of which, until 20 years ago, were built in other States.

And yet, gentlemen, propagandists have the—well, I should say, effrontery to scatter broadcast through the Congress of the United States a little pamphlet with a red back and a red front attempting to tell the people of the country that the upper basin States are not contributing to the cost of this project.

We build power; we have returns from the projects. Of course, it would be impossible to require the farmers on the newly irrigated farms in this area to pay the entire cost. Everybody knew that when the Colorado River compact was drawn and when it was approved. That was known when the Hoover Dam was built and made a power project to develop power and earn revenue.

I wish it were possible to display to you on a screen the pictures of the Colorado River and the lower basin before the Hoover Dam was

built and after it was built. I have some photographs here showing the site after completion of the dam. But it is only necessary to refer to the irrigation of the Imperial Valley in California, it is only necessary to refer to the great expansion of the City of Los Angeles, it is only necessary to refer to the development of California industry as a result of the water and the power which was stored in these dams to prove conclusively that it was a wise and salutory act of Congress to authorize the harnessing of this stream. Surely what was good enough for the lower basin ought to be good enough for the upper basin, too.

Now it is said that the Echo Park Reservoir should not be permitted to be built. It is said that Congress ought to preserve the deep canyons which were worn in the terrain of the upper basin by the Green and Yampa Rivers during all these centuries past, preserve them as a monument to the dinosaurs; and the public is sought to be convinced that those of us who advocate the construction of this reservoir are flooding out the Dinosaur Monument. It is not so.

In this same monograph of the National Park Service, written by William Lee Stokes of the United States Geological Survey and the University of Utah in 1949, there is a map of Dinosaur National Monument in Utah and Colorado, and this map contains a little diagram showing the original Dinosaur National Monument. I would like the members of the committee to see that.

Congressman Thomson, the original Dinosaur Monument is this almost infinitesimal spot at the extreme western end of the Dinosaur National Monument, as expanded [indicating].

Long before the Dinosaur National Monument was created by the Executive order of President Woodrow Wilson under the authority of the Antiquities Act, long before that, there was a reclamation withdrawal in this area because it was recognized that reclamation was one of the constructive purposes to which water could be put. Here was a stream that had been rushing torrents of wasted water down through an area larger than the whole New England States and part of New York, Pennsylvania, and New Jersey. Here was this great area through which this river had been tearing and foaming and pouring torrential floods, carrying all sorts of silt and, maybe, mineral resources in its flood, but always digging in and digging in. Here was this river.

Then an attempt was made to store water, store it in the Hoover Dam, with great success. But they tell us, if we store water in the Glen Canyon Dam, that will deprive the lower basin, or at least California, of some of its uses. The words are written into the bill to prevent that.

But the point that I want to make to this committee with respect to these dams is that the only way by which the upper basin States can get the water which was allocated by the authority of the Congress of the United States to the upper basin is to build these dams.

It is said that the minute the Glen Canyon Dam is built Hoover Dam or Lake Mead will be deprived of its supply. That assumes that to build a dam in the upper reaches of a stream it is necessary to stop the flow of the stream entirely. That is not the way the engineers build dams.

The members of this committee can look at pictures, some of them on the walls of the committee room outside, pictures from the Bureau

of Reclamation, which show how the tunnels are dug so that the stream can continue to flow. You cannot build a dam with a flooding lack behind it; you have to make the stream flow around the construction work. Otherwise men could not live there very long; they would soon join the dinosaurs of 150 million years ago.

The dams at Glen Canyon and at Echo Park are structures that are designed to balance the flow. What the engineers have planned to do is to store the water that goes to waste, the water that is not claimed by the lower basin, the water that the lower basin could not get under the Colorado River compact, the water that we can use if we have the intelligence to build structures that will save it. And all the time that those dams are being built the upper basin is still under the obligation of the Colorado River Act and of the compact to deliver at Lee Ferry an average of 7½ million acre-feet annually, or 75 million acre-feet for a 10-year period for the use of the lower basin.

The testimony before the Senate, as I said at the beginning, is, according to Mr. Ely's figures, that the maximum present use of water in the lower basin, including the use by Arizona, is about 6½ million acre-feet. So we have not reached their full allocation, and we intend only to take the water that is not necessary to meet what they need.

Now then, just a word about the creation of the monument.

I wrote to the Director of the National Park Service, asking him for some pictures of the Dinosaur Monument, where the bones are found. His letter to me reads as follows, being dated December 23, 1954:

DEAR SENATOR O'MAHONEY: In answer to your letter of December 16 requesting photographs of the original 80 acres of Dinosaur National Monument, I am enclosing three 5 by 7 prints of photographs taken in the quarry section, and two copies of a sales pamphlet on the dinosaur fossils which contains illustrations of several scenes in that area.

We do not have on hand prints of the pictures in the pamphlet, but we can have them made for you if you will let us know which ones you would like and the size print desired.

Although we cannot furnish the sales pamphlet in quantity, we can furnish you a few extra copies if you need them.

Sincerely yours.

I wish to pass these photographs around because they prove conclusively that the 80-acre Dinosaur Monument set aside by Executive order of President Woodrow Wilson to preserve the bones of the dinosaurs is not a thing of beauty. It is like any quarry—a bleak and unattractive area.

Now I want to read from the Congressional Record of August 20, 1954, from a statement made by Senator Watkins, of Utah, in which he set forth in orderly progress the history of the movement by which the Dinosaur National Monument was expanded.

Official actions since 1902 which established the priority of water and power development in the Green and the Yampa Rivers follow:

1. October 17, 1904, reclamation withdrawal;
2. June 8, 1906, act authorizing the creation of national monuments.

I pause here to say parenthetically that that act, the Antiquities Act, authorized the President to set aside by Executive order areas of historical or scientific value, but it contained a specific proviso that the area should be the smallest possible area to protect the historic site

or the scientific area. The Dinosaur Monument was created by Executive order and it embraced only 80 acres.

As long after that as 32 years, the same forces which are now attacking the development of the Colorado River in the upper basin as some sort of a raid upon conservation succeeded in persuading President Roosevelt to issue an Executive order expanding that 80-acre monument of Wilson's by some 209,664 acres.

Where were those acres, Mr. Chairman? They were the acres embracing the confluence of the Yampa and the Green River. There are no dinosaur bones there; there is nothing of scientific value there except the scientific value of flowing water which ought to be used.

So I say without any hesitation or equivocation that the creation of the expanded Dinosaur National Monument in 1938 on the 14th of July had nothing to do with the preservation of any historical site or the preservation of any scientific area. On the contrary, it was an attempt to use for scientific purposes, for development purposes, water that had previously been recognized as one of the best sources of waterpower in the United States.

I return now to Senator Watkins' statement:

October 4, 1915, proclamation establishing the Dinosaur National Monument of 80 acres.

June 10, 1920, Federal Power Act passed; section 4 giving authority to issue licenses for the erection of dams both within and without a national monument.

March 3, 1921, the Federal Power Act was amended to prevent the licensing of dams, powerplants or other works in national parks and monuments without specific authority of Congress.

That is now cited, I say parenthetically, by some of the witnesses against this bill as a congressional disapproval of this act; whereas, upon its face, all that that act does is to say that the Federal Power Commission cannot by executive action alone issue licenses within parks or monuments, but must have the approval of Congress. It was an act which retains for this committee and this Congress the authority to pass the bill which is before you, and the bill which we have before the Senate.

Now I return to Senator Watkins' statement again:

This amendment was limited to "existing" national parks and monuments "as now constituted."

So that it was, you see, a limitation bounded by the date of the passage of that act, which was March 3, 1921.

Let me skip now a little bit to August 9, 1934.

The National Park Service asked the Federal Power Commission to restore its withdrawal for power purposes in the acres in Green and Yampa River Canyons so that a national monument could be established, and stated: "Such an area would be established by Presidential proclamation which would exempt all existing rights and a power withdrawal is an existing right."

On December 19, 1934, the Federal Power Commission replied, referring to withdrawals for the Echo Park and Blue Mountain power developments, saying, after noting that the Park Service had acknowledged the withdrawal and stated that such rights would be exempted, the Federal Power Commission continues—

this I want to emphasize—I am quoting from the Federal Power Commission—

"It is generally recognized that the Green and Yampa Rivers present one of the most attractive fields remaining open for comprehensive and economical power development on a large scale."

Those were the words of the Federal Power Commission on December 13, 1934, when the National Park Service was endeavoring to expand the 80-acre monument by 209,664 acres in order to include the power sites. Who is rating whom?

Then the Power Commission goes on: "The sites we are considering are important links in any general plan of development of those streams. The Commission believes that the public interest in this major power resource is too great to permit its impairment by voluntary relinquishment of two units in the center of the scheme. The Commission will not object, however, to the creation of a monument if the proclamation contains a specific provision that power development under the provisions of the Federal Water Power Act will be permitted."

Clearly, the story of the expansion of this monument is the story of the attempt of the Federal Power Commission to protect the water resources and the power resources of this area. And then what happened?

I will skip so that I may not take up too much of your time.

July 14, 1938—

says Senator Watkins—

after many local meetings were held, at which the people of the area were assured that the proposed expansion would not prevent the development of the water and the power resources, the President of the United States issued a proclamation enlarging the Dinosaur National Monument from 80 to 209,744 acres.

The proclamation provides that this expansion—

this is in the proclamation by President Roosevelt—

this expansion shall not affect the operation of the Federal Power Act of June 10, 1920, 41 Stat. 1063, as amended.

Then Senator Watkins says:

This proclamation, including the specific reservation, is a pledge to the people of Utah and Colorado that the expansion of the monument would not interfere with the development of their water and power resources. The construction of the Echo Park Dam in the Dinosaur National Monument, therefore, cannot be an invasion of the national monument principle, nor establish a precedent that would be applied to other monuments.

Mr. Chairman, I believe that this recitation by Senator Watkins, briefly pointing out each step of the way, is conclusive proof that the passage of this act will create no precedent to injure any national park or national monument, and no power site can be granted thereafter, I think, without the consent of Congress.

So, Mr. Chairman, the issue before us in the Congress this year is simply whether or not we shall take the intelligent course of allowing the people in the upper Colorado River Basin to have the benefits which were allocated to them by a compact among the Basin States and approved by Congress, whether they shall have the right to have the Federal Government do for them what it has already done for the lower basin, by building reservoirs to store the flowing water which otherwise would go to no use at all.

Now in closing—I have talked too long—I merely want to say that the area of the State of Wyoming, which is in this upper basin, is at the very top of the Colorado River system. The waters have been flowing down there through the Green River for ages. The land there needs the water. It can be placed upon the land. It can be placed upon the land by this plan, this comprehensive plan, by engineers who have not yet built any dam anywhere in the United States that has collapsed. The record of the Bureau of Reclamation is perfect upon that point.

So, Mr. Chairman, I say, please, please forget these emotional appeals without basis, and instead of making the upper Colorado River

Basin a monument to the destruction of the ages that have gone, let us make it a monument to the growth and expansion and the development of intelligent action, using the discoveries of science and the learning of the colleges and schools we have built by public resources all over the United States, in order to make it easier and of a better standard for people to live.

If we were to follow the course of policy outlined by Gen. U. S. Grant, who testified before us, by Sierra witnesses, by the Wilderness witnesses, we would be turning our back on all that science has developed, and we would be saying, "The people of America may enjoy these great achievements of the century except in the upper Colorado River Basin."

And not there, because of fears entertained, without justification, because of the language in the bill, and because of sentimental and thoughtless appeals by people who do not know that when the Dinosaur National Monument was expanded the power resources of the area were protected in the President's Executive order.

I thank you very much, gentlemen.

Mr. ASPINALL. Thank you, Senator O'Mahoney.

The Chair would ask unanimous consent that the meeting this afternoon be extended from 4 to 4:30 so that we can have from 2 p. m. to 4:30 this afternoon. Is there any objection?

Hearing none, it is so ordered.

The Chair would also ask unanimous consent of the committee that we would be allowed to meet Saturday morning 2 hours from 10 to 12.

Mr. RHODES. Mr. Chairman, reserving the right to object, is it the thought of the Chair that we will be able to finish this hearing this week?

Mr. ASPINALL. We will be able to finish all of those which we planned this week, and then we will have one day on Monday the 28th of March.

Mr. RHODES. So that both the opponents and proponents of the bill will appear this week, but with one additional day.

Mr. ASPINALL. One additional day given to the Conservationist group on the 28th of March.

Mr. RHODES. I do not object.

Mr. ASPINALL. Hearing no objection, it is so ordered.

Mr. BERRY. Might I ask one question. I would like to have the citation that Senator O'Mahoney gave on the testimony of Senator Watkins from the Congressional Record.

Senator O'MAHONEY. That was in the Congressional Record of August 20, 1954, page 14654.

Mr. BERRY. Thank you very much.

Mr. ASPINALL. Congressman Thomson, do you wish any time at this time?

Mr. THOMSON. No, I do not.

Mr. ASPINALL. Thank you.

In accordance with our agreement, we shall listen at this time to the testimony of Hon. Edward D. Crippa, former United States Senator from the State of Wyoming, a personal representative of the Governor, Gov. Milward L. Simpson, of Wyoming.

Senator Crippa, we are glad to have you before our committee.

STATEMENT OF EDWARD D. CRIPPA, PERSONAL REPRESENTATIVE OF THE GOVERNOR OF WYOMING, ROCK SPRINGS, WYO.

Mr. CRIPPA. Mr. Chairman and members of the committee, I appear as the representative of the Governor of the State of Wyoming. I am sorry he cannot be here to attend this meeting which is of vital importance to our great State, but our Governor is sick and asked that I appear in his stead.

He has a prepared statement, and I am going to ask it be placed in the record, and also, the 33d legislature of the State of Wyoming passed a joint memorial, Senate Joint Memorial No. 2, memorializing the Congress of the United States to authorize the Colorado River storage project and participating projects, and I ask that also be incorporated into the record.

Mr. ASPINALL. Is there any objection to the inclusion of the statement and the resolution at this point in the record?

Hearing none, it is so ordered.

(The statement and the memorial above referred to follow:)

STATE OF WYOMING

OFFICE OF THE SECRETARY OF STATE

UNITED STATES OF AMERICA,
State of Wyoming, ss:

I, Everett T. Copenhaver, Secretary of the State of Wyoming do hereby certify that the annexed is a full, true, and correct copy of Enrolled Joint Memorial No. 4, Senate, being Original Senate Joint Memorial No. 2, as passed by the 33d legislature of the State of Wyoming, and approved by the Governor on February 10, 1955, at 8:15 o'clock a. m.

In testimony whereof, I have hereunto set my hand and affixed the Great Seal of the State of Wyoming. Done at Cheyenne, the Capital, this 24th day of February A. D., 1955.

[SEAL] EVERETT T. COPENHAVER,
Secretary of State.

ENROLLED JOINT MEMORIAL NO. 4, SENATE

(Original Senate Joint Memorial No. 2)

Thirty-third State Legislature of the State of Wyoming

A JOINT MEMORIAL memorializing the Congress of the United States of America with reference to proceeding with the development of the Colorado River in the Upper Basin States by authorizing the Colorado River storage project and participating projects

Whereas the development of the Colorado River in the Upper Basin States, consisting of Arizona, Colorado, New Mexico, Utah, and Wyoming, is of foremost importance to the future development and general welfare of said States and of the western United States; and

Whereas, the allocation of the waters of the Colorado River apporportioned to the upper basin by the Colorado River compact has been amicably settled by and between the above States; and

Whereas, the Upper Colorado River Compact Commission, comprising one member each from the States of Colorado, New Mexico, Utah, and Wyoming and the Federal Government is a functioning body and has already completed a dynamic plant for the development of the project; and

Whereas, a report of the participating projects has been compiled by the United States Bureau of Reclamation, approved, with modifications, by the Secretary of the Interior, and submitted by him to the Congress of the United States; and

Whereas, this desirable development cannot be commenced without the authorization of the Congress of the United States of America: Now, therefore, be it

Resolved by the Senate of the 33d legislature of the State of Wyoming, the house of representatives of such legislature concurring, that the Congress of the

United States of America, be and it is hereby memorialized to promptly, diligently and fairly consider and act upon at this session, legislation to authorize the Colorado River storage project and participating projects; and be it further

Resolved, that certified copies hereof be promptly transmitted to the President and Vice President of the United States, the Speaker of the House of Representatives of said Congress, United States Senator Frank A. Barrett, United States Senator Joseph C. O'Mahoney, and Representative in Congress E. Keith Thomson, to the Secretary of the Interior, the Commissioner of Reclamation, the Upper Colorado River Compact Commission, and to the Governors and legislatures of the following States: Arizon, Colorado, New Mexico, and Utah.

R. L. GREENE,
President of the Senate.
T. C. DANIELS,
Speaker of the House.

Approved, February 10, 1955, 8:15 a. m.

MILWARD L. SIMPSON, *Governor.*

STATEMENT OF MILWARD L. SIMPSON, GOVERNOR OF WYOMING

As Governor of the State of Wyoming, I am vitally concerned with the development of our water, mineral, in fact all natural resources and our industrial potential. The development of the Colorado River Basin is essential if we are to approach anywhere near our capacity as a State and as an area. I firmly believe that the authorization and construction of the Colorado River storage project and participating projects is the key to the development of this great treasure chest of America.

Through the negotiation of the 1922 Colorado River compact, the use of the waters of the Colorado River were allocated to the upper and lower basins. To date the lower basin has been given a tremendous amount of development in Hoover, Parker, Davis Dams, the all American Canal and other great works of the Bureau of Reclamation while we in the upper basin have been willing to cheer them on knowing that through the compact our turn would eventually come.

We in Wyoming believe in solemn agreements as well as laws. The law of the river stipulates that there shall be 75,000,000 acre-feet of water delivered at Lees Ferry every consecutive 10-year period. With full knowledge of this obligation we now desire to proceed with the development of our resources.

Practically all of the Nation's most vitally needed resources, uranium, coal, oil, natural gas, titanium, vanadium, phosphorus and others, are known to be available in the upper basin. To fully develop, we must have power which can be supplied by the Colorado River storage project and we must have water which can only be supplied by the Colorado River storage project and participating projects. It is possible, God forbid it, that dispersion of industry could mean the difference between winning or losing a war. The great distances available only in this area are the best means of escaping from the deadly atomic fallout.

Echo and Glen Canyon Dams are vital elements in the development of the upper basin States. An equitable agreement can be reached to assure the lower basin that no impairment of their rights will take place during the filling period of these reservoirs. All we are trying to do is put to use part of the water assigned to us by compact.

By diverting natural flow upstream in exchange for storage water Wyoming will utilize the waters stored behind Echo and Glen Canyon Dams to irrigate lands in three participating projects included in the bills now pending before Congress. These projects are LaBarge, Lyman, and Seedskadee. Also the already authorized Eden project will participate in the power revenues. Wyoming is convinced that the Kendall Reservoir unit located in the upper reaches of the Green River should be included in the original authorization, either as a storage unit or as part of the Seedskadee irrigation unit.

The 33d State Legislature of the State of Wyoming passed senate joint memorial No. 2 memoralizing the Congress of the United States to enact legislation authorizing the Colorado River storage project and participating projects. I am presenting this official act under the great seal of the State of Wyoming for the record.

We in Wyoming are doing everything we can unitedly to get this much needed development and we urge early enactment of proposed legislation.

Mr. ASPINALL. You may proceed, Senator.

Mr. CRIPPA. Much has been said about the Colorado River projects but to my way of thinking there is ample proof that we of the great West have been able to succeed because the Congress of the United States has had the foresight in the past to approve the building of great reclamation projects and will be asked to continue the programs for building dams and power projects so we can continue to grow and progress. Congress was foresighted, too, in the arrangement for financing these projects in the form of a loan, much too large for private enterprise generally to carry, especially in view of the varied benefits, but at the same time paid back into the Treasury in power revenues, land sales, and taxes. I am sure no one in America wants to go back, but we want to plan and be prepared for the future. The West can be the arsenal for defense in times of war and peace. In my State of Wyoming, by the construction of Echo Park and the participating dams or other projects such as Flaming Gorge, Seedskadee, LaBarge, and Lyman projects, we can expand the great mineral resources of our State for the benefits of all the people of our country.

The prospects for development of the natural resources in the great State of Wyoming are tremendous and these resources will be important to our country as it grows in population. Of equal importance is the development of such resources for our national defense, or probably as insurance to protect our future defense needs.

All of this would result from orderly and continued development of the upper Colorado River as here proposed. The Green River Basin in Wyoming, included in this project, is rich in iron ore, coal, phosphates, uranium, trona, oil and gas, and other vital materials and also a wealth of timber for pulp, newsprint, building, or other products of timber.

The development of all such resources needs both water and power, and while this protection is taking place with the water conservation, homes are being found for an expanding population to augment the labor supply for new industry. Of course, these resources do not end at the Wyoming line, but the example here on the Green River is true as the river flows into the Colorado where the abundance of undeveloped wealth continues in this great basin into Utah and New Mexico. Our expanding population will find as a result of the development, opportunities for better living while producing products to be shared by the entire Nation and buying in return the manufactured products of other parts of the country.

Coal might be given as an example of the potential of the area. Coal has suffered a serious decrease in production as fuel with serious loss of employment, but this very situation is bringing expanded research for the many other valuable products derived from coal—coal-tar medicines and dyes and many other things. Adjacent to the Green River in the Rock Springs—Kemmerer area is one of the largest coal reserves in our Nation, but large amounts of water are required for coal processing to extract the oil and tar. Your approval of the proposed water control is insurance to the country that these vital products are available whenever our people should want and need them.

Water is the greatest resource of the entire world. Man has come a long way in the last 100 years in the improvement and use of chemicals and minerals, and the greatest feat of our time is solving the atom.

But until man can discover how to create or manufacture water, we must put what waters are given us by nature to beneficial use by finding ways and means to preserve this great resource, and this can only be accomplished by harnessing these waters through the construction of dams and reservoirs so that our water can be distributed to the allocated projects and peoples during good or bad years which in our Western States must depend on the snowfall for we have very little rainfall to depend upon.

All that Wyoming requests is fairness; the upper basin States have faithfully throughout the years encouraged the development of the lower basin by supporting their project proposals before Congress. By your approval of this entire upper Colorado River project you gentlemen will provide the insurance for the protection and welfare of the area for many years in the future. Insurance for continued growth, insurance against the dry years, insurance for industrial expansion.

The State of Wyoming finds itself in a very unique position; our snowsheds in the Jackson Hole country furnish the waters of the great Snake River which travels the full width of the State of Idaho and on to the Pacific Ocean. Our snowsheds provide the headwaters of the Missouri River drainage flowing down to the Gulf of Mexico. The snowsheds of Wyoming—the headwaters of the Green River begin—continue down to the Colorado River drainage basin and on down to the Gulf of California.

Wyoming can be called the Mother State for water; today our people ask the Congress for fairness in helping us get through the Congress the approval of plans for construction of the upper Colorado River project so we can have the use of the 14 percent of the water we are rightfully entitled to.

Wyoming has suffered a drought for the past 3 years, and our snowsheds are getting dryer; the snowfall this year is reported to be about 60 percent of normal. If the lower basin is to continue to receive its rightful share of water as stated in the Colorado River compact, the time is not too far away when it will be absolutely necessary that the development of the upper Colorado River storage projects must be built to protect the future of both the lower and upper river basin.

Mr. ASPINALL. Thank you very much.

In accordance with our agreement, if you will sit in the audience until all of the papers have been presented.

Mr. CRIPPA. Thank you.

Mr. ASPINALL. The next witness for the State of Wyoming is H. T. Person, dean of the college of engineering, University of Wyoming.

May the Chair add a double welcome, Dean, to your appearance here this morning. You have appeared before this committee before, and the Chair remembers with much pleasure the service you and I had together while we were serving on the Missouri Basin Commission.

STATEMENT OF H. T. PERSON, DEAN OF ENGINEERING, UNIVERSITY OF WYOMING, LARAMIE, WYO.

Mr. PERSON. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, I am H. T. Person, dean of engineering at the University of Wyoming. For the last 15

years I have served as engineering adviser to the Wyoming State engineer's office and the Wyoming interstate stream's commissioner. I am submitting this statement for the Wyoming State engineer's office.

The bills under consideration by the committee proposes the authorization for construction of initial storage units and a number of irrigation units of a multipurpose project for the development of the upper Colorado River Basin. The storage and irrigation units proposed for authorization under the bills being considered are only a part of the units that will be needed in the upper Colorado River Basin for the ultimate development and utilization of the water resources of the basin.

The proposed storage units are essential elements of the overall upper Colorado River Basin development project. They are part and parcel of a program to permit the use by the upper basin States of the water allocated to them under the 1922 Colorado River compact. They are necessary to the upper basin States in connection with meeting the water-delivery obligation at Lee Ferry imposed by the 1922 Colorado River compact.

Of the 4 to 6 storage units included in the various bills, none are in Wyoming. Three of the irrigation units or so-called participating projects are located in Wyoming. The three participating irrigation units or projects in Wyoming are the LaBarge, Lyman, and Seedskadee projects. These 3 units will irrigate 68,000 acres of new land, and will provide a supplemental water supply to about 40,000 acres, which are already under irrigation. The total consumptive use of water resulting from these 3 proposed irrigation units will be about 125,000 acre-feet per year. When these 3 projects are completed, the total consumptive use of water in the Colorado River Basin in Wyoming will be about 380,000 acre-feet per year, or about 37 percent of the water allocated to Wyoming under the 1922 Colorado River compact and the 1948 upper Colorado River Basin compact.

Wyoming believes that the Kendall Reservoir unit, a 350,000 acre-foot storage reservoir in the upper reaches of the Green River, should be included in the original authorization either as a storage unit or as part of Seedskadee irrigation unit. Wyoming is convinced that this storage unit is not only essential in connection with further irrigation development in Wyoming, but is also essential for the fullest development of the irrigation potential of the Seedskadee unit.

The projected plan for the use of the water resources of the upper Colorado River Basin proposed in the bills under consideration is, we believe, one that will result in the fullest ultimate development of the basin and its resources. The program is the result of many years of investigation by the Bureau of Reclamation and the upper Colorado River Basin States. The contemplated storage units will furnish a source of power which is needed to meet the expanding economy of the area. They will enhance the recreational facilities of the entire area. They will furnish benefits to fish and wildlife. They will provide benefits to sediment control which will prolong the useful life of Lake Mead. The storage units and participating units will provide water and power for the development of the extensive mineral resources of the upper Colorado River Basin.

The total consumptive use of water in the upper Colorado River Basin under all constructed projects and all storage and participating

projects contemplated in the bills under consideration is about 4¼ million acre-feet, or slightly more than 50 percent of the 7½ million acre-feet of consumption used allocated to the upper basin under the 1922 Colorado River compact.

In regard to Echo Park Reservoir—this unit is one of the very important units in the team of storage units necessary for the fullest development of the water resources of the upper basin. Its strategic location below the confluence of the Green and Yampa Rivers, its low-evaporation losses and its contribution to maximum power production makes it an essential unit in the upper basin development. The grandeur, the spiritual and esthetic values of the canyons of the Echo Dam site are acknowledged. The Echo Park Reservoir will not destroy these values. Echo Park will eliminate some sections of river rapids—but there are hundreds of miles of river rapids in the vast areas of the upper Colorado River Basin. Echo Park Reservoir will make the recreational values of this vast area available to hundreds of thousands of people every year—rather than to just those few hundred daredevil river runners who now have that opportunity. Echo Park Reservoir is in the Dinosaur National Monument. However, the evidence is documented and clear, that the people of the area were given assurance in 1938 when Dinosaur Monument was extended to include the Echo Park area, that establishment of the extensive monument would not interfere with the use of the area for grazing, or with the development of the water resources of the area.

In closing, I summarize by saying Wyoming is convinced that the authorization of the Colorado River storage project and participating projects proposed under these bills is the essential first step in making possible the use of the water of the upper Colorado River Basin. It is the step that determines the future economy of every State in the upper basin. It is an essential step in the development of the vast mineral resources of the entire upper basin. It is an important step in the development and fullest utilization of the recreational resources of the upper basin.

Mr. ASPINALL. Thank you very much, Dean Person.

The next witness is Joe L. Budd, Acting Commissioner for Wyoming on the Upper Colorado River Commission. Mr. Budd, we are glad to have you with us.

STATEMENT OF JOE L. BUDD, ACTING COMMISSIONER FOR WYOMING ON THE UPPER COLORADO RIVER COMMISSION, BIG PINEY, WYO.

Mr. BUDD. Mr. Chairman, I appreciate this opportunity to appear before the committee.

Before reading my own statement, I would like to have permission to insert the remarks of Norman W. Barlow in the record. This statement was given before the Senate committee and contains material that I do not believe has been introduced before this committee.

Mr. ASPINALL. Will you identify Mr. Barlow's interest in these hearings, please?

Mr. BUDD. Mr. Barlow is assistant commissioner for the State of Wyoming.

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Mr. ASPINALL. Is there any objection to the request of Mr. Budd that Mr. Barlow's statement be made a part of the hearings at this place in the record?

Hearing none, it is so ordered.

(The statement of Mr. Barlow follows:)

STATEMENT BY NORMAN W. BARLOW, ASSISTANT COMMISSIONER FOR WYOMING, UPPER COLORADO RIVER COMMISSION, BEFORE THE IRRIGATION SUBCOMMITTEE OF THE HOUSE INTERIOR AND INSULAR AFFAIRS COMMITTEE, WASHINGTON, D. C.

Wyoming is in complete accord with the policy of the Department of the Interior for the planned development of the water resources in the upper Colorado River Basin.

Under the provisions of the upper Colorado River Basin compact of 1948, Wyoming was allocated 14 percent of the share eligible to the upper division of the Colorado River under the terms of the 1922 compact, which, reflected in acre-feet, totals of 1,043,000 yearly over a 10-year continuing period.

The present consumptive use of water or stream flow depletion by Wyoming water users in the Colorado River Basin in Wyoming presently is 258,400 acre-feet per year. This annual use includes all irrigation uses, reservoir losses and municipal and industrial uses. This leaves 795,000 acre-feet per year for new uses.

If Wyoming is to be able to develop its potential irrigable lands, holdover storage, such as is contemplated in Glen Canyon and Echo Park Reservoirs will be necessary. The participating projects located in Wyoming are the Lyman, LaBarge, and Seedskadee projects. The Lyman will furnish supplemental water to 40,600 acres. The LeBarge project will irrigate 7,670 acres of new land and will provide supplemental water to 300 acres. The Seedskadee project will irrigate 60,720 acres of new land. The Eden project, which is now under construction, would also be included as a participating project from the standpoint of utilization of power revenues to aid irrigation cost repayment. Wyoming's total water use per year, if these projects were complete, would be approximately 372,000 acre-feet or only about 37 percent of the water allocated to Wyoming under the 1922 Colorado River compact and the 1948 upper Colorado River Basin compact.

Wyoming also has another fine project—namely the Sublette project, that will provide water for 72,000 acres of undeveloped lands and supplemental water for 12,000 acres presently irrigated with an inadequate water supply. The lands included in this project are situated in the upper Green River Basin, Sublette County, Wyo., along the Green and New Fork Rivers and their tributaries.

The Sublette project includes 3 reservoirs, a 2,200-kilowatt powerplant, 2 main distributing canals, a lateral system and a drainage system. The potential reservoirs are: Kendall, Burnt Lake, and Boulder Lake with capacity of 162,000—30,000 and 165,000 acre-feet, respectively. The Bonneville Canal would distribute water to lands lying along the east side to Pine Creek and Big Sandy and the west side canal would serve lands along the west side of the upper Green River Basin between Kendall Reservoir and South Piney Creek. Storage regulation for lands on the west side of the basin would be provided at the Kendall Reservoir site while the regulation for lands along the east side of the basin would be provided in the potential Burnt Lake and Boulder Lake Reservoirs.

Mr. ASPINALL. You may proceed, Mr. Budd.

Realizing that nearly every aspect of the Colorado River project has already been covered in previous hearings before the committees of both the House and Senate, I am going to confine my remarks to one particular question regarding the proposed participating projects in Wyoming, and that is the question of the productivity of our high altitude area.

I feel well qualified to comment on this phase, because my grandfather came to the area in 1878 and I have lived my entire lifetime on a ranch at Big Piney, Wyo., which was homesteaded by my father in 1897.

Considerable doubt has been expressed by people of other areas as to the feasibility of applying water to the lands of such high altitudes where the growing season is so short.

To begin with, I wish to point out that we have many very productive meadows at altitudes up to 8,500 feet in both Wyoming and Colorado. Our proposed projects are all at altitudes below 6,500 feet.

In Wyoming we are in an extremely favorable position to prove our productivity. We did not just jump into this reclamation scheme without first checking up on our capabilities. 'Way back in the 1920's the first phase of the Eden project was created encompassing 9,000 acres right out in the middle of the Little Red Desert at an altitude of from 6,600 to 6,700 feet.

This tract of worthless desert land has developed into a very prosperous community. Most of the land is owned by the original settlers or their families. They are prosperous and happy. Their children and their children's children are attending our State university where they will become even better equipped to reap benefits from the soil.

The main crops are alfalfa, barley, and oats; crops that have been sorely needed during our disastrous drought. We produce from 3 to 4 tons of alfalfa per acre in this area and produce oats and barley that will compare well with those from any of our Western States. We have produced some oats and barley on our ranch ever since it was first started and we have never had a crop failure caused by frost.

While our production per acre is favorable another measure even more important in the arid West that we should keep in mind is the production per acre-foot of water. At our high altitude where the growing season is short, our irrigation season is also short, evaporation is at a minimum and all of the water not actually consumed by the plants finds its way back to the streams of the basin where it can be used over and over again on its way to the ocean.

The authorization of the upper Colorado River storage project is essential to the development of this area, because without the storage that it will provide, we cannot even hope for an uninterrupted or dependable water supply. You cannot ask a man to settle on a project that does not have such a supply.

We hope that this committee and the Members of Congress will give favorable consideration to this project. Do not fear that the authorization of this project will add to our surplus problems. It will be many years before the participating projects are actually producing food for our rapidly growing Nation. By that time, in all probability we shall be dealing with shortages.

Mr. ASPINALL. The next witness appearing for Wyoming is Paul Rechard, chief of water development, Wyoming Natural Resource Board.

We are very glad to have you with us this morning.

STATEMENT OF PAUL RECHARD, CHIEF OF WATER DEVELOPMENT, WYOMING NATURAL RESOURCE BOARD

Mr. RECHARD. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, my name is Paul Rechard and I am chief of water development for the Wyoming Natural Resource Board. I am here to speak for the board in favor of the Colorado River storage project and participating projects.

Four participating projects mentioned in the various bills before this committee are in Wyoming. Besides these units, we also have some other projects which we hope will some day be constructed. One of these is the Elkhorn project in Sublette County of Wyoming. I understand that the Bureau of Reclamation has chosen to call it the Buckskin division of the Sublette project. This development would irrigate lands along the east side of the Green River from the town of Pinedale to the Big Sandy.

Wyoming would also like to have Kendall Reservoir included as part of the Seedskadee project or as an initial storage unit since it would be on the headwaters of the Green River.

If Wyoming and the other upper basin States are to be able to develop their potential lands, holdover storage is a necessity. None of the storage dams included in the proposed legislation are in Wyoming; even so, we are wholeheartedly in favor of constructing these large units, such as Glen Canyon and Echo Park, and in starting them now. It will take a number of years before these units are completed and even longer before water can be put on the lands for irrigation. The storage projects are a vital and necessary part of this proposed development at the present time. The statement has been made that 58 percent of the water allocated to the upper basin could be utilized without providing holdover storage. Gentlemen, this is purely a theoretical assumption and must be recognized as such.

With good conscience, no person could ask a rancher or farmer to settle on a project, work his heart out preparing the land, planting the seed, and constructing his home when water cannot be guaranteed for his lands. In fact, any person with the knowledge of this business would not attempt to settle on the land even if someone would have the nerve to ask him to.

We are going to live within the terms of the laws of the river which include the 1922 and 1948 compacts. By these instruments we were given the opportunity to develop our water resources to the fullest practicable extent, providing the flow of the Colorado River at Lee Ferry were not depleted below 75 million acre-feet in any continuing 10-year period. The only way we can do this is to have large holdover storage reservoirs in the upper basin which will be filled in years of plentiful supply. The water would then be released in drought periods to the lower basin to satisfy our commitment as mentioned above.

If we proceed on the theory, and let me emphasize that it must only be theory, that the upper basin could develop 58 percent of the water allocated to us without the storage reservoirs, we find that the development of the remaining 42 percent could only be done with greatest difficulty. At the present time we are only utilizing about 33 percent of our water. Right now California is objecting to our stopping some of the water in Echo and Glen Canyon Reservoirs. I cannot believe that they would feel any more kindly 25 years from now when the additional 25 percent has been developed. During the interim more sediment would have been deposited behind Hoover Dam and then during a filling period power generation would be curtailed. But most important a delay would almost preclude the States of Colorado, New Mexico, Utah, and Wyoming from ever being able to use the water to which we are entitled. I believe that this committee of rea-

sonable persons would not want us to violate the law of the river, but neither would they want California to violate not only the law of the river but their solemn word as given to the upper division States during the negotiations of the 1922 compact.

I cannot believe that the people of California are no longer interested in western reclamation which has been such a great factor in the building of our country, nor can I believe that they are selfish to the extent that they are only interested in reclamation for themselves. Rather, I feel the true sentiment was expressed earlier in these hearings by the Congressman from California when to protect this great reclamation program he voiced vigorous disapproval of those who sponsor vicious and untruthful propaganda that tends not only to discourage this project but all western reclamation.

Not only are the storage projects needed now, but they will be needed from now on. Actually the storage in these reservoirs is as valuable below irrigation as above. The water will be used for irrigation upstream just as surely as we know money that is deposited in a bank account and withdrawn by check is used; the actual paper or water is different but the effect is the same.

We in the upper basin are ready and most anxious to proceed with this development—all we need is the opportunity as afforded by the legislation now before you.

Mr. ASPINALL. Thank you very much, Mr. Rechard.

Mr. RECHARD. Mr. Chairman, I would also like to introduce into the record two letters which have been sent to me by residents of the area explaining the need for water in their particular area.

Mr. ASPINALL. Will you show the Chair the letters, please?

(The documents were handed to the chairman.)

Mr. ASPINALL. Members of the committee, the request of Mr. Rechard is for introduction of a letter by Mr. Micheli, of Fort Bridger, Wyo., and Mr. Gradert, of Fort Bridger, Wyo.

As I understand, Mr. Rechard, these are in support of the upper Colorado River project?

Mr. RECHARD. Yes, sir.

Mr. ASPINALL. Is there any objection?

Hearing none, it is so ordered.

(The letters referred to follow:)

MICHELI HEREFORD RANCH,
Fort Bridger, Wyo., February 14, 1955.

Mr. PAUL A. RECHARD,
Natural Resource Board,
Cheyenne, Wyo.

DEAR SIR: This letter is in regard to some information on the effects of the 1954 drought in this area, which will long be remembered by the ranchers and farmers of this section as a disaster year.

I will confine my remarks only to the Black and Smith Fork area, but I am sure that similar conditions prevailed in other parts of the Green River Basin.

This valley comprises approximately 50,000 acres of land that has some degree of irrigation water at the present time. However, few indeed are the years that this acreage can properly be irrigated. Of the 50,000 acres, about half is in hay meadows, a little acreage in small grains, and the rest in pasture. In an average year, the meadows will yield approximately 1 ton to the acre or about 25,000 tons. I am sure that in the drought year of 1954 the yield was less than 8,000 tons, the grain reduced in the same proportion; plus the fact that the carrying capacity of the pasture was less than one-third of normal.

In the event of water development in this valley, it could be very feasible to increase the total irrigated acreage to 100,000 acres with the additional land as good or better than what is now irrigated.

I hope this gives you some idea of the great need for water development in this area and that the information given will be of some help.

Yours truly,

JOSEPH MICHELI.

FORT BRIDGER, WYO., *February 12, 1955.*

NATURAL RESOURCE BOARD,
Cheyenne, Wyo.
(Attention of Mr. Paul A. Rechard, chief of water development)

GENTLEMEN: In support of water storage development in the Green River system basin in Wyoming, I wish to state that by virtue of being superintendent of Water Division No. 4 of the State of Wyoming, and it being the foremost of my duties to supervise the distribution of waters for irrigation and other uses, I naturally come into closer contact than perhaps any other person with the water user or irrigator himself and do, therefore, know of the difficulties experienced by the water users in the Green River system.

The season of 1953 was what must be considered a season of inadequate water supply owing to the below normal snowfall during the winter of 1952–53 and insufficient rainfall during the irrigation season of 1953, and while considerable shortage of crops in some localities was brought to my attention, the damage was not extensive, but shortage of water supply had a tendency to lay the foundation through drying out the lands and the consequent lowering of the natural water table for the disastrous insufficiency of water supply during the drought of the 1954 season.

Again, the snowfall during the winter of 1953–54 was far below normal and with the exception of a little of the upper portion of the Green River Basin, in Wyoming, little, if any, rainfall occurred, and in consequence many of our water users along the tributaries of said Green River raised much below average crops of forage, many ranchers in Uinta County, Wyo., having harvested no crops of hay and but scant pasturage and, therefore, have been forced to dispose of half-fat livestock at competitive prices in order to save their stock from starvation during this winter of 1954–55.

My heart indeed goes out to those unfortunate ones who, after years of toil and privations having built up what they considered a livelihood for their later years, and through no fault of theirs, were forced to thus sacrifice.

When one has experienced such a disaster, it certainly brings to attention the fact that water storage should be brought about in accordance with the plan set up under the Colorado River compacts, wherein it was intended to construct storage reservoirs in the Colorado River Basin, including Green River Basin, had we people in the counties of Uinta, Sweetwater, and the southern portion of Sublette County had access to stored water that could have been stored in standby reservoirs during past flood stages, such catastrophies could have been avoided on farms and ranches now in existence and many thousands of new acres yet undeveloped could have been brought under cultivation and thus affording homes and livelihoods for many now looking for help through welfare or kindred setups and bringing about more payments in taxes from well-tilled lands now only capable of supporting 1 sheep on 7 or 8 acres and 1 cow on 25 to 30 acres.

We cannot but know that water in these semiarid regions of the United States is the lifeblood of the land and its people and such lifeblood should not be allowed to flow uselessly into the Gulf of Mexico, and I, therefore, urge that all interested in building and developing our western lands get behind the movement to get approved the Colorado River project as first intended.

Yours most respectfully,

EMIL C. GRADERT,
Superintendent of Water Division No. 4.

Mr. ASPINALL. The Chair would advise the committee, at the time Mr. Person appeared before the committee there was also given to each member of the committee a six-page statement, with attached map, on the subject of utilizing Colorado River water which originates above Lee Ferry. It is the wish of the Wyoming group that the questioning of the witnesses whose statements have already been made be undertaken at this time and Mr. Person be allowed to make

his other presentation upon the conclusion of the questioning of the witnesses now before us.

Is there any objection?

Hearing none, it is so ordered.

I have one question, Dean Person. In your statement you spoke of three participating projects—LaBarge, Lyman, and Seedskadee. You do not mean to overlook the Eden, which is already authorized and being constructed and will receive a part of its construction costs from the proposed project now beforethe committee?

Mr. PERSON. That is right. The Eden project is a participating project from the standpoint of its participating in power revenues.

Mr. ASPINALL. The Chair recognizes the gentleman from North Carolina, Mr. Shuford.

Mr. SHUFORD. No questions.

Mr. ASPINALL. The gentleman from Utah, Mr. Dawson.

Mr. DAWSON. I will be glad to yield my time to the gentleman from Wyoming, Mr. Thomson.

Mr. THOMSON. It it would please the Chair, I would like to ask just a couple of questions.

Mr. ASPINALL. Certainly.

Mr. THOMSON. In the first place, I would like to ask of Mr. Budd, you mentioned in your statement that the principal crops to be raised are alfalfa, oats, and some barley. That is the essence of it, is it not?

Mr. BUDD. That is correct.

Mr. THOMSON. And these will not go into surplus. Are these products needed in this area at the present time for use within the area as seed there?

Mr. BUDD. They are definitely needed. As I imagine most of the members of the committee are informed, we are having quite a disastrous drought in the State of Wyoming, and we need these crops sorely at the present time and would have use for them continually.

Mr. THOMSON. In other words, we are not only trying to create something new here, but more than that, we are taking care of the needs to stabilize the economy of this area as it presently exists. Is that correct?

Mr. BUDD. That is correct.

Mr. THOMSON. Has that economy varied with the flow of the upper Colorado River, from your ranching activity and the ranching activity of your family here for many, many years?

Mr. BUDD. I think if you would check the record of the flow of the Colorado River, you would have a pretty good record as to how the bank accounts have fluctuated in our particular area.

Mr. THOMSON. Does that also refer to the purchasing power of your particular area and the income-tax returns from your particular area?

Mr. BUDD. That is definitely true. In years that we are short of water, we just do not raise feed for our livestock and naturally do not have money to spend for machinery and automobiles and other necessary equipment.

Mr. THOMSON. When this river hit its low spot in 1934, what were you doing?

Mr. BUDD. I was engaged in the ranching business, but in the fall of 1934 I acted as assistant appraiser on the drought relief buying program.

Mr. THOMSON. Do you know how many cattle, or approximately how many cattle, were purchased and shipped out of that area and slaughtered there because of the competitive conditions that existed?

Mr. BUDD. In our particular county, the Federal Government bought 14,000 head of cattle. We killed 1,400 head of them right out on the ranches.

In the State of Wyoming the Federal Government bought two-hundred-eighty-four-thousand-some-odd cattle, of which, as I recall, at least 10 percent were slaughtered. It amounted to over 25 percent of all the cattle in Wyoming that were purchased by the Federal Government to help us through that.

Mr. THOMSON. And about 10 percent of them were just slaughtered on the range there?

Mr. BUDD. That is right. They were in such condition that they could not even be shipped to market where the other cattle were put in pens.

Mr. THOMSON. How long did it take the area to recover from that shock and become a worthwhile cog in our economic setup in this country?

Mr. BUDD. A large majority of the ranchers just did not recover. They were forced to sell out. Everyone was fighting to retain their ranches for the rest of the thirties. In fact, the economy was definitely strained. I guess we might say that we were in all probability just saved by the war.

Mr. THOMSON. It was not until after World War II came along that the numbers of your cattle recovered from that 1934 drought?

Mr. BUDD. That is right; they held at practically the numbers we were left with.

Mr. THOMSON. And a lot of the ranchers were forced into bankruptcy?

Mr. BUDD. Yes; a great number.

Mr. THOMSON. Then the point is that we need this project to stabilize present existing economy just as a flood-control project stabilizes existing economy; is that correct?

Mr. BUDD. That is definitely true.

Mr. THOMSON. In the last year we spent five or six hundred thousand dollars of Federal money trying to overcome the hay situation out there. This area stands to be, and in good years is, a source of supply for hay for the entire area, the entire State?

Mr. BUDD. Yes; it has been and will be.

Mr. THOMSON. And will stabilize the activities of the entire grazing industry and ranching industry in the entire State?

Mr. BUDD. It will stabilize the entire economy.

Mr. THOMSON. You mentioned frost there. What is the effect of frost in this higher altitude? I think your ranch sits right along the top in about the coldest spot there.

Mr. BUDD. It is very peculiar. I know that people read of our extremely low temperatures and the frequent occurrence of frost in that particular area, and they just feel we should be unable to grow anything. Apparently in that high, dry area it takes a much lower temperature, as recorded by the thermometer, to create crop damage than it does in a lower altitude because, as I said in my statement, in all the years we have produced oats and barley on our ranch,

we have never lost a crop due to frost. We have lost some because of lack of water.

Mr. THOMSON. Dean Person, you have been a civil engineer for several years, have you not?

Mr. PERSON. Yes, sir.

Mr. THOMSON. And you have worked with the Bureau of Reclamation and cooperated in working with them on various projects?

Mr. PERSON. I have worked in cooperative work, working with the State of Wyoming.

Mr. THOMSON. Yes. You have cooperated with the Bureau. You are familiar with this Glen Canyon site, are you?

Mr. PERSON. Yes, sir.

Mr. THOMSON. Are you concerned at all, or do you have any concern with the safety of a 700-foot structure proposed by the Bureau of Reclamation to be built at Glen Canyon?

Mr. PERSON. I have enough confidence in the Bureau of Reclamation and their records in building dams that, if they say you can build a 700-foot dam, you can build it.

Mr. THOMSON. You are also familiar with the fact that this area is developing as far as atomic energy is concerned, very rapidly?

Mr. PERSON. Yes.

Mr. THOMSON. And I believe in and around Lander they are looking forward to a uranium mill—and in the DuBois area uranium has been discovered—and the Colorado Plateau. Are you familiar with the electrical requirement in order to develop that atomic energy to make it available

Mr. PERSON. I know they are very short of power at the present time. The whole area.

Mr. THOMSON. In the development of atomic energy or uranium, it does require a great deal of electricity, does it not?

Mr. PERSON. It does that.

Mr. THOMSON. And that has been one of the principal reasons for the growth of the country as a whole?

Mr. PERSON. That is right.

Mr. THOMSON. Senator Crippa, you were a United States Senator last year?

Mr. CRIPPA. Yes, sir.

Mr. THOMSON. Did you vote for the flood-control project that passed, almost a billion dollars?

Mr. CRIPPA. Yes, sir.

Mr. THOMSON. Did you try to compute the interest that would accumulate on that compounded for the next 100 or 200 or 500 years?

Mr. CRIPPA. I am afraid I could never do that.

Mr. THOMSON. Why was it you voted for something like that which meant absolutely nothing directly to the benefit of Wyoming?

Mr. CRIPPA. Mr. Congressman, I feel this way: When I was in the United States Senate I felt it was the duty of the Congress of the United States to take care of and do the things that the people themselves cannot do. If private industry can do them, I am willing to go along with private industry. But I find in flood control that is almost out of the hands of private enterprise. You are spending a great deal of money, that is true, but you are also saving lives, saving farms, everything else, where you have an abundance of water with no control over it. It is a much different issue than we have out in

Wyoming where we are now fighting to try to conserve what we have by building reclamation dams. That is one of the reasons I am fully convinced, if I had the opportunity to be in the United States Senate again today, I would vote for flood control and also insist upon reclamation for the West.

Mr. THOMSON. I think Senator Duff, of Pennsylvania, sat beside you as your colleague at that time.

Mr. CRIPPA. Yes.

Mr. THOMSON. And you told him that if it was good for another area of the country, it will be good for the country as a whole, and you would support it.

Mr. CRIPPA. I did; I told that to Senator Duff. As a matter of fact, I happened to be one of the few Senators in the United States Senate who had never been in Pennsylvania. I listened to Senator Duff. He told me it was a very good idea and thought it was needed. From what I have been able to read, where we have disasters I think it is the duty of the Congress to take care of those things, and I also felt he should go out and visit with us and see our problems where we have a shortage of what they have an overabundance and no control over.

Mr. THOMSON. Thank you. Thank you, Mr. Chairman.

Mr. SHUFORD (presiding). Mr. Dawson, do you have any further questions?

Mr. DAWSON. That is all I had, except, Mr. Chairman, to commend the witnesses for a fine presentation. I think it is a good picture of the situation in Wyoming.

I particularly want to commend Mr. Rechard for the fine statement he has made, particularly in reference to the 58 or 56 percent doctrine that has been enunciated here by some of the opponents of this project. I think that is a very clear statement of what the facts are.

Mr. ASPINALL (presiding). The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. I have no questions, Mr. Chairman.

Mr. ASPINALL. The gentleman from California, Mr. Hosmer.

Mr. HOSMER. No questions.

Mr. ASPINALL. The gentleman from California, Mr. Sisk.

Mr. SISK. Yes; I have one comment to make, Mr. Chairman.

With reference to Mr. Rechard's statement on page 3, as a Representative from California, I wish to commend him for the fact that he does not believe that certain statements that have been rather promiscuously tossed around do represent the views of the people of California. I want to assure him, as one Representative to the State of California, they do not.

I would like to say, we very strongly believe in reclamation. I happen to come from the central part of the great State of California, and we are certainly in need of further reclamation projects, and particularly in northern and central California we are desirous that they continue.

I would like to commend the gentlemen from Wyoming, from that great State, for the excellent presentation that they have made here this morning.

I, for one, am anxious to see that they, along with other States of the West, have an opportunity to develop and to use reclamation and irrigation for the development of that great area. I heartily disagree with some of the propaganda that has been presented by, what I feel

to be, a small group of rather perverse thinkers in our area. But I can assure you that the State of California is interested in being completely fair to the West and to the Nation as a whole.

So far as I am concerned, in my particular area we stand shoulder to shoulder with the development of the West.

Thank you, Mr. Chairman.

Mr. DAWSON. Will the gentleman yield?

Mr. HOSMER. Will the gentleman yield on that point?

Mr. ASPINALL. Does the gentleman yield?

Mr. SISK. I will yield to my colleague from California.

Mr. HOSMER. I think my colleague from California has made a very fair statement in expressing to this committee that the State of California does believe in reclamation and does believe in the upper Colorado River development.

Our only concern is that it be carried on in such manner as not to trample upon the water rights of the State of California, and so as not to withhold in the upper basin water which is reasonably necessary for us to carry on our existing uses in the lower basins.

The kernel of the nut in this whole controversy is whether or not this project will permit sufficient water to pass Lee Ferry to carry on these uses, and whether or not the project is so conceived and designed and is proposed to be constructed and operated in such a manner as to observe these rights of the lower basin acquired by appropriation, contract, and compact.

Mr. DAWSON. Will you yield to me there?

Mr. HOSMER. There is in the rivers of the Colorado system sufficient water to permit reasonable development in the upper basin and to permit reasonable uses in the lower basin. That amount of water is undoubtedly, to my mind, fixed and determinable. So at any time the proponents of the projects in the upper basin will admit that fact and come to the figure and agree to it, and keep it, we have no objection to the upper basin development. But we see before this committee a constant series of people coming in proposing some developments, and then some of the other witnesses in the upper basin come in and disagree with them, and they want other developments, and then we have other bills for additional developments in the upper basin, and as reasonable men we do not know where it will stop. But, as reasonable men, we know you can build those projects within the live-and-let-live doctrine, which for the first time I heard announced by an upper-basin proponent this morning, Senator Barrett, of Wyoming.

All we are trying to do is live and let live on that river, and any time the upper basin will decide and agree upon that doctrine, I doubt if they will have any opposition whatsoever from the lower basin.

I yield back.

Mr. SISK. I yield to the gentleman from Utah.

Mr. DAWSON. I want to commend the gentleman from California, Mr. Sisk, for a very fair statement, and I can assure him it is reassuring to those of us in the upper basin States who are only asking for our fair share of this water, to find such a fair attitude on the part of the Representative from California.

And to my friend on this side of the aisle, I simply want to remind him once again there is written in this bill in a number of places the provision that nothing shall be done in the development of these waters which will in any way violate the terms of the Colorado River com-

pact, which in itself is a guaranty that your rights are going to be protected.

Mr. HOSMER. Will you yield on that point?

Mr. DAWSON. Yes; I will be happy to yield.

Mr. ASPINALL. Gentlemen, the Chair wants to be fair. We would like to have a statement from Mr. Person, if possible. Of course, these arguments will come before the committee later on.

Will the gentleman yield to the gentleman from California?

Mr. SISK. Yes.

Mr. HOSMER. That is all right. I will yield back. I do not want to interrupt the progress of the hearings.

Mr. SISK. That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from California, Mr. Utt.

Mr. UTT. I have nothing to say but to associate my feelings with those of my colleague, Mr. Sisk, in an effort to cooperate and still defend our own position.

Mr. ASPINALL. The gentleman from Oklahoma, Mr. Edmondson.

Mr. EDMONDSON. I also would like to commend my colleague from California, Mr. Sisk, for his very fine statement of the purposes and principles in the use of the Nation's water resources, and his emphasis on the need for teamwork among the States in developing the water resources of the entire West. I am sure the people of Oklahoma feel exactly as Mr. Sisk has expressed the sentiments of California to be—that reclamation is something that affects the welfare of the entire area, the entire West. I am sure that if that is the spirit in which we proceed we can accomplish a wonderful future for this Nation.

That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from Texas, Mr. Rutherford.

Mr. RUTHERFORD. No questions.

Mr. ASPINALL. Thank you very much for your statements and your appearance, gentleman, and at this time we shall listen to the statement by Dean Person, a statement which has already been handed to us, on utilizing Colorado River water that originates above Lee Ferry.

You may proceed, Mr. Person.

STATEMENT OF H. T. PERSON, DEAN OF ENGINEERING, UNIVERSITY OF WYOMING, LARAMIE, WYO.—Resumed

Mr. PERSON. Virgin flow: Analysis of the streamflow records and the available data on uses of water in the upper Colorado River Basin indicates that the average annual flow of the Colorado River at Lee Ferry (the dividing point between the upper and lower basin) under virgin conditions would have been about 15½ million acre-feet during the 40-year 1914–53 period. Of this total average annual flow, 7½ million acre-feet are apportioned to the lower basin and 7½ million acre-feet to the upper basin by the 1922 Colorado River compact. Constructed and authorized projects in the upper Colorado River Basin will use consumptively about 2½ million acre-feet per year. This leaves 5 million acre-feet of consumptive use per year still to be realized in the upper basin States, before full development of the water resources is attained under the 1922 compact apportionment.

Annual runoff characteristics: The high flow for the Colorado River at Lee Ferry occurs during the 4 months of April through July, which is the snow-melt period in the high mountain areas of the upper basin. From the latter part of July or early August to the end of the summer season, the Colorado River flows are low and are made up largely of contributions from springs and return flows from irrigation and bank storage.

In other words, the seasonal period of high streamflows does not coincide with the period of greatest demand for irrigation water. The use of water for irrigation during the April-through-May period is relatively small while the use is highest during the July-through-September period when the actual streamflows are low. The natural flows of the Colorado River during the late summer months are insufficient to meet even the present irrigation requirements of the upper Colorado River Basin. This fact makes the storage of water in the upper basin vitally important, not only in connection with the long-period development of the water resources of the upper basin, but also in connection with meeting the seasonal year-to-year water needs for irrigation, industrial, and municipal developments in the basin.

Periodical runoff characteristics: The annual flows of the Colorado River are highly variable. During the period 1914 through 1954 there were 12 years during which the measured flows at Lee Ferry have exceeded 16 million acre-feet. During this same period there were 9 years in which the annual discharge has been less than 10 million acre-feet. The virgin flows of the Colorado River at Lee Ferry have varied from a maximum of 24 million acre-feet in 1917 to a minimum of 5½ million acre-feet in 1934. The annual virgin flows are shown on the accompanying charts A and B.

Reasons for carryover storage: Chart A has been prepared to show the annual water supplies available from the upper Colorado River Basin, the present uses of upper-basin water by the lower and upper basins, and the uses by the projects or units of the upper Colorado River project proposed for authorization under the bills now being considered. The present estimated use of upper-basin water in the lower basin is 5.35 million acre-feet per year, and is shown by the dotted portion of the chart. The average present consumptive use in the upper basin under constructed and authorized projects is 2½ million acre-feet per year and is shown by diagonal lines. The estimated average consumption use by the storage and participating units proposed for authorization in the bills under consideration is about 1¾ million acre-feet per year and is shown by the horizontally lined area. The unused water in the upper basin is shown in solid black. It is noted that the chart shows that the water supplies for the years 1931, 1934, and 1940 would have been sufficient for little if any additional utilization in the upper basin.

(Chart A faces p. 636.)

Chart B shows the 1914–53 water-supply situation in the upper Colorado River basin with the upper basin meeting the Lee Ferry delivery obligation of 75 million acre-feet in any 10-year consecutive period. The dotted area on the chart represents the water delivery by the upper basin to the lower basin. The diagonal lines on the chart again represent the present use in the upper basin, and the horizontal

lined portion represents the use by the storage and participating units now being considered for authorization. On this chart a line has been drawn to show a total consumptive use of 7½ million acre-feet in the upper basin in accordance with the 1922 Colorado River compact apportionment.

From this chart it is evident that the upper basin needs carryover storage, not only to make possible the use of the 7½ million acre-feet apportioned to it by the 1922 compact, but also to take care of present uses, and the uses contemplated by the projects included in the bills which are now under consideration.

(Chart B faces this page.)

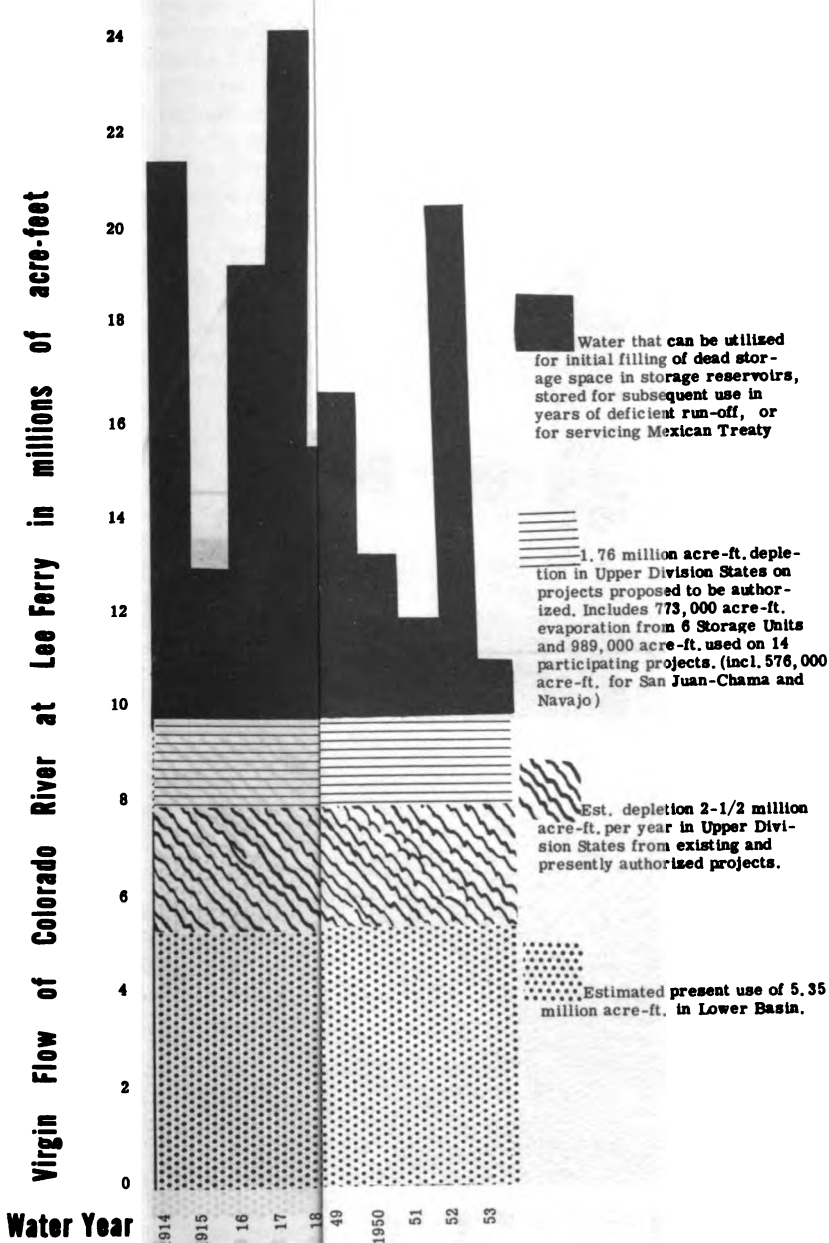
Carryover storage required: Every engineer who has studied the upper Colorado River situation has arrived at the conclusion that carryover storage is essential in connection with the further development and utilization of the water resources of the upper basin. This is the conclusion of the Bureau of Reclamation. This is the conclusion of the engineering firm of Leeds, Hill & Jewett in their report, Depletion of Surface Water Supplies of Colorado West of Continental Divide, prepared for the Colorado River Water Conservation Board in which they say—

> Increased diversions of water for use by agriculture and industry on the western slope and for transmountain diversions will depend upon the provision of sufficient storage capacity in reservoirs for conservation of flood flows and some cyclic regulation; in order that Colorado may make full use of the water allocated to it by the compacts, cyclic regulation of Colorado River over periods longer than 20 years will also be necessary.

An examination of chart B shows that the period from 1914 through 1930 was one of generally high flows. During this period the Colorado River water supplies were adequate for the upper basin to meet the Lee Ferry delivery obligations, to provide the 7½ million acre-feet of consumptive use allocated to the upper basin and to furnish water to store in carryover storage reservoirs. During the period 1931 through 1953 carryover storage water would have to be used 9 years to meet the Lee Ferry delivery obligation, the present uses in the upper basin, and the contemplated uses under the projects included in the bills now being considered. Also, during this 1931 through 1953 period, carryover storage water would have to be used 14 years to meet the Lee Ferry delivery obligation and to provide 7½ million acre-feet consumptive use for the upper basin.

A study of the 1914–53 streamflows indicates that something over 30 million acre-feet of active carryover storage capacity will be required in order to permit the upper basin to meet its Lee Ferry delivery obligation and consumptively use the 7½ million-acre per year apportioned it by the 1922 Colorado River compact. Possibly as additional streamflow records become available, it may be found that the required carryover storage capacity may be even greater.

Sufficient water available: A study of the flows of the Colorado River at Lee Ferry for the 1914–53 period, indicates that there would have been sufficient water available during this period to meet the Lee Ferry delivery obligation, and to permit a total annual consumptive use in the upper basin of 7½ million acre-feet, provided adequate carryover storage capacity is provided in the upper basin. Referring again to the chart B, this means that the excess flow indicated by the solid black color above the line representing the 7½ million acre-feet



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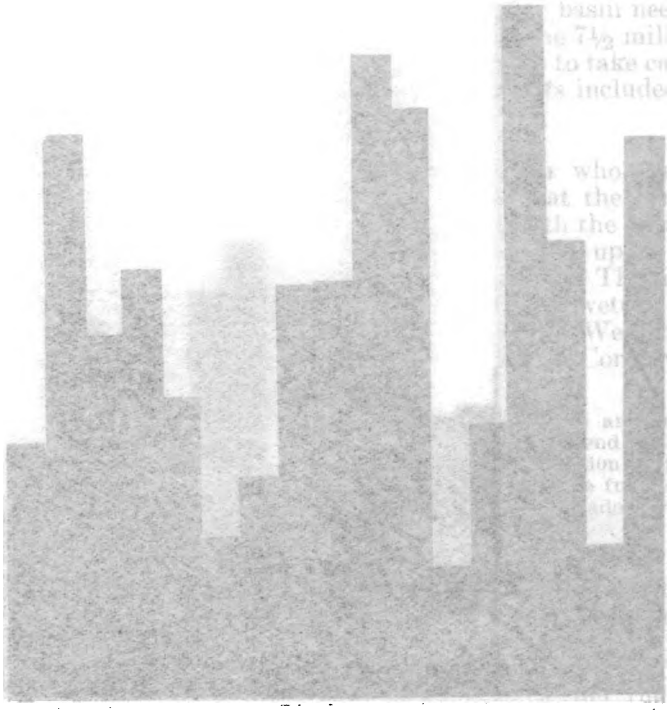

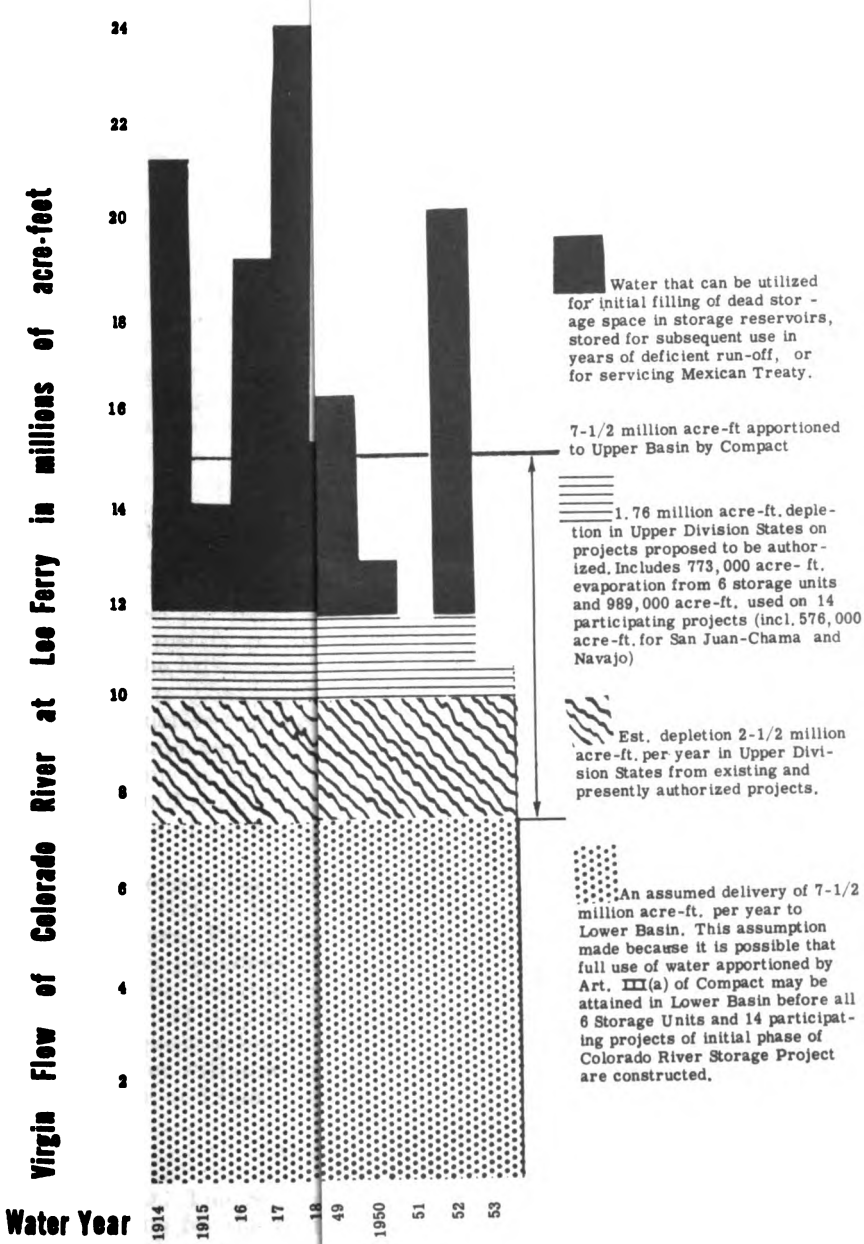

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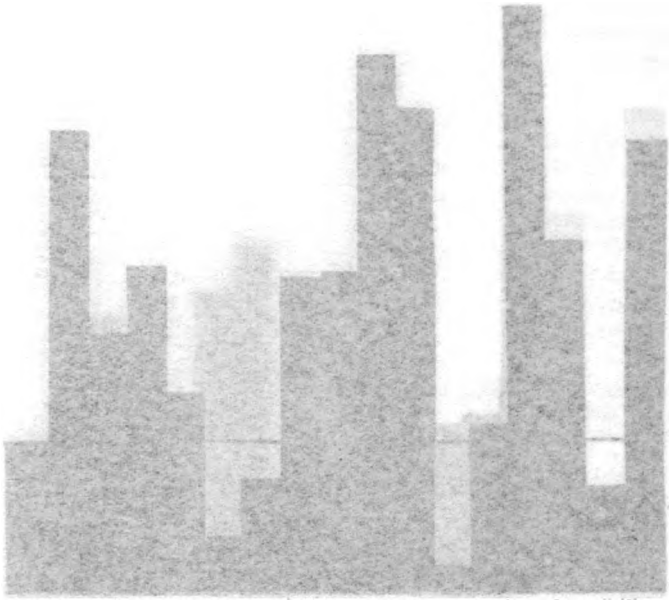

delivery obligation at Lee Ferry and the 7½ million acre-feet consumptive use in the upper basin would have been sufficient to fill the deficiencies represented by the white spaces below the line.

Carryover storage should be provided now: It has been suggested that some consumptive use development could be made in the upper basin without large quantities of carryover storage capacity. That limited development can be made, if local project storage is provided to equalize the seasonal and annual variations of the particular tributary stream involved, is certainly true. However, if the carryover storage is going to be provided with the minimum interference with established water needs, a large part of this carryover storage capacity must be provided before too much additional consumptive use development is made. Providing carryover storage capacity as early as possible is essential to permit filling of the inactive storage capacity without interfering with existing consumptive use rights. Also providing the storage capacity ahead of additional consumptive use development will permit initial filling with minimum interference with the operation of existing facilities. The present developments in the Colorado River Basin indicates now is the time to provide a large part of the required carryover storage capacity.

It has been suggested that additional streamflow records may possibly show that the upper Colorado River water supplies are inadequate to permit an annual consumptive use in the upper basin of 7½ million acre-feet, and that this fact might not warrant as much carryover storage capacity as is now contemplated. It is granted that the records may be of insufficient duration to assure a complete water-supply picture, and that additional years of records may possibly show that the upper basin use will be limited to something less than 7½ million acre-feet per year. However, the records are of sufficient duration to fully justify providing the carryover storage capacity contemplated in the bills now under consideration.

Mr. ASPINALL. Thank you, Dean Person, for another very interesting and constructive statement.

I have no doubt but that this statement is going to take some of the committee's time in questioning, so when we convene at 2 o'clock I wish you would present yourself before the table for questioning on this statement and anything else the committee members might wish to ask you.

The Chair forgot, but intended to call to the attention of the committee that J. Byron Wilson of McKinley, Wyo., president of the Wyoming Natural Resources Board, and Charles E. Astler of Cheyenne, Wyo., vice president of the Wyoming Natural Resources Board are present at the hearings and are supporting the legislation before the committee. If they so desire, they will be allowed to sit with Mr. Person upon questioning by the committee this afternoon.

The committee will now be recessed until 2 p. m.

(Whereupon, at 12 noon, the subcommittee recessed to reconvene at 2 p. m.)

AFTERNOON SESSION

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will be in session for the further consideration of the legislation having to do with the authorization of the upper Colorado River project.

Before we begin our session, I wish to state to the committee that we do have permission of the Speaker to sit this afternoon during the meeting of the House. The Speaker is very insistent that when the bells ring indicating the visit of the Prime Minister of Australia, the committee take time out long enough to go over and pay its respects to the Prime Minister in his visit before Congress.

At the recess Dean Person was before the committee and had just completed the reading of his statement. It is now time for questioning, and the Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Person, I listened with a great deal of interest to your testimony this morning, and I presume that it is based on both your engineering knowledge and the study of the Colorado River compact. Is that right?

Mr. PERSON. Yes.

Mr. HOSMER. And I would assume that you are fairly familiar with the Colorado River compact in its various provisions?

Mr. PERSON. I think I am, Congressman.

Mr. HOSMER. Is it Dr. Person?

Mr. PERSON. No.

Mr. HOSMER. Chart B which you have accompanying your testimony indicates the black line at the 15 million acre-feet a year level.

Mr. PERSON. Yes, sir.

Mr. HOSMER. And it illustrates during the period 1914 to 1953, inclusive, by vertical bars, the total flow of the Colorado River. Is that right?

Mr. PERSON. At Lee Ferry.

Mr. HOSMER. These are flows at Lee Ferry?

Mr. PERSON. Yes, sir.

Mr. HOSMER. Will you explain why you chose this particular period of years?

Mr. PERSON. Because the best records were available for this period.

Mr. HOSMER. Are you a meteorologist or a climatologist, or have you studied in allied fields?

Mr. PERSON. I am not a meteorologist.

Mr. HOSMER. What can you say to the committee with respect to the period that you have taken here as it involves being an average period?

Mr. PERSON. I think it would be fairly average, as near as we can tell. It does have a period of high flows and it does have a period of relatively low flows.

Mr. HOSMER. Would that be the same for the period 1919 to 1935?

Mr. PERSON. I think it might be slightly lower.

Mr. HOSMER. I know the amount would be lower, but would that period still be a characteristic period?

Mr. PERSON. Fairly characteristic. Of course, the longer the period, the more characteristic it would be.

Mr. HOSMER. I understand that, but I also understand that there may be certain climatic changes over a long period of time. Of course, you could get an average out of that long period of time, but you cannot get what the present and prospective conditions might be. My question is directed to the certainty with which we can assume this 1914 to 1953 period actually is a representative period upon which we

can rely in evaluating whether or not the millions of dollars that are involved in this bill should be spent.

Mr. PERSON. I feel the period is long enough so that it is reliable as far as the project proposed in the present bill.

Mr. HOSMER. You would be unable to say, though, whether or not for climatic or other reasons this might not be characteristic?

Mr. PERSON. A longer period of records might change the picture some.

Mr. HOSMER. I notice that from the middle years, approximately 1932, 1933, the years after that are considerably drier than the years before that insofar as the flow goes. Would you state whether or not that is all due to increased beneficial consumptive use in the upper basin or exchange of water?

Mr. PERSON. No sir. That is, these flows we plotted here are the undepleted flows. We have added the depletions in the upper basin to the flows at Lee Ferry.

Mr. HOSMER. I see.

Mr. PERSON. The top of the solid bar is what we call the undepleted or virgin flow at Lee Ferry.

Mr. HOSMER. What is your definition of the words "beneficial consumptive use"?

Mr. PERSON. It is water that is burned up or used in growing plants or for other purposes. It is dissipated.

Mr. HOSMER. In relation to the Colorado River compact, do you conceive of it as being measured at Lee Ferry or at the place of beneficial consumption?

Mr. PERSON. I conceive it as being measured at Lee Ferry.

Mr. HOSMER. Then is it your idea that the Colorado River compact is a document which, in effect, made a physical division of the waters of the river at Lee Ferry?

Mr. PERSON. That is what I feel, sir.

Mr. HOSMER. You do not believe it was a document which made a division of the uses of the waters of the whole Colorado River system?

Mr. PERSON. I feel that the compact allocated to the upper basin 7½ million acre-feet of depletion at Lee Ferry, provided we met the 75 million delivery obligation at Lee Ferry.

Mr. HOSMER. That would be an answer to another question.

Mr. ASPINALL. Will the gentleman yield just a minute?

Mr. HOSMER. Yes.

Mr. ASPINALL. That is one of the differences that exists between the upper and lower basin at the present time.

Mr. HOSMER. That is right.

Do you know whether or not that difference is involved in the suit between Arizona and California now in the Supreme Court?

Mr. PERSON. I do not, sir.

Mr. HOSMER. If this difference were resolved in a manner that is contrary to your present thinking, that, of course, would have a bearing on what you have said in your testimony, would it not?

Mr. PERSON. Not very much, I do not think.

Mr. HOSMER. Do you know how much?

Mr. PERSON. No, I do not, frankly, without going into it.

Mr. HOSMER. But there is an amount of water involved?

Mr. PERSON. There is some amount. It is a relatively small amount compared to the total amount we are talking about.

Mr. HOSMER. You are familiar, are you not, with the provisions of article 3 of the Colorado River compact? That is the one in which the divisions of water occur.

Mr. PERSON. Yes.

Mr. HOSMER. I call your attention to article 3 (a) which is written in terms of the beneficial consumptive use, and which permits the respective basins to make up to 7½ acre-feet beneficial consumptive use per annum.

Mr. PERSON. Yes.

Mr. HOSMER. What is your thought as to the term "per annum" as used in article 3?

Mr. PERSON. I would say it was the average consumptive use per annum.

Mr. HOSMER. You would not say it was per year?

Mr. PERSON. I could not distinguish between per annum and per year.

Mr. HOSMER. I point out to you that there would be a considerable difference in what you said if it is per year that is meant there rather than on an average.

Mr. PERSON. Oh, yes. In other words, an average use, you might have some uses above 7½ million.

Mr. HOSMER. Well, it would make a difference whether in any one year you could store or hold over water to be used in another year in which there was less actual water available, I believe, would it not?

Mr. PERSON. Yes, sir.

Mr. HOSMER. I note in your testimony that you have made no reference to provisions of article 3 (c), and that article stated that if and when the United States and the Republic of Mexico came to an agreement as to what the Republic of Mexico was entitled to out of the river, that agreement would be binding upon the signatories. Subsequent to the time that the Colorado compact was finally approved, the treaty was made, and 1½ million acre-feet of water per annum was allocated to the Mexican Government.

Mr. PERSON. Yes.

Mr. HOSMER. Now, it has been interpreted that the term "per annum" in connection with that treaty means per year. I would assume, then, that the term would have to have the same definition both in the lower basin and the upper basin, would it not?

Mr. PERSON. Of course, does not that treaty say a maximum of one and one-half? I am not sure about it.

Mr. HOSMER. I think that is also the purpose and intent and meaning of 3 (a), too.

Mr. PERSON. Of course, it says per annum, but I think the treaty says a maximum of 1½ million, does it not?

Mr. HOSMER. Irrespective of what the treaty says, it does have the words "per annum" in it, and my question was whether or not they would apply equally to the upper and the lower basin.

Mr. PERSON. I would interpret, if it says maximum, as a maximum. When it says "per annum," I would interpret it to mean an average.

Mr. HOSMER. That again, Mr. Person, is an answer to some other question that I did not ask. What I did ask you, Would it have the

same meaning as applied to the lower basin as it does to the upper basin?

Mr. PERSON. Well, the 7½ million consumptive use——

Mr. HOSMER. I am talking about the term "per annum" as you said in the Mexican Treaty.

Mr. PERSON. I think you could use more than 7½ million acre-feet.

Mr. HOSMER. You have again answered another question I did not ask. I am asking whether or not the term "per annum" as it affects the lower basin has a like effect on the upper basin or at least the same definition applies to both basins.

Mr. PERSON. I would think it would.

Mr. HOSMER. Article 3 (c) provides that the burden of the waters to Mexico shall be borne first out of surplus waters and, next, equally out of the 3 (a) waters allocated to each basin.

In referring to your chart B, I ask you where on that chart would be the Mexican burden.

Mr. PERSON. If there is a shortage in meeting that Mexican burden, it would come out of both the upper basin and the lower basin 7½ million.

Mr. HOSMER. Then if there is not a shortage, where does it come from?

Mr. PERSON. The excess.

Mr. HOSMER. The excess. In excess of what?

Mr. PERSON. The 15 million.

Mr. HOSMER. In other words, the water on your chart B which is above the 15 million acre-feet per annum amount, therefore, must be surplus water, must it not?

Mr. PERSON. It could be surplus.

Mr. HOSMER. What else could it be, then?

Mr. PERSON. Well, above the black line, some of it might be used to fill in the spaces below the black line.

Mr. HOSMER. That is what you are arguing for, and I am not arguing what you want to do with it, I am trying to ascertain the status of the water that you have pictured on your chart here in relation to the Colorado River compact.

Now, you have said that the water above the 15 million acre-feet per annum line could be surplus water.

Mr. PERSON. Yes.

Mr. HOSMER. And I ask you what else could it be in terms of the compact.

Mr. PERSON. I do not think I could answer that.

Mr. HOSMER. As a matter of fact, it has to be surplus water, does it not? It is water unallocated and unapportioned by the terms of the Colorado River compact, that water which is in excess of 15 million acre-feet a year, is that right?

Mr. PERSON. Possibly.

Mr. HOSMER. Well, do you not know?

Mr. PERSON. No.

Mr. HOSMER. You told me that you were familiar with the terms of the Colorado River compact, and your entire testimony is predicated upon definitions and what is legal or not legal within the terms of that compact.

Mr. Person, I am trying to find out, bluntly, whether you know what you are talking about when you say you know what this compact contains.

Surplus water cannot be water below the 7½ million in each basin, so it must be water above, which means water above 15 million acre-feet.

Mr. PERSON. Yes.

Mr. HOSMER. All right.

Now, as you recall, there is another subparagraph of article 3, which is article 3 (b), and that article provides that the lower basin can appropriate for beneficial consumptive use, in addition to its 7½ million acre-feet assigned by 3 (a), another 1 million acre-feet of surplus water.

Mr. PERSON. That is right.

Mr. HOSMER. And as we have developed this thing so far, that surplus water that they are talking about must, of course, be water in excess of the 15 million acre-feet.

Now, have you had that provision in mind when you have made your testimony here?

Mr. PERSON. I am familiar with the provision. I think we should keep in mind there is some water that originates below the Lee Ferry.

Mr. HOSMER. Yes, I understand that. There is about a million acre-feet of water, in fact, that is supposed to originate in the Gila River.

Mr. PERSON. That is right.

Mr. HOSMER. And there is some more water that originates on the Virgin River. In the suit of *Arizona* v. *California* in the Supreme Court, Arizona contends that the waters of the Gila are the surplus waters referred to by article 3 (b), and California contends that they are not. This, of course, makes a difference of about a million acre-feet a year in what water would be required to pass Lee Ferry in order to meet the terms of the compact.

As a matter of fact, California's position is the one which is favorable to the upper basin. But, if and when that decision is made, there is a possibility that there is going to be a million acre-feet of water one way or the other, the legal status to which is settled. Of course, when we are talking about the upper basin development a million acre-feet is a lot of water.

Now, I wonder if you had that in mind when you prepared your statement?

Mr. PERSON. No, I have no opinion on that, frankly. I am familiar with the 1 million acre-feet.

Mr. HOSMER. You do, however, admit that the status of the water in the Gila River would have some bearing on this whole matter?

Mr. PERSON. Actually, I do not think it would have any bearing on the participating projects, the storage projects, proposed at the present time. I think it could have some bearing on the ultimate development.

Mr. HOSMER. Let me put it this way, then: The very decision of that question as to the status of the waters of the Gila River depends upon whether or not this compact made a physical division of waters at Lee Ferry or made a division of beneficial consumptive uses of the water of the whole river; and, as a consequence, that is one of the things that came in, and I think it more or less defines at least the minimum amount of water we were talking about a few moments ago that might be affected by which way this definition went.

In other words, at stake in the Supreme Court is at least 1 million acre-feet of water at Lee Ferry.

Mr. ASPINALL. May I remind the gentleman from California that we do have to get through.

Mr. HOSMER. I realize that, Mr. Chairman. As I tried to explain this morning, the crux of this whole proposition, the kernel of the nut, is the amount of water which passes Lee Ferry. Of course, this is inextricably entwined in the definitions of the Colorado River compact.

We have had this gentleman very ably testify that there was a lot of water in this river, and a few other things, and I think that we have got to examine the weight of his testimony.

Mr. ASPINALL. My colleague will agree that when the representatives from southern California put on their testimony they are going to go into this.

Mr. HOSMER. I do not know what they are going to go into. Contrary to the general belief around here, I am not in conference with the southern California water boards and other people at all times, and I am not in this committee. Although I am not exactly playing a lone game here, I am doing the best I can to protect my State's interests and my people's interests, and I am using what other help I can get along the way.

Now, what you want to do, essentially, aside from what you have admitted so far, is take this surplus water and hold it up in the upper basin, do you not, because you are going to take the water above the 15 million acre-feet a year and store it?

Mr. PERSON. That is right.

Mr. DAWSON. Will the gentleman yield to me?

Mr. HOSMER. Yes.

Mr. DAWSON. So as to get the record clear, is it the gentleman's contention, then, that all the water in excess of the 15 million acre-feet is excess water, surplus water, and that California or the lower basin is entitled to any excess above that amount even though we may go down as low as 3 million acre-feet in 1 year, go above the 15 million in another, that you are entitled to any amount in excess of the 15 million acre-feet in any 1 year?

Mr. HOSMER. The story, Mr. Dawson, is even blacker than that.

This amount in excess of 15 million acre-feet a year is unapportioned surplus. There is other water in addition to that which must flow to the lower basin.

Let me refer you to the questions that were posed to the chairman of the Santa Fe Compact Commission, the Honorable Herbert Hoover, by the Representative and subsequent Senator from Arizona, Mr. Hayden, and the particular answer to Hayden's question No. 20, in which Mr. Hoover said:

> The compact provides that no water is to be withheld above that which cannot be used for purposes of agriculture. The lower basin will, therefore, receive the entire flow of the river, less only the amount consumptively used in the upper basin States for agricultural purposes.

Mr. DAWSON. Will the gentleman yield further?

Mr. HOSMER. Yes.

Mr. DAWSON. In other words, what you are saying is there is no need for any storage dams whatever because there is no water to store. Is that it?

Mr. HOSMER. What I am saying is this: That if you are going to follow out technically the terms of the Colorado River compact, it is more than doubtful that you could store this water. However, my State does not take the attitude that we are going to hold you right strictly to the terms of this compact because, despite the accusations that I suffer constantly that I am one of the biggest dogs in the manger and I am just representing the State that wants nothing to happen, we are trying our darndest to get this project built for you on a live-and-let-live basis.

We recognize the fact that you cannot do it legally and lawfully, but, however, we are quite willing to enter stipulations and agreements with you.

Mr. DAWSON. To do it unlawfully?

Mr. HOSMER. That are legally binding which will permit you to make the development that you seek.

California has an interest, like all the other States, in seeing that the totality of our Nation is developed to the greatest extent possible. Therefore, we persist in our reasonable attitude.

(Discussion off the record.)

Mr. HOSMER. Inasmuch as the chairman has indicated that many of these things may be brought up later, while I would like to question the gentleman a great deal further, I shall refrain from doing so.

Mr. ASPINALL. Thank you very much.

Does the gentleman from Florida have any questions?

Mr. HALEY. No.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. The first question I think you have already answered, Mr. Person, but in case you have not—the chart which you have furnished in connection with your statement, chart A, shows the entire flow of the river and does not take into consideration the million and a half acre-feet allocated annually to Mexico by treaty?

Mr. PERSON. This is the flow of the river at Lee Ferry, Congressman. This is the undepleted flow at Lee Ferry.

Mr. SAYLOR. Now, Mr. Person, assume that the report of Mr. Hill, the engineer hired by the State of Colorado, is correct, and that there is not available for upper basin use 7½ million acre-feet per year, but only 6 million acre-feet per year. Then how will it affect your testimony as indicated on chart B?

Mr. PERSON. Of course, the proposed projects under these bills will not come anywhere near to the 6.2 million that was suggested by Mr. Hill.

Mr. SAYLOR. But am I correct that the line which you have indicated here, the black line, which you have drawn between 14, 15, and 16 million acre-feet, would be brought down then proportionately 1.3 million acre-feet; is that right?

Mr. PERSON. Yes. If the upper basin was limited to, say, 6.2 million, it would be down to 14.7.

Mr. SAYLOR. Were you here the other day when the former dean of the University of Utah was on the stand?

Mr. PERSON. I was not, sir.

Mr. SAYLOR. Then I might tell you that he made the statement—Mr. Chairman, I wish to be corrected if this is in error—that as near as he could tell us there is no definite way of determining the amount

of evaporation from existing lakes or dams. I would like to ask you, as the dean of the College of Engineering of Wyoming, whether you concur in that statement?

Mr. PERSON. I think there is a way of determining approximately, at least, making an estimate on the evaporation.

Mr. SAYLOR. That is not what I said. I said there is no exact way of determining evaporation.

Mr. DAWSON. Let us be exact now.

Mr. PERSON. No exact way. That is right.

Mr. SAYLOR. And that there were methods whereby you could determine approximate amounts of evaporation from existing dams.

Mr. PERSON. That is right, sir.

Mr. SAYLOR. He went over and gave us in detail the things that entered into evaporation losses as he studied them.

Now, I would like to ask you this question: In your opinion, is there any way of determining or estimating evaporation losses from nonexistent dams or reservoirs?

Mr. PERSON. Yes, sir.

Mr. SAYLOR. Will you tell us how you would do that?

Mr. PERSON. I would use records available, and the temperature would affect it, wind velocity, and a number of other factors.

Mr. SAYLOR. That is the thing that I am trying to get at, because we have had the Bureau of Reclamation tell us that they do not have any wind-velocity studies at the elevation at which these dams are to be built at the dam sites.

Since they do not have any records of wind velocity, how would you make your study?

Mr. PERSON. With the best data that would be available. You would have to use the best that would be available for the particular area you were figuring.

Mr. SAYLOR. Would it make a difference, Mr. Person, if you had the wind velocity in the floor of the canyon or if you had the wind velocity at 700 feet above the floor of the canyon where you expect to have the surface of the water?

Mr. PERSON. I think it would.

Mr. SAYLOR. Is there any method which you know of that could determine the temperature of the nonexistent reservoirs?

Mr. PERSON. No, but you would have to estimate the temperatures.

Mr. SAYLOR. And the temperature of the water is one of the major factors in determining evaporation, surface temperature?

Mr. PERSON. It would be a factor; yes, sir.

Mr. SAYLOR. And wind velocity is a factor?

Mr. PERSON. Yes, sir.

Mr. SAYLOR. And the temperature of the proposed dam at the water level would be a factor in determining evaporation?

Mr. PERSON. Yes, sir.

Mr. SAYLOR. Now, I was very much interested in a portion of your statement on page 5, in which you say:

A study of the 1914–53 streamflows indicates that something over 30 million acre-feet of active carryover storage capacity will be required in order to permit the upper basin to meet its Lee Ferry delivery obligation and consumptively use the 7½ million acre-feet per year apportioned it by the 1922 Colorado River compact.

How much over 30 million acre-feet?

Mr. PERSON. We do not know until we have more records. That is, it depends upon what the streamflows are in the future.

Mr. SAYLOR. Am I correct, in looking at your chart, that you would have one estimate if you take the streamflow from 1914, as you have indicated in your chart, to 1953, and you would have a completely different holdover storage if you took the figure from 1930 to 1953 as shown on your chart?

Mr. PERSON. Yes; that is, the amount that would be available as a holdover would be different. But you would use the longest available if you were going to make an estimate of how much carryover storage you wanted or needed.

Mr. SAYLOR. Then what you are telling this committee is that you have stated you used the longest records available, that there is no repetition in the pattern of weather for the area?

Mr. PERSON. There is no particular repetition here. But, again, we would assume that it might repeat in the future. But we are not sure it would repeat in exactly this way in the future.

Mr. SAYLOR. Then the amount of storage which you are estimating is based only in one particular on the records that you have from 1914 to 1954?

Mr. PERSON. That is right, sir.

Mr. SAYLOR. And that with regard to the fact that this may not be a typical period, it is only estimated?

Mr. PERSON. It is as typical a period as we could get. Usually that long a record would be considered a fairly reliable record.

Mr. SAYLOR. If you took the period from 1930 to 1954, a period of 25 years, you would not have much storage in that period, would you?

Mr. PERSON. We would not have as much as we would in the longer period; that is right, sir.

Mr. SAYLOR. In fact, the dams would not be very close to being full if that were the storage period?

Mr. PERSON. That is right.

Mr. SAYLOR. If that were the case, you would hardly have enough water here in these reservoirs to produce the electricity that has been talked about here in Glen Canyon and Echo Park, which are to be the cash registers for this affair. There would not be any water there to produce electricity, would there?

Mr. PERSON. There certainly would be some. There is 7½ million we have to deliver to the lower basin—7½ million acre-feet per year or 75 million in a 10-year period. That would produce electricity.

Mr. SAYLOR. Now we are getting down to it—that you intend to use this water before we send it down.

Mr. PERSON. No; not the 75 million. The delivery obligation certainly would be sent down.

Mr. SAYLOR. But you are going to use it to produce electricity before you send it down?

Mr. PERSON. That is right, sir.

Mr. SAYLOR. That is something we have not been told up to this point—that it is the intention of the Department to use this water. Apparently we are going to get a little less water down there; the water that is going to go down the river is going to be used water.

In view of the fact that the people from Utah the other day complained about not wanting to take water from Flaming Gorge because

it was being used by the people of the great State of Wyoming, it just depends on whose ox is being gored. It is the unjust southern people in the lower basin who complain they would like to have a little better quality of water. Would you care to comment on that?

Mr. DAWSON. Will you yield to me?

Mr. HALEY. Will you yield?

Mr. SAYLOR. I yield to the gentleman from Florida.

Mr. HALEY. I may suggest they are going to put it to a little different use.

Mr. PERSON. This water being used through powerplants is not affected in quality.

Mr. DAWSON. That is the point I was going to make to the gentleman from Pennsylvania. Is it his contention that by taking the electricity out of the water we are reducing the quality?

Mr. SAYLOR. I do not know. But you are bringing up something here that has not been brought up heretofore.

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. HOSMER. Do I understand, despite the explanation of this surplus water, it is still your contention that 75 million acre-feet on an annual average during a consecutive 10-year period is all the water you have to release to the lower basin?

Mr. PERSON. No, sir.

Mr. HOSMER. What in addition do you have to release?

Mr. PERSON. We cannot use more than 7½ million on an average in the upper basin.

Mr. HOSMER. So you have to release a million 3 (b) water, you have to release a million and a half 3 (c) water as surplus. That takes care of 10 million acre-feet a year there—7½, 1, and 1½.

Mr. PERSON. We have to deliver 75 million in any 10-year period.

Mr. HOSMER. You cannot withhold more water than that.

Mr. PERSON. Yes; more than the 7½ million per year in the upper basin.

Mr. HOSMER. But you withhold it for things other than beneficial consumptive use.

Mr. PERSON. Of course, when we store it we assume that beneficial consumptive use. The only way we can use it consumptively is to store it.

Mr. HOSMER. Well, testimony before this committee by Senator O'Mahoney this morning was that there is a leeway under the existing projects of about a million acre-feet, by, which if you add all the existing uses, plus all the beneficial consumptive uses in the projects that are before the Congress, you could still make a million acre-feet additional uses before you met the holdover storage of 3 (d) and other commitments.

Mr. PERSON. Will you restate that?

Mr. HOSMER. Will the reporter——

Mr. ASPINALL. It does not make any difference what Senator O'Mahoney said this morning as far as this witness is concerned, Mr. Hosmer. Those are matters we can argue over in committee. The Chair is doing his best to get along here this afternoon so we can get to other witnesses.

Mr. HOSMER. I am trying to find out what water we are talking about.

Mr. ASPINALL. The witness has answered you and Mr. Saylor about the particular water he is talking about. I think you have done a pretty good job of putting him on the record.

Mr. HOSMER. I think he is talking about the water flowing downstream myself, the way I get it.

I yield back.

Mr. SAYLOR. That is all. Thank you for your cooperation, Mr. Person.

Mr. ASPINALL. Does the gentleman from Utah, Mr. Dawson, have any questions?

Mr. DAWSON. Just one question, Mr. Person. In view of the questions asked by my colleague from California as to the rights of the lower basin States, do you feel they are going to be taken advantage of in the Supreme Court? I read from a statement in a United Press release——

Mr. HOSMER. A point of order, Mr. Chairman, that the gentleman is making a speech and not asking a question.

Mr. DAWSON. I think the gentleman from California has been making a speech, and I think I am entitled to answer it.

Mr. ASPINALL. The gentleman from California will not press his point of order, of course. The gentleman from Utah will proceed.

Mr. DAWSON. The California Legislature, according to this press release, has just appropriated an additional $220,000 to add 5 attorneys to assist them in the United States Supreme Court in addition to the other 5 which they already have, making a total of 10 attorneys. Do you feel they are going to be taken advantage of in the Supreme Court?

Mr. PERSON. I do not, sir. [Laughter.]

Mr. SAYLOR. I think we should have the record clear that that, sir, is your opinion as the dean of the college of——

Mr. PERSON. Engineering.

Mr. SAYLOR. Of the University of Wyoming. As the dean of the College of Engineering of the University of Wyoming, I do not think your opinion will have any effect whatsoever on the position of the Supreme Court.

Mr. ASPINALL. Mr. Budge.

Mr. BUDGE. In view of the fact our colleague, the gentleman from Wyoming, Mr. Thomson, has been in attendance throughout these hearings, with the Chair's permission, I would like to yield to him at this point.

Mr. THOMSON. I think you are familiar, Mr. Person, with the old statement we use—when we are weak on the facts, we argue the law, and when we are weak on the facts and the law, we shout about the Constitution.

You are not holding yourself—you are not a lawyer, are you?

Mr. PERSON. No, sir.

Mr. THOMSON. And you are not holding yourself out to place a legal interpretation upon the compact?

Mr. PERSON. No, sir.

Mr. THOMSON. By your charts A and B, and particularly B, you presume to show as a practical matter, from the engineering viewpoint, that we could satisfy the storage as you made in your statement, and that we could provide for uses or provide for smoothing out of the

flow of the river so as to make available in excess of 15 million acre-feet of water per year on the average. Is that correct?

Mr. PERSON. Yes, Congressman.

Mr. THOMSON. That is on the facts, not the law. Is that not correct?

Mr. PERSON. Yes.

Mr. THOMSON. Thank you.

Mr. HOSMER. Will the gentleman yield at that point?

Mr. THOMSON. Yes.

Mr. HOSMER. I think that you cannot get away from law or the facts here because you are talking about water which has some status under the compact, are you not, either apportioned water or unapportioned or surplus water under the compact?

Mr. PERSON. Yes, sir.

Mr. HOSMER. That is all I wanted to bring out. I yield back.

Mr. THOMSON. That is all.

Mr. ASPINALL. The gentleman from California, Mr. Utt, is recognized.

Mr. UTT. I have no questions, sir.

Mr. ASPINALL. Thank you very much, Mr. Person.

At this time we shall listen to the following witnesses: Mr. Untermann, Mr. Kay, and Mr. Smart. The Chair would ask that the three witnesses be permitted to give their presentations, and then we will question them as the committee desires together.

The Chair understands that Mr. Untermann will take approximately 15 minutes, Mr. Smart 8 minutes, and Mr. Kay 5 minutes. The Chair would like you gentlemen to keep as close to that time as possible.

Mr. Untermann, you will proceed. We have had you before this committee before on this matter, and we are glad to have you here again.

STATEMENT OF G. E. UNTERMANN, DIRECTOR, UTAH FIELD HOUSE OF NATURAL HISTORY, VERNAL, UTAH

Mr. UNTERMANN. Mr. Chairman and members of the committee, I am G. E. Untermann, director, Utah Field House of Natural History. I was formerly a ranger at Dinosaur National Monument. With Mrs. Untermann, who is also a geologist, and former ranger-naturalist at the monument, we have mapped the geology of the entire area. The report on this work is a bulletin known as Bulletin 42 of the Utah Geological and Mineralogical Survey. I would like to present this committee a copy for your files with our compliments.

Mr. SAYLOR. I would suggest it be made a part of the files and not of the record.

I might say that Mr. Untermann was kind enough to send me a copy. I have read it, and it is a very interesting and informative document of the geology of the area.

Mr. UNTERMANN. Thank you.

Mr. ASPINALL. Unless there is objection, it will be made a part of the file.

(The document referred to will be found in the committee files.)

Mr. ASPINALL. You may proceed.

Mr. UNTERMANN. I was under the impression I had only 5 minutes, so I will quickly read my brief, and to make up the other time there,

without imposing, I would read a few items that I would like to get out of the main statement. Incidentally, I would like to submit the full statement for the record, if permitted.

Mr. ASPINALL. You may proceed.

Mr. UNTERMANN. Much of the opposition of rabid conservation groups to a proposed dam in Dinosaur National Monument is baseless and unrealistic. Time will permit but one illustration, but my full statement lists several.

Concern over the supposed inundation of such famous bandit hideouts as Hole-in-the-Wall and Robber's Roost proved needless in the extreme when we informed these crusaders that Hole-in-the-Wall was in the Powder River country of northern Wyoming, 150 miles away from the monument, and the Robber's Roost was in the San Rafael Swell of Utah, 150 miles to the south. Western geography can be a bit confusing when you are roughing it as far away as a Park Avenue penthouse. Such reverence for horse thieves, cutthroats, and outlaws may be a worthy endeavor, and if so, our friends might do well to maked sacred shrines and hallowed cities of Chicago and Cicero, because Al Capone and Dillinger operated there.

In spite of claims to the contrary, running the rivers of Dinosaur is no sport for the novice and should not be attempted, and will not be permitted without the services of a professional boatman.

Ninety-nine percent of the visitors see only 1 percent of the monument, the headquarters and quarry area. I am counting only the regular tourists, not the nature crowd, who, with the great fanfare, flock there for propaganda purposes and invade the wilderness portion of the area to build up an impressive attendance. Capital is being made out of the increase in visitors since this aimless controversy began. Those figures will bear looking into. Prior to 1953 the attendance at Dinosaur hovered around 12,000. Then in 1953 the number of visitors jumped to 22,000. This was largely due to the national controversy over the monument, the greatest piece of free publicity in the history of advertising. In 1954 attendance vaulted to the phenomenal total of slightly over 70,000.

This increase was not due to the spotlight of national publicity but to a change in the method of calculating travel. Instead of counting registered visitors, as formerly, a highway counter was used to clock the cars, which were then multiplied by 3½, the number of people assumed to be in each car. Registration for 1954 was approximately 30,000. At the same time, registration at the State Museum of Natural History in Vernal, right on the highway, was 63,000. In 1953 the State museum had 60,000 registered visitors. We have not gone over to the highway counter as yet for, frankly, that half a person puzzles us—we don't know whether to admit the upper or the lower half of the individual to the museum.

Inspirational values of the canyons in the monument will not be destroyed by a dam and the bottom lands are so small in extent as to be insignificant.

Fluctuating reservoirs have been a bugaboo of the opposition. They fail to recognize that natural streams do the same thing and the Green and Yampa are no exception. The fluctuation in the volume of water in these streams is tremendous, as much as 300 percent, and the difference in elevation amounts to as much as 20 feet

between high and low water with plenty of mud flats, quicksand and unsightly driftwood and refuse.

A precedent is a precedent. If the recognized Brown's Park withdrawal elicits no objection, neither should Echo Park so far as precedent is concerned. Brown's Park establishes that precedent. What the opposition is really yelling about is location. Echo Park partially inundates more area than Brown's Park. This is the real objection, so why not say so.

How much wilderness do the wilderness people want? In Utah alone there are 2 national parks and 9 national monuments in addition to 7 national forests. Besides, we have hundreds of thousands of square miles of wilderness running around loose outside these areas. If some of this wilderness can be put to work doing something useful instead of being merely ornamental it should not be looked upon as a national calamity.

Archaeological, mineral, and geological values are not endangered by Echo Park Dam. See documentation attached to full statement and also pages 9 to 12 of Bulletin No. 42, Geology of Dinosaur National Monument and Vicinity.

If you will shut me off when my time is up, I would just like to refer to a few things in the principal statement.

The Bureau of Reclamation is again cast in the role of a villain with its implacable critics hounding its every move. Among other things the Bureau is supposed to have tip-toed into Dinosaur National Monument, through the back door, and stealthily conducted its Echo Park studies without the knowledge of the National Park Service. This makes amusing reading for those of us who were stationed at Dinosaur at the time and who not only knew about the Bureau's work but were instructed to cooperate in every way. This cooperation with the dam builders extended even to a dinner and social given by us at Dinosaur. Our relations were most cordial and if the men of Reclamation were underhanded in all this we have yet to learn about it. Only the other day I received a letter from a Park Service official in which he stated:

> No matter how loyal I am to the National Park Service ideals, I still believe that Dinosaur was not the place for conservationists to take such a determined stand against reclamation. I feel that our Park Service has lost much ground, and much good will, because of the attitude we have all had to assume in this matter. I am willing to bet that if a poll were taken of the National Park Service people a majority of them would surprise everyone by their stand, provided of course, that their names were kept secret. They still have to eat.

It is probably a good thing that the name and position of this official is not known, for I very much doubt whether the Sierra Club could survive the shock.

I would like to refer to the report of the distinguished landscape architect, Frederick Law Olmstead, A Survey of Recreation Resources of the Colorado River Basin—Dinosaur National Monument Region, as recorded on page 734 of the January 1954 House hearing on the Colorado River project. After stating, in effect, that the dam probably would not make the Park Service very happy, Mr. Olmstead has this to say:

> Nevertheless, the canyon unit would still have scenic and recreational values of notable importance and of nationwide interest * * *. The canyon of Lodore, in general V-shaped in section, is so deep that raising the water in its bottom by

100 to 500 feet or thereabouts would hardly diminish its great impressiveness to a perceptible degree.

To those of us who live in the intermountain West, where one can travel 50 to 100 miles without seeing even a house, let alone a town, the frenzied concern of nature groups over the "vanishing wilderness" seems needless in the extreme. (It can be nearly disastrous if you break down and need help and it can be mighty inconvenient when you want to borrow a cup of sugar.) We have hundreds of thousands of square miles of solitude running around loose. We want less, not more, wilderness. What these people and their kindred spirits should do is to visit such solitude, enjoy its vastness and wilderness, and then keep the knowledge of their "discovery" to themselves. In the past they have always shouted from the housetops, "This is wonderful. This should be made into a national park and preserved for future generations." Then they corral the area with an imaginary fence, turn the spotlight of publicity on it which attracts hordes of the "Coney Island crowd," whom they detest, and who spoil the wilderness for them. Most of these areas which have been preserved in national parks and monuments (and it certainly is true of Dinosaur) were a whole lot more untouched and primitive before the conservationists set about saving them than they are today. It has taken nature and geological processes millions of years to create the values so cherished by these wilderness people, values which are not enhanced by bitter controversies over their preservation.

Thomas Munro in his discussion of The Aesthetic Appreciation of Nature has this to say:

A man who must wrest a difficult living from the land is forced to take a different attitude toward it from that of the leisurely vacationist. He must, in other words, take a practical attitude toward nature.

The vacationist enjoys our rugged mountains and scenic splendor for 3 months of the year, then he goes back home to make his living where things are easier. The native lives out there the year round and has to grub for his living where he is. These "fair weather" people who oppose the development of our country only come out there to play. We have to work there. You can't blame a man like Ebeneezer Bryce, for whom spectacular Bryce Canyon was named, for not going overboard for the scenic aspects of the region when he took the more practical attitude by saying that, "it was a hell of a place to lose a cow." Any stockman will appreciate what he meant.

That having fun is the primary object of most of these visitors to our picturesque West is shown by the statements of some who are honest enough to give the real reasons for opposition to dams in Dinosaur National Monument. Dr. Russell G. Fraser, an ardent river runner, comes right out and makes no bones about it when he says, "I may be selfish in my viewpoint but I like to run rivers and if you fellows build those dams in there you'll spoil my fun."

Mr. ASPINALL (rapping the gavel). The responsibility of the Chair, Mr. Untermann, was to stop you. This is the fourth time I have listened to you, and I have listened to you with interest, and so has every member of the committee, whether in opposition or advocating what you recommend.

The committe will have to stand in recess from 15 minutes after 3 until 15 minutes before 4, so I wish the other 2 gentlemen will try to get their presentations before us in the next 15 minutes.

Without objection, Mr. Untermann's statement will be made a part of the record of the hearings.

Hearing none, it is so ordered.

(The prepared statement of Mr. Untermann follows:)

Realism and the Dinosaur National Monument Controversy

By G. E. Untermann, Director, Utah Field House of Natural History, Vernal, Utah

The bitter nationwide controversy raging over the proposed construction of dams in Dinosaur National Monument, especially Echo Park, has all the aspects of a heated political campaign, with one exception. To my knowledge, neither proponent nor opponent has been called a Communist, although the Lord knows they have been called everything else. Charges and countercharges have run the gamut from the sublime to the ridiculous with many a cherished illusion still clasped firmly to the bosom. It would be well to approach this subject with a bit more realism and logic and less emotion and misinformation. A calm analysis of this squabble, based on factual data should give a more correct picture of the whole discussion and sift some of the wheat of reality from the chaff of fantasy.

In the early stages of the debate over Dinosaur we were gullible enough to believe that Echo Park Dam was the principal cause of all this controversial hullabaloo; now, however, we find the Colorado River project itself under vicious attack from numerous sources, with so-called conservation groups attracting a strange assortment of bedfellows who use every means of obstruction at their command. At the extreme end of the motley gathering are several southern California enthusiasts who shout, "Stop, thief," when we in the upper basin attempt to put to beneficial use some of the water which originates in our area and has been allocated to us by law. With a gracious and charitable attitude these groups define compromise as "not caring how much the other fellow gives up as long as they get everything they want." With their openly hostile attitude toward upper-basin development, the claim that withdrawing Echo Park will clear the way for the rest of the project, leaves us highly skeptical. The continuing attack on the Colorado River storage project as a whole, would seem to indicate that Echo Park Dam is merely the whipping boy.

The Bureau of Reclamation is again cast in the role of a villain with its implacable critics hounding its every move. Among other things the Bureau is supposed to have tiptoed into Dinosaur National Monument, through the back door, and stealthily conducted its Echo Park studies without the knowledge of the National Park Service. This makes amusing reading for those of us who were stationed at Dinosaur at the time and who not only knew about the Bureau's work but were instructed to cooperate in every way. This cooperation with the dam builders extended even to a dinner and social given by us at Dinosaur. Our relations were most cordial and if the men of Reclamation were underhanded in all this, we have yet to learn about it. Only the other day I received a letter from a Park Service official in which he stated, "No matter how loyal I am to the National Park Service ideals, I still believe that Dinosaur was not the place for conservationists to take such a determined stand against reclamation. I feel that our Park Service has lost much ground, and much goodwill, because of the attitude we have all had to assume in this matter. I am willing to bet that if a poll were taken of the National Park Service people a majority of them would surprise everyone by their stand, provided, of course, that their names were kept secret. They still have to eat." It is probably a good thing that the name and position of this official is not known, for I very much doubt whether the Sierra Club could survive the shock.

Many of us who live in the upper basin and have been engaged in the fight for the right to use our share of the water, have sometimes wondered if it wouldn't all be simpler if we pulled up stakes and moved to southern California and let our water flow down to us. Perhaps we would be permitted to use it there instead of struggling to hold it up where it originates. This is not as facetious as it sounds. Because of the limited water development in the upper basin, which restricts agriculture and industry, 30 percent of native Utahans must seek employment outside the State. Thousands of these have already migrated to southern California. One native Californian expressed the fear that upstream development on the Colorado would mean a threat to the southern

California water supply. That in dry years we, in the upper basin, would shut off the water and leave the folks in the land of eternal sunshine stranded with parched throats. We soothed his fears by telling him that his water supply was safeguarded by law and that we wouldn't shut it off even if we could, because we would only be harming our own friends and relatives who are numbered among his citizens.

Much of the objection to upper-basin development is of this irresponsible, misguided, and uninformed nature and results in a nationwide protest over something that doesn't amount to a hill of beans. It is unfortunate that so much of the uproar over dams versus dinosaurs, scenery, and violated principles has been of this careless nature.

Conservation groups have reluctantly conceded that the dinosaur fossils are in no danger at the monument as a result of the proposed dams. In fact, they even now tell you that they never made any such claim and that we have executed the neat trick of transforming dinosaurs into red herring. However, I can assure you that dead dinosaurs are still a very live issue out in our country and the rumor that they are in danger has to be refuted almost daily.

Another needless concern of the conservationists was their valiant defense of western outlaws whom they felt were in danger of historical liquidation. We were soon to learn that proposed dams in Dinosaur National Monument would flood such famous bandit hideouts as Hole-in-the-Wall and Robber's Roost. Our crusaders were shocked to find that Hole-in-the-Wall is in the Powder River country of northern Wyoming, 150 miles away from the monument, and that Robber's Roost is in the San Rafael swell of Utah, at least 150 miles to the south. Western geography can be a bit confusing when you are roughing it as far away as a Park Avenue penthouse. Such reverence for cutthroats, outlaws, and horsethieves may be a worthy endeavor, and if so, our friends might do well to make sacred shrines and hallowed cities of Chicago and Cicero, because Al Capone and Dillinger operated there.

With true missionary zeal the wilderness crowd threw their aching hearts into what they felt was sure to be a real tear-jerker. Since the eccentric old hermit, Pat Lynch, had lived in the area of the monument now bearing his name, Pat's Hole, it seemed safe to assume that he died there. And if he died there he must be buried there. So we were told, "That surely you wouldn't bury a poor old Irishman under 500 feet of water. Have you no respect for the dead? Is nothing sacred to you?" There was a great gloom in camp when we informed these saviors that Pat wasn't buried in Pat's Hole. In fact, what was even worse, he wasn't buried in the monument. Several years before Pat was harvested by the Grim Reaper, a fellow countryman by the name of Moran, an early exponent of free private enterprise, chased Pat from the holdings on which he had squatted, with the persuasive muzzle of a 30–30. Pat went to live with the Baker family in Lily Park, 50 miles up the Yampa River, where he was buried, high and dry, in 1917. But even in death the fates were unkind to Pat, for the only other occupant in the burial plot with the old Irish Catholic was a Mason. And adding insult to injury, the Masonic emblem was carved on his neighbor's tombstone. On quiet evenings, when not a breath of air is stirring, the sagebrush growing on these desolate graves can be seen to shake violently, and from this we know that these departed souls still have not reconciled their earthly differences.

Congress is too busy to look into the merits of every protest and anguished outcry of the folks back home and has a right to assume that such complaints are based upon more than petulance and poorly authenticated sources of information. When someone reports a bunch of kids in space helmets and starts a nationwide hullabaloo over the heavy and unregulated traffic to Mars, flooding an overworked Congress with letters and telegrams in protest, Congress in self-defense can only assure the outraged citizenry that such travel will be regulated and will not be permitted at all unless, and until, foot-long hot dogs, Coca-Cola and a comfort station are available at least every 100 miles.

Sierra Clubbers represent by far the greatest number of the nature fraternity to run the rivers of Dinosaur National Monument under the guidance of competent river pilots. Their avowed purpose was to enjoy the river trips, but their crusading urge was too much for them and they could not resist telling us that they had come to Utah to save Dinosaur for us. To which we replied, "We don't want to be saved. We want to be damned."

We gladly concede that experienced rivermen can supply the adventurer with thrills with reasonable safety. We vigorously oppose the propaganda of the Sierra Club that just anyone can blunder into the river and come through

unscathed without the services of a professional boatman. Besides, the Park Service does not permit such foolhardy trips and will not authorize them. If the Sierra Clubbers want to commit suicide by going through the canyons without guides, and can slip through the Park Service vigilance, they must take the consequences. But if they encourage such stupidity on the part of others they are guilty of homicide. Bluntly stated, anyone who would attempt such a venture should have his head examined. Probably the kindest thing we can say about these unrealistic people is that they lack practical sense and are wholly devoid of sound judgment. (See attached statements of rivermen and others in this connection.)

In spite of all attempts to create the impression that running the rivers of Dinosaur National Monument is a sport for infants, invalids, and the infirm, such trips will never be popular with the general public and this portion of the monument's interior will remain little known. At present, 99 percent of the visitors see and use only 1 percent of the monument. Our opponents will tell you that they can show by simple arithmetic that I don't know how to figure percentages. For their information, I would like to state that I am counting only the regular tourists, not the so-called conservationists who flock there for propaganda purposes, and who, with great fanfare, invade the wilderness portion of the area to build up an impressive attendance. Before this controversy over the dams arose, these people were seldom heard of out in our country, and after the uproar dies down, will probably be in little evidence again.

Along with the construction of Echo Park Dam the Department of the Interior, through the National Park Service, plans the expenditure of $21 million to develop the recreational facilities and to make the entire area accessible to all visitors instead of a limited number. It will then see a real use by the general public and share in attendance with the quarry and headquarters section of the monument where it is now almost wholly confined.

If wilderness people have jeopardized the lives of their own families in a foolhardy attempt to prove that the rivers are safe for everyone, they have wasted their time. No one has advocated building the dam because it will create safe stillwater bodies. Placid lakes will be the result of the dam being built, not a reason for building it. Any attempt to justify it on such a flimsy pretext would be utterly ridiculous. The dam is needed for stream regulation, holdover storage, power development, etc. Echo Park Dam, particularly, is one of the most important sites on the entire river system and meets all the requirements of adequacy. Nature has provided good dam sites sparingly and these must be used where they are. Any alternate dam site, worthy of consideration, must do at least the following things: (1) Adequately fulfill the purpose of the dam being replaced, (2) keep evaporation losses at a minimum, (3) must have comparable reservoir capacity, (4) must be where water and power can be economically utilized, (5) must impound the waters of the Yampa River, and (6) must inundate a minimum of property having economic value. Finding an alternate which has these minimum requirements has failed to materialize.

The charge has been repeatedly made by wilderness enthusiasts, in text and pictures, that "the canyons of Dinosaur National Monument will be filled with water." The dam that would fill these canyons with water would be the eighth wonder of the world and would dwarf all the other seven wonders of the ancient world combined. Let us take a realistic look at the situation and see what we actually have. At Echo Park Dam itself the water will probably be 500 feet deep plus or minus. Whirlpool Canyon, in which the dam site is located, rises 2,500 feet above this point. Thus the canyon depth will be diminished one-fifth at the dam. In Lodore Canyon, the deepest and most rugged of all canyons in the monument, the average depth of the reservoir will approximate 350 feet, while the walls rise more than 3,000 feet, resulting in a diminution of only one-tenth. On the Yampa River the placid lake will not even go all the way through the canyon but will leave rushing white water at the upper end. If our friends had said that the dams will fill the bottoms of the canyons they would have made a factual statement. What they overlooked in their eagerness to be alarming, was the fall of the river itself which causes backed-up water to become shallower as you go up stream until the zero point is again approached. The lakes produced by Echo Park Dam will modify the character of the canyon country but will little affect its grandeur and scenic qualities. In this connection, as supporting evidence, I would like to refer to the report of the distinguished landscape architect, Frederick Law Olmstead, A Survey of Recreation Resources of the Colorado River Basin,

Dinosaur National Monument Region, as recorded on page 734, of the January 1954 House hearing on the Colorado River project. After stating, in effect, that the dam probably would not make the Park Service very happy, Mr. Olmsted has this to say, "Nevertheless, the canyon unit would still have scenic and recreational values of notable importance and of nationwide interest * * *. The canyon of Lodore, in general V-shaped in section, is so deep that raising the water in its bottom by 100 to 500 feet or thereabouts would hardly diminish its great impressiveness to a perceptible degree."

The wilderness fraternity seems to be a bit confused in their own minds as to just what they do believe. In one breath they tell us we are all wet when we talk about canyons 2,000 and 3,000 feet deep, and in the next they talk about "walls that rise vertically 2,000 feet above the water." (Stephan Bradley in the Roundup Section of the Denver Post, January 31, 1954.) As pointed out by C. R. Henderson, Vernal, Utah (see attached, Steamboat Rock Disappears), they can't even agree among themselves on the height of their pet, Steamboat Rock, and have it varying anywhere from 650 to 800 feet, while the topographic map shows the elevation of the highest point to be 1,006 feet above river level.

Another pet peeve of the conservationists is fluctuating reservoirs. They have been extremely unobservant if they think reservoirs are the only bodies of water that fluctuate. Rivers do the same thing. As indicated by stranded driftwood, the Green and Yampa Rivers vary as much as 20 feet between high and low water stages. Quicksands are numerous and treacherous and mud flats are common everywhere. Unsightly tangles of driftwood litter the middle of stream channels in low water as well as the flotsam abandoned at high water levels. One must not fall into the habit of feeling that something ugly is beautiful merely because it is natural, or going to the other extreme of thinking that something beautiful is ugly because it is artificial. Dams would regulate stream flow and minimize such flunctuation and also lengthen the boating season. Last fall boating had to be abandoned on the Yampa River long before the end of the regular season because of low water.

Not satisfied with protesting the purported destruction of scenic grandeur in the canyons, nature groups now rush to a last-minute defense of the bottom lands along the streams and tell us that we are ruthlessly destroying the balance of nature and wiping out biotic communities. The area affected is so small as to be negligible, while the same values are represented in abundance elsewhere in the monument and on the outside. In their grave and exaggerated concern over the fate of willows, cottonwoods, and boxelders, all of which consume and transpire large quantities of water which could better be used in the service of man, wilderness lovers have failed to recognize that man himself is also a child of nature, and as such, is entitled to at least a little consideration by them.

Although entomologists tell us that there are at least 625,000 different kinds of insects in the world, this did not keep one nature enthusiast from accusing us of callously murdering the bugs by flooding the bottom lands along a portion of the stream beds of the monument. This merely goes to show how fantastic and unrealistic some of the opposition can become. My heart bleeds for the crawling vermin along the riverbanks, but if the backed-up water of Echo Park Dam will drown a few million of the wood ticks which cause the often fatal Rocky Mountain spotted fever out in our country, it is just another reason for building it that we have entirely overlooked.

Wilderness groups also object to lakes in Dinosaur for still another reason. They say, "How will posterity be able to tell by what means the canyons were formed if the living streams which carved them are no longer active?" If when posterity stands on the rims of the monument and can't tell that the canyons they are looking at were carved by stream action, they will be mighty dumb and certainly no credit to their progenitors.

The fact that the alpine glaciers which carved the high Sierras and Yosemite are no longer active, does not impair the enjoyment of the Sierra Club and others, of this majestic area. It is for this very reason that the area is accessible to large numbers just as the canyon areas of the monument will become easily accessible after the rivers which formed them have been tamed in their headlong flight to the sea.

The terrific fuss and fury over the partial inundation of Steamboat Rock, in Echo Park, would mislead one to believe that this was the only scenic feature in the whole of Dinosaur National Monument. It has become the symbol of the crusaders and is emblazoned on all their banners. Nothing is ever said about some of the other magnificent areas which are unaffected by proposed dams. So flagrant is this omission by writers on the area who are in opposition to Echo

Park, that I felt impelled to make the following reply to one stanch defender who sent me his article, "This is Dinosaur," in the hope of converting me to his viewpoint. "Although your article is entitled 'This is Dinosaur,' I note that you make no mention at all of Dinosaur quarry and the headquarters area, while the wilderness section is featured entirely. The wilderness area of the monument is vast by comparison with the quarry area, but it is, nonetheless, secondary in importance to the quarry development. Unless the dam is built, in my opinion, the primitive area of the monument will remain relatively unimportant, as it is today, so far as sharing in the number of visitors is concerned.

"I also note another glaring omission, conspicuous by its absence, especially since you are writing entirely about the primitive portion of Dinosaur National Monument. You utterly fail to mention the Jones Hole area. For the most part, itinerant scribes like yourself will visit those areas of the monument which can be reached while sitting on soft cushions, even if it wrecks the car to get you there, but we can't get you into an area which involves a horseback ride and may mean that you're going to have to eat off the mantlepiece. Jones Hole, probably the most spectacular and scenic wilderness section in the monument, has received the most consistent and persistent 'brushoff' of any area in the region. And yet it has been considered worthy of setting apart as a national monument by itself alone. (National Park Service report of July 14, 1935.) Its location and solitude, its lack of gas fumes and horn blowing, are the very things which should make it irresistible to you wilderness people who are always yelling that you want to get away from it all. Well, here's your chance. Better come back and take another look at Dinosaur National Monument and finish your job. Jones Hole is something you'll really rave about, and best of all, it is unaffected by any dam.

"Let's get some realism into this thing and quit the visionary daydreaming which may make for poetic writing but which certainly ignores the facts as though they were a plague."

It can be said of this particular writer that he did spend a week or more at the monument gathering material for his article. Most of them camp there only overnight and then rush home to dash off a masterpiece on why Echo Park Dam will ruin Dinosaur.

I have lived in or adjacent to Dinosaur National Monument for over 30 years and with Mrs. Untermann, also a geologist, have mapped the geology of the entire monument. This publication, entitled "Geology of Dinosaur National Monument and Vicinity, Utah-Colorado," is Bulletin No. 42, of the Utah Geological and Mineralogical Survey. Mrs. Untermann was formerly a ranger-naturalist at Dinosaur and I have been a ranger there. In spite of our long association with the region and our intimate knowledge of it, there still are a lot of things we do not claim to know about it. How these hit-and-run scribes who camp there only overnight and then take a pot shot at the monument can be so well informed is too deep for me. I have always envied such clever sagacity.

The rivers of the monument now inundate approximately 3 percent of the area. After both Echo Park and Split Mountain Dams are constructed only 11 percent of the entire region will be inundated, leaving the remaining 89 percent a wilderness untouched by man. Does this sound like the destruction of Dinosaur National Monument? It does, however, raise the old question of just how much wilderness do the wilderness people want? In the national park system is already encompassed an area nearly as large as the State of Maine. Canadian national parks preserve an area larger than Scotland or nearly 30,000 square miles. The national forests of the United States administer a wilderness of approximately 20 million acres with a like acreage in Alaska. These are classified as "wilderness areas, wild areas, and natural areas," and by themselves alone should keep all the nature enthusiasts in the Northern Hemisphere happy for many generations to come. The rugged State of Idaho has 3 million acres of primitive area set aside in the national forests which are accessible only by saddle trail. This vast acreage is sufficient to make thousands of wilderness seekers eat many of their meals standing up and cause many more to sleep on their tummies.

In Utah 71 percent of the land is federally owned, which includes 2 national parks, 9 national monuments, and 7 national forests. No one out in that country is going to shed any tears over the modification of a small portion of this Federal land, especially when it makes the area more accessible and advances the development of a rapidly expanding West.

To those of us who live in the intermountain West, where one can travel 50 to 100 miles without seeing even a house, let alone a town, the frenzied concern of nature groups over the "vanishing wilderness" seems needless in the extreme.

(It can be nearly disastrous if you break down and need help and it can be mighty inconvenient when you want to borrow a cup of sugar.) We have hundreds of thousands of square miles of solitude running around loose. We want less, not more wilderness. What these people and their kindred spirits should do is to visit such solitude, enjoy its vastness and wilderness, and then keep the knowledge of their discovery to themselves. In the past they have always shouted from the housetops, "This is wonderful. This should be made into a national park and preserved for future generations." Then they corral the area with an imaginary fence, turn the spotlight of publicity on it which attracts hordes of the "Coney Island crowd," whom they detest, and who spoil the wilderness for them. Most of these areas which have been preserved in national parks and monuments (and it certainly is true of Dinosaur), were a whole lot more untouched and primitive before the conservationists set about saving them than they are today. It has taken nature and geological processes millions of years to create the values so cherished by these wilderness people, values which are not enhanced by bitter controversies over their preservation.

Not satisfied with fencing off great wilderness tracts in the continental United States with its enveloping tactics, the Sierra Club was caught in a sneak attack on the vast open spaces of Alaska. A couple of years ago an Alaskan got wind of what the Sierra Club was trying to do and when he called at club headquarters in San Francisco, the officers were highly embarrassed that their plan had become known, admitting that they were trying to keep it a secret. Their reason for trying to sew up still more wilderness, they said, was because, "It won't be long before you are building roads all over Alaska, and people will be living everywhere. Then it will be too late to establish a wilderness area." Again we ask, "How much wilderness do the wilderness people want?" There are no roads and no development of any kind in 99 percent of Alaska and these "conservationists" are worrying about a vanishing wilderness. There are many effective wilderness areas held by the Federal Government in Alaska. In addition to the national forests already mentioned, there also Glacier Bay National Monument, Katmai National Monument, and McKinley National Park. These constitute some of the largest land holdings the United States has anywhere in the world. Alaskans say that under the administrative policies of the Federal Government, these areas bid well to be withheld permanently from any useful purpose as nothing is being done with them. One of these areas, Glacier National Monument, is so wild and remote that an enemy could capture and hold it for years without anyone even knowing that it was occupied. (See attached copy of editorial from the Anchorage Daily Times.)

Thomas Munro in his discussion of the aesthetic appreciation of nature, has this to say: "A man who must wrest a difficult living from the land is forced to take a different attitude toward it from that of the leisurely vacationist. He must, in other words, take a practical attitude toward nature." The vacationist enjoys our rugged mountains and scienic splendor for 3 months of the year, then he goes back home to make his living where things are easier. The native lives out there the year round and has to grub for his living where he is. These fair weather people who oppose the development of our country only come out there to play. We have to work there. You can't blame a man like Eberneezer Bryce, for whom spectacular Bryce Canyon was named, for not going overboard for the scenic aspects of the region when he took the more practical attitude by saying that "it was a hell of a place to lose a cow." Any stockman will appreciate what he meant. If some of this vast western wilderness can be put to work doing something useful, instead of being merely ornamental, it should not be looked upon as a national calamity.

That having fun is the primary object of most of these visitors to our picturesque West is shown by the statements of some who are honest enough to give the real reasons for opposition to dams in Dinosaur National Monument. Dr. Russell G. Fraser, an ardent river runner, comes right out and makes no bones about it when he says, "I may be selfish in my viewpoint but I like to run rivers and if you fellows build those dams in there you'll spoil my fun."

Miss Mildred E. Baker, in the 1950 autumn number of the Living Wilderness says practically the same thing in different words. Stating her opposition to Split Mountain and Echo Park Dams, she concludes "* * * forever making it impossible for anyone to enjoy the thrills of fighting the river and pitting their puny strength against all the forces of the wilderness." It seems a bit heartless on the part of those of us who favor Echo Park Dam that we should deprive this small group of their selfish pleasure when by so doing we are only thinking of the welfare of a whole river basin.

We are aware, of course, that the major objection of the conservationists to the dams in Dinousaur, the opposition which looms up largest, stems from the purported threat to a National Park Service area by commercial interests and the alleged violation of principles and precedents. There are two sides to this story so far as the Monument is concerned. The wilderness people have steadfastly contended that our side of the story is of no importance and carries no weight. We feel, however, that each case should be judged on its own merits. There is more to the enlargement of the Monument than meets the eye, as will be brought out by other testimony and ample evidence will be submitted to show that there is every reason to place faith in the promise that such enlargement would not interfere with grazing or water and power development on the streams. Many events preceding and following the enlargement of the Monument give logic to the belief that this promise will be kept. It should be noted that grazing continues in Dinosaur National Monument as per agreement. This fact, however, has never been a cause for raising a national rumpus and claiming that grazing in the Monument is a bad precedent and threatens all other Park Service areas with a similar invasion. In principle the objection to the dams has no more basis in actual fact.

What a lot of people never knew, or may have forgotten, is that the initial expansion program at Dinosaur started out as a vastly larger scheme. The original idea was to make a wildlife area out of the region and as such it took in a great deal more territory. Indeed, it took in just about all the sagebrush flats and hills in the surrounding country and bore no resemblance to any plan presuming to preserve scienic and recreational values. The vigorous protest of the local people, both in Utah and Colorado, shrank the boundaries to approximately their present limits. The monument's "new look" resulted from confining the envelopment of the region to the four major canyons, Lodore, Whirlpool, and Split Mountain on the Green River and Bear Canyon on the Yampa, with control areas reaching back several miles from both rims.

A terrific uproar has been made over the charged violation of a principle and the claim that an undesirable precedent will be established in the construction of Echo Park Dam. I do not believe it will take a Philadelphia lawyer to establish the fact that these people do not know what they really are objecting to. I fail to see the logic of the nature group's argument that a precedent is involved in permitting the construction of Echo Park, when they already concede that the Browns Park Dam (recognized by President Roosevelt in his proclamation enlarging the monument), would not involve such a precedent nor would it involve any violation of Park Service principles. A dam within a National Park Service area is a dam no matter where it is located, so far as precedent is concerned. What these people are really objecting to is not a dam but its location. Browns Park Dam being in upper Lodore Canyon, near the northern boundary of the monument, would affect only a small portion of Dinosaur. Echo Park Dam, in upper Whirlpool Canyon, would modify the bottom of both Lodore and Bear Canyons and increase the affected area. This, then, is the real objection. If the wilderness people would base their case on location instead of precedent they would be getting things into their true perspective. But can you imagine anyone raising a national hullabaloo over the location of a dam when no objection can honestly be made to the dam itself? As long as you can get misinformed people to believe that their national park system is being violated you have a much stronger case for fanatical objection than if you came right out and said that, What we are objecting to is that they are going to back water up canyons A and B instead of only canyon A, and for heaven's sake write the President, write Congress, write Churchill, that they are destroying our national park system with such a dangerous precedent.

What of archaeological and mineral values which may be partially inundated by dams in Dinosaur National Monument. Archaeological exploration at the monuments dates from 1921. The principal work of study and excavation was carried out by the University of Colorado Museum in cooperation with the National Park Service. Considerable material has been recovered, especially in the Castle Park area, with papers covering the work published by the University of Colorado Press in 1948 and 1951. (The Archaeology of Castle Park and Excavations at Hells Midden, Dinosaur National Monument.) Castle Park has produced only artifacts while Jones Hole has produced both artifacts and skeletal remains of primitive people. Prehistoric Indian sites, mainly Basket Maker II and III, ranging from 200 to 700 A. D., are widespread in northeast Utah and northwest Colorado, both inside the monument and outside. This is equally true of the cliff murals or petroglyphs which are no rarity in the region. There is no

danger of erasing lost civilizations as a result of Echo Park Dam. They are too well represented everywhere in that section of the country. In the attached statement, Dr. Jesse D. Jennings, head of the anthropology department, University of Utah, and one of the intermountain's outstanding archaeologists, shows that if salvage of archaeological values is carried out ahead of inundation (and there is ample time for this), there is no reason to oppose construction of the dam.

In our 5-year survey of the monument's geology we could find no minerals of economic importance. This includes oil and uranium. The formations which produce oil elsewhere in the region are exposed on the surface at Dinosaur and do not have a sufficient cover to retain oil if it were present in the first place. The only oil saturation I know of in the monument is in a Weber sandstone boulder where we high-centered on the so-called road to Steamboat Rock. Formations from which uranium is being recovered in commercial quantities in southeast Utah and southwest Colorado, are present in the monument but apparently do not carry such values. Common minerals, such as copper, iron, lead, etc., occur so scantily as to produce only prospect holes which give no promise of having any commercial value. An independent investigation will easily verify the truth of these statements. Attached are letters signed by seven prominent intermountain geologists who support the above views and who conclude by saying, "All geologic information believed to be worthwhile at present is, therefore, at hand * * *, it is unreasonable to anticipate that any impediments to research will be thrown us as a result of the dam construction and the impounding of waters back of it." I would also like to refer you to the chapter on minerals, pages 10–12, in Geology of Dinosaur National Monument.

The grave concern over the presence of economic minerals in Dinosaur National Monument has long been a source of secret amusement to us. If the monument were made of uranium and was studded with diamonds no one would be permitted to develop these resources anyway, because they would be in a Park Service area and the same "hands off" policy would apply. The same uproad over "invasion" and "precedents" would be furiously hurled by the conservationists as are now being hurled over the proposed dams. While the Park Service would not permit any "development" at Dinosaur, the local stockmen claim that the monument has a development project of its own; that of raising coyotes, mountain lions, and bobcats to prey on their young stock. The Park Service has a wildlife publication which shows that coyotes don't eat sheep. An autopsy was made of the stomachs of a couple of coyotes which proved that they ate only rabbits, prairie dogs, and other natural food animals. However, one of the stomachs contained a strange item—a shoelace. From this we must conclude that while these particular coyotes did not eat any sheep—at the time of their examination, one of them certainly must have eaten the herder.

In this concern over "inundated values," the Park Service has, inadvertently introduced an item of confusion on its own. On page 47 of the National Park Service report which forms a portion of the 1950 Colorado River storage project report, under geological program is the following: "To excavate two important dinosaur sites in Echo Park and Split Mountain Canyon, respectively; recovery, preservation and storage of artifacts and plan for subsequent public exhibit." Twenty-five thousand dollars anually, for a 2-year period, are requested to make this study.

I wrote the then Secretary of the Interior pointing out the error in referring to this material as dinosaurs. Inasmuch as the canyons referred to are carved in formations which antedate the dinosaurs of the monument by at least 100 million years, no fossil dinosaurs could be present. The Assistant Secretary replied that they regretted the error and that the statement should have read "fossils" instead of dinosaur fossils. I in turn replied that using only the term "fossils" was still very confusing, since any fossil in the monument would immediately be interpreted as a dinosaur fossil by the average reader. It would be better to say what they meant, which was invertebrate fossils; in other words, marine shells of the Carboniferous period. We had had such a difficult time refuting the rumor that dinosaurs would be flooded by proposed dams, that we didn't want to see this bugaboo raise its head again through the use of any misleading language. (This aptly illustrates how these false impressions arise and how a tempest in a teapot results from something which has no being in reality.) Besides, $25,000 a year seemed to give these "seashells" an exaggerated importance which they certainly do not merit and which was sure to cause additional needless controversies. Especially when the same material in exactly the same beds could be studied in many other localities within the monument and on the

outside. Within the monument the identical geology, stratigraphic layers and invertebrates occur at these among other places: Round Top, Martha Peak, Tanks Peak, Bear Valley, Thanksgiving Gorge, East Cactus Flat, Douglas Mountain, Zenobia Peak, Wild Mountain, Harpers Corner, and Jones Hole. Outside the monument these same fossils can be studied on Diamond Mountain, Lena Peak, Brush Creek Mountain, Taylor Mountain, and others, all of which are wholly unaffected by any dams proposed in the area. This duplication of values within the monument and on the outside is typical of practically every feature which seems to cause some quarters so much needless concern and applies not only to the geology, fossils, and archaeology, but to faunal, floral, and mineral values as well. This makes one wonder what all the shouting is about. Such a baseless commotion is either due to misinformation or to a deliberate attempt to misrepresent things as they actually are.

It comes as no great surprise that conservationists are divided among themselves over this controversy and that such groups as would normally be expected to aline themselves with the wilderness people, because of their aesthetic appreciation of nature, are not opposed to the dams in Dinosaur National Monument. In our State we have such organizations as the Federated Artists, Associated Garden Clubs, Federated Women's Clubs, Wildlife Federation, and the Wasatch Mountain Club who do not go along with the conservationists. These groups are not misled by a barrage of meaningless jargon and interpret conservation as the wise use of the Nation's resources. (See attached, Some Views of the Wasatch Mountain Club, Salt Lake City.) Even individual members of opposing groups can't stomach some of the antics of the leaders of these organizations. Listen to this from a member of the Sierra Club, no less: "I do not see eye to eye with the club. The entire club is led by a few who do the thinking for them and hold sway over the membership. I think reclamation is in its infancy and should not be blocked by a few individuals, or groups led by a few individuals, who know nothing of the needs of a land so far away. I have openly stated my views on Echo Park Dam to many club members, and in 9 cases out of 10 they have not written their Congressman or Senator because they do not feel that they are in a position to pass judgment on the merits of the project, and realize they are being told how to think by the club leaders, and they don't like it. One member asked a lady who held up her hand in answer to a request for a show of hands of members who had written letters in opposition to Echo Park, where Echo Park Dam was and what she thought the Sierra Club had to do with it in the first place. She didn't know where the dam was and parroted a few of the club's stock objections. Here we have a woman who doesn't even know what the score is, yet she feels qualified to write her Congressman and tell him how to vote."

My most unpardonable sin, in the eyes of the wilderness people, is that I, a museum man who himself preserves the beauties of nature, should be on what they are pleased to call, the wrong side in this controversy. My reply has been, and will continue to be, that it merely goes to show that one can love nature and still be rational about it.

In view of all the consideration that has been given to posterity, I only hope they appreciate it when they finally arrive. I am sure they will be far more grateful to those forebears who leave them a means of making a living than to those of whom it can only be said, "They left us a wilderness."

SALT LAKE CITY, UTAH, *January 29, 1954.*

Hon. WILLIAM A. DAWSON,
House of Representatives,
Washington, D. C.

DEAR MR. DAWSON: This letter is in supplement to our wire of yesterday concerning the current controversy regarding Echo Park Dam.

Each of us has written previous letters concerning the aspects of this matter, of which we have personal knowledge. However, it has come to our attention that, as part of the so-called conservation testimony, considerable capital has been given to the claim that, in future years, Dinosaur National Monument may be made a tourist attraction primarily through the use of boat trips down the river.

This contention is as ridiculous, in our opinion, as is most of the testimony which has been given by conservation groups speaking without personal knowledge of the monument. No one who has traversed the waters of the Yampa and the Green River through the Dinosaur National Monument can possibly claim that those waters are safe to casual travel during high water.

As mentioned in our wire, on June 20 last, 7 of us capsized at the top of Split Mountain Gorge on the final day of a 5-day boating trip down the Yampa and Green Rivers from Lily Park, Colo. to Jensen, Utah. Our party was composed entirely of men between the ages of 35 and 45, all in good health. The leader of our party is a man who has devoted a good portion of his adult life to river running, who has made 12 to 15 trips down this very stretch of river, and who has traversed most of the white water in the Western States. Two more of us had made this same trip the previous year. All of us have spent considerable time outdoors and in the primitive areas of the West.

We were going down the river this year in an Army pontoon, which, as you know, is approximately 20 feet long, with 20-inch rolls on the side, a craft which few people would believe capable of capsizing. However, on the fifth day of our trip, right at the bottom of Moonshine Draw Rapids in Split Mountain Gorge, the boat, despite the efforts of the two men at the oars, was swept over a rock and capsized into a hole behind the rock. Two of the party were thrown clear of the boat. The rest were drawn back into the rock several times before the boat pulled away. The two who were thrown clear managed to make it to shore just above the next rapids, appropriately named S. O. B. None of us on the boat had any idea that the two thrown clear had or could reach shore safely, just as we did not believe, through our knowledge of the river, that we could live hanging onto the overturned boat going through S. O. B. Rapids and the succeeding white water and rapids.

We were approximately 30 or 35 minutes in the water clinging to the overturned boat in an effort to get it to shore, but were unable to do so through that entire section of the river. At the end of that time, we were able to get a rope across the top of the overturned boat and climb on top, in which fashion we rode the last rapids. We were just over an hour from the time we capsized until we came ashore at the southern end of the monument. During that time, those of us who had stayed with the boat were convinced that the two men who had been thrown clear could not have gotten through that stretch of river alive. It may be interesting to know that experienced rivermen told us later that they would never have expected anyone to live through that water at that stage of the river.

For 3½ hours, we were unsure of the fate of the others in the party until search planes which we chartered and others sent out by the parks department located the party which had been stranded upriver. They were subsequently rescued.

This experience moves us all to protest most strongly any testimony that this river can be considered safe for any but fully equipped, healthy adults. We assure you that, although we all hope to make the trip again this year, we are going to go, as always, fully equipped and that if the water looks to us as it looked last year, we fully intend to walk around that particular portion of the river.

We certainly feel that there are many aspects of this Echo Park controversy which may be more sensibly debated than the safety of the river from a recreational standpoint. We are, of course, as we have indicated in previous letters, strongly in favor of the Echo Park Dam and the entire central Utah project; but whether or not we were for the Echo Park Dam, we could not condone the testimony given in Washington the past week by so-called conservation forces.

Very truly yours,

ROBERT G. ARNOLD,
MAX C. SMITH,
RICHARD F. REED,
ROBERT L. PARKER,
Salt Lake City, Utah.

SALT LAKE CITY, UTAH,
February 16, 1954.

To Whom It May Concern:

My name is Harold Twitchell. My reason for writing this letter is to refute the statements I have read about how safe it is for anyone to make a trip down the Green River through the Dinosaur National Monument in a boat without any experience at all. My opinion is that if anyone went through these canyons without a very experienced guide, he should have his head examined.

On June 14, 1948, 4 of us, Arnold Kidd, Erwin Day, Evert Billings, and myself, left Lily Park, Colo., and started down the Yampa River in a 7-man Navy rubber craft. The first day we went to the Mantle Ranch. The next morning we were up early and shoved off. This stretch of water is fairly slow until you get

to the junction of the Green River. Then the fun really begins as you must go around Steamboat Rock and then into the Whirlpool Rapids. This 3 miles of whirlpools are very vicious and only by sheer luck were we able to make it to Jones Creek.

At Jones Creek we met a group of fishermen. I tried desperately to get one of their group, anyone, to take my place in the boat. Believe me, I was scared. No one wanted any part of it.

The next morning we took off at 7 a. m. and went to the mouth of Split Mountain. We got out of the boat and looked the rapids over very carefully, as we had every rapid previously. (Little did we know what was in store for us.) We entered our boat and went on our way—and I do mean went. This water moves so much faster than any we had gotten into. We had gone about a quarter of a mile when a rock loomed up before us. We did everything in our power to avoid it, but over we went I was very lucky as I was able to hold onto the boat. The other fellows were thrown clear. I saw Arnold Kidd and Mr. Billings in the middle of the stream fighting for their lives. That was the last time I saw Mr. Billings alive. Mr. Billings drowned a few minutes later, according to Mr. Kidd. I drifted a mile or so below there and finally was able to get the boat ashore. All this time the boat was upside down. I made my way back upstream where I found Mr. Kidd. Mr. Day had gotten out on the other side of the river. We all finally made our way back for help.

Now let me explain. Mr. Billings had a Mae West life preserver which was fully inflated and strapped on him securely. The next morning we found the life preserver, fully inflated, all straps in place but Mr. Billings was not in it. The reason I mention this is to try to explain how vicious and swift the rapids were.

In closing all I can say is it is a beautiful canyon. It is too bad that a few want to keep it so for a few privileged persons when millions could see it if Echo Park Dam were built.

Anyone who knows me will vouch that I like my sports and have taken active part in conservation, but I feel this river is not only for the few who are brave enough to gamble with their lives. It should be for all who wish to enjoy the marvelous scenery without risking lives.

I would also like to say that I know of 6 boats that have been smashed on this same stretch of water where we had our accident and 4 of those 6 were guided by experienced men.

Sincerely,

HAROLD H. TWITCHELL.

TELEGRAMS TO REPRESENTATIVE WILLIAM A. DAWSON OF UTAH

VERNAL, UTAH, *January 27, 1954.*

Being an experienced boatman and having made several trips through the canyons of the Green River in the area the Sierra Club says is so safe, I wish to inform you that it is not safe for anyone, and only experienced rivermen should ever attempt it. I almost lost my own life along with 4 others on 1 trip. I lived in constant fear last summer while the Sierra Club was on their trip.

WILLIAM H. SLAUGH.

VERNAL, UTAH, *January 27, 1954.*

I was employed as boatman by Bus Hatch during the entire summer of 1953, and was boatman on two of the Sierra Club runs. I personally saved the life of Dot Pepper a member of the expedition during the last run. As a result she sent me an honorary membership to the Sierra Club.

Sincerely,

JOHN A. HACKING.

VERNAL, UTAH, *January 27, 1954.*

I have run boats through all the gorges in Dinosaur National Monument. In the spring of 1951 I ran with the Hatch River group. On this trip 2 boats were upset and 5 men were in the river for about 1½ miles. I personally saved the lives of 2 of them. If this river is safe for anyone it needs better boatmen than I have seen on it.

GRANT MERRELL.

VERNAL, UTAH, *January 27, 1954.*

I was the truck and bus driver for the Hatch River expeditions in 1953. At every point where I met the boats on the river I brought out dissatisfied members of the Sierra Club.

DALE J. MERRELL.

VERNAL, UTAH, *January 27, 1954.*

In May of 1951 I was one of a party of 13 men who ran the Green and Yampa Rivers. We started at Linwood, Utah. Three days later we entered Lodore Canyon and 2 hours later 2 boats with 4 men and myself capsized at Upper Disaster Falls. The 5 of us were in this terrible water for 1½ miles before we could reach the bank. By the grace of God only we reached the bank before we were battered to death on the thousands of rocks in this wild river. This water is so fast and rough it is impossible for the best swimmer to even attempt to swim. If all 5 of us had not been lucky enough to have held to the boats we would have all been battered to death. We reached the bank minus 1 boat and all our provisions.

After making this trip I personally cannot see why any sane person would take it. To think that the National Park Service will permit elderly persons and small children to take this trip is beyond any safe and sane thinking. This river is not safe to swim in even below the canyons where it is running smooth because of the undercurrent. The records show that several people have drowned even in this smooth water. I can see why a few people might make this trip once, but after running the waters of these canyons I cannot see why anyone would want to make a second trip. This entire trip was under the direction of Bus Hatch, veteran river runner, and even with his expert knowledge of the rivers we still almost lost five lives.

Sgt. S. J. HATCH,
Utah State Patrol.

VERNAL, UTAH, *January 27, 1954.*

As a boatman I have taken parties through the Yampa and Green Canyons. They are far too rough and dangerous for the average boatman. The few who have gone through were taken by expert boatmen who knew every foot of the river. They ran the safest parts when the water was at the safest stage. Even so there will be people killed in the future as there have been in the past.

LYNN M. POPE.

STEAMBOAT ROCK DISAPPEARS

What are the nature lovers doing to our Steamboat Rock in Dinosaur National Monument?

In 1941 the Geological Survey, in cooperation with the National Park Service, surveyed and mapped the Dinosaur area, map release as of 1945, showing the top of Steamboat Rock at 6,066 feet, stream bed at 5,060 feet, or at that time this massive rock was 1,006 feet high.

Devereux Butcher, field representative of the National Parks Association, in the National Parks magazine of December 1950, somehow disposed of 206 feet of this giant and moved it to only 800 feet high—that made the 500-foot dam more impressive.

Then somehow Martin Litton, an official of the Sierra Club, got into Pats Hole and he photographed the great rock down to 700 feet, see page 378 of the March 1954, National Geographic. No one saw him carry off the top 100 feet which Mr. Butcher left there.

Now comes Phillip Hyde in cooperation with the Sierra Club and he takes off another 50 feet by his photograph in Sunset magazine, March 1954. He is very kind. He did not take such a big chunk, he still left us 650 feet of rock and it still looks the same.

Now, I don't know exactly what they did with this billion tons of sandstone, but I think they have been feeding it to some of their associates all over the good United States and calling it save our scenery.

Now, gentlemen, or nature lovers, will you please bring back that 356 feet of our rock for we have plans to keep 500 feet of our magnificent Steamboat Rock out of water when the Echo Park Dam is built.

C. R. HENDERSON,
Vernal, Utah.

[From Anchorage Daily Times, February 25, 1954]

OUR VANISHING WILDERNESS

A new clamor for a big land withdrawal in Alaska is abuilding down California way, and bids well to become an important issue if it continues.

There is a move being pushed by a handful of men to have a big slice of Arctic Alaska set aside as a wilderness area.

If accomplished, it would mean that the area—no doubt huge in extent—would be forever closed to development by man. It would be a sacred spot where wildlife could live undisturbed except by its own predators and diseases. It would have no roads, no mines, no traplines. All things invented and used by man to make the riches of the earth useful, would be taboo.

Alaskans will find it difficult to understand why there should be a clamor to perpetuate what Alaskans are so desirous of bringing into production. They can't see why anyone should want more of what Alaska already has so much of.

The revised version of the Alaska statehood bill now pending in Congress, protects the Territory from such a land withdrawal at the moment. It promises there will be no new reservations established for at least 5 years. If the bill dies without enactment, the Territory would lose that flimsy protection.

The wilderness area is believed to have been the brainchild of a group of mountain climbers in the San Francisco area. The idea came from the Sierra Club, a conservation organization of national repute.

Two years ago an Alaskan called on the officers of that organization and inquired as to their plans. First tip that such a scheme was in the making came when other conservation groups endorsed the idea which had been expressed by the Sierra Club.

The officers were found to have few definite ideas. They were embarrassed that their plan had become known. They admitted that they were attempting to keep it under cover.

The main idea that prompted their scheme was the rapid development of Alaska that they had been reading about.

"It won't be long before you will have roads built all over Alaska and people will be living everywhere," one officer said. "Then it will be too late to establish a wilderness area."

It is silly to be fearful that all the 586,400 square miles of this vast northland are about to be opened up by road construction. The 99 percent of Alaska's area that is wilderness is undergoing no change because of today's developments.

It is apparent that the move for creating a wilderness area is based on a false premise.

A further look at the situation shows the scheme is superfluous and unnecessary. There are already many effective wilderness areas held by the Federal Government. These include some of the largest landholdings the United States has anywhere in the world. They are Glacier Bay National Monument east of Yakutat, the Katmai National Monument southwest of Anchorage, and the McKinley National Park north of Anchorage.

Each of these huge reservations is a wilderness area as it stands. Under the administrative policies of the Federal Government the areas bid well to be permanently withheld from any useful purpose. Nothing is done with them. No new roads are built.

McKinley Park is opened to the public on a limited basis, but only a fraction of the huge area is accessible for lack of facilities. Katmai National Monument is even less accessible and Glacier Bay National Monument could be captured and held by an enemy for years without being discovered.

Why should there be an effort to set aside another huge area as a wilderness, when the project has been achieved so perfectly through past reservations?

Wilderness boosters could contend that creation of the Arctic area would not interfere with the big developments that are coming for Alaska. That may be true.

But the chances are equally strong that the interference could be terrific. Alaska has so many prospects for development, in so many places and in so many different fields, that there is no place that can be definitely and finally designated as good only for wilderness.

Mineral possibilities are attracting national attention. There is great need for the mineral impregnating Alaska's hills and valleys. They may be found anywhere, and that includes the Arctic as well as the subarctic.

Alaskans have first-hand knowledge of the stubborn jealousy of Federal agencies in regard to their holdings. Only a few years ago a limestone deposit was

discovered in a remote and inaccessible mountain at the southeast corner of McKinley National Park. An intradepartmental fight was precipitated when the deposit was under investigation.

The Bureau of Mines was stopped from moving drill equipment into the area. The National Park Services refused to allow the Bureau to cross the park boundaries. Both are Interior Department agencies. Their deadlock went to Cabinet level in Washington for adjudication. The Bureau was allowed to drill.

Would a private firm have been allowed to drill? If it had been decided that the limestone should be mined on a commercial basis, would the Interior Department have allowed it?

To Alaskans, wilderness is something to be enjoyed as it is and developed if, as, and when an opportunity is found. A couple of generations from now, the natural wilderness areas may be reduced to a point where steps should be taken to set aside some acreage for perpetuation as such. When that time comes, Alaskans will be glad to have the help of the mountain climbers in San Francisco in the project.

UNIVERSITY OF UTAH,
DEPARTMENT OF ANTHROPOLOGY,
Salt Lake City, January 15, 1954.

Dr. A. RAY OLPIN,
President, University of Utah,
Campus.

DEAR PRESIDENT OLPIN: Herewith is my brief response to your request for a statement regarding archaeological resources which would be jeopardized by the construction of Echo Dam in Dinosaur National Monument.

(1) In the portions of the Yampa and Green River Canyons involved in the reservoir there are known to be scores of aboriginal sites, ranging from at least 2000 B. C. to A. D. 500–700. Earlier ones may well be there. More of these known sites lie in the Yampa Valley than in the Green; this reflects only the fact that the Yampa has been surveyed more carefully for cultural material than the Green.

(2) At least two cultures are represented in the area. The earlier, and least spectacular, is the nonagricultural and relatively low-level way of life showing relationships with the material recovered from caves in western Utah and the rest of the arid West.

The second and later manifestation, called the Fremont, is a recognizable, but very poorly understood variant of the Pueblo culture of the Southwest. It is less flamboyant (than Pueblo) in overall development, but was an agricultural, pottery-making culture. In my opinion (and we plan to do research on this problem), the Fremont culture developed from the desert cultures of the arid West and may prove to be of somewhat greater age than the long sequence of better publicized southwestern cultures. Actually, archeologists know the potential and wealth of resources more fully than they know the cultures of these canyons.

(3) Two good reports of the work at two small sites in Castle Park, on the Yampa, are available. These are:

Burgh, Robert F., and C. R. Scoggin, the Archaeology of Castle Park Dinosaur National Monument, University of Colorado Studies, Series in Anthropology No. 2 (1948); and

Lester, Robert H., Excavations at Hells Midden, Dinosaur National Monument, University of Colorado Studies Series in Anthropology No. 3 (1951).

A third general report by Marie Wormington on the Fremont culture will soon be available from the Denver Natural History Museum.

In addition there are three extensive manuscript reports of archeological surveys within Dinosaur National Monument on file at the monument headquarters at Vernal, Utah. These are of value in this connection because these manuscripts contain full inventories of the known aboriginal sites in the reservoir site and other parts of the area.

(4) There is now a precedent—begun in the TVA days and continued since World War II—that Government agencies recognize an obligation to salvage, on a sampling basis, archeological, historical, and paleontological data threatened with inundation because of reservoir construction. We could expect a similar arrangement, I suspect, in the case of Echo Park Dam. (In fact, this university would perhaps have opportunity to contract to conduct salvage archeological work in the reservoir area.)

(5) In summary, there are important archeological values to be considered, these are known and understood in the most limited and incomplete way. These, by precedent, can be salvaged ahead of inundation, and the ends of science would thus be saved. On purely scientific grounds, therefore, if there is assurance that a sample salvage program will be incorporated into the dam construction project, there is no reason to oppose dam construction.

If no provision for salvage is made, however, there will be loss of rather significant anthropological data and values—the more important because of our present incomplete knowledge about the remains of the two cultures found in the region. The scientific necessity for arrangements for salvage should be, I think, emphasized as being the crucial factor in the position I have taken.

(6) The above statements are very hastily put together. A more detailed and informative statement can be prepared, if desired, by travel to Dinosaur National Monument where the detailed survey reports can be consulted.

Sincerely,

JESSE D. JENNINGS,
Head, Anthropology Department.

JANUARY 15, 1954.

Dr. A. RAY OLPIN,
President, University of Utah.

DEAR PRESIDENT OLPIN: The following brief report concerns the geological implications of the Echo Park Dam. It reflects the opinions of the staff of the Department of Geology.

The dam itself and the waters impounded back of it will not cover the dinosaur bone beds. The dinosaur fossils occur in the Morrison formation, and the site from which the skeltons in the Museum of the University of Utah, in the Carnegie Museum, the Denver Municipal Museum, and the National Museum came, will not be impaired in any way. There is very little fossil material at the monument for the tourist to see at present, but the Park Service has made plans to quarry out in relief the dinosaur bones from a large sandstone slab at the quarry site, and this will make an imposing exhibit when completed. A sheet metal structure has been built over the slab but excavation of the bones has not yet started because of lack of funds. Professor Stokes, of the department of Geology, University of Utah, was to have directed the actual excavation. The site of such proposed excavation is several miles from the proposed dam and the waters collecting back of the dam would extend away from the bone beds and not toward them and over them. Moreover, the Morrison formation extends in belts of outcrop from New Mexico to Montana, and at several places in it various species of dinosaurs have been found. We can see no way in which research on fossil reptiles will be impaired by the building of the Echo Park Dam, and no way in which possible naturally occurring exhibits for the general public will be covered or made less attractive.

The waters will cover short stretches of some of the Paleozoic formations, but only a little more than the present Green River and Yampa River. For the most part the waters will spread along the bottom of the Green River Canyon over the Precambrian Uinta series which makes up the core of the Uinta Mountains. So far no commercial mineral deposits have been found in the Uinta series. No petroleum geologist would spend time on the Uinta series in the search for oil. To the writer's knowledge no uranium deposits have yet been found in it. The percentage of areal exposure that the impounded waters would cover is negligible, and it is entirely improbable that future geological interpretations of structure or stratigraphy would be hampered.

The small extent of the Weber sandstone and underlying shales and limestones that would be covered by the proposed Split Mountain dam is of no geological concern. Although the Weber sandstone is the chief producer of oil in the nearby Rangely and Ashley Valley fields, the structure at the place where the Weber would be covered by the waters of the dam is not suitable for oil accumulation, and as far as I know, no geologist has designs on the dam site area.

A good topographic and geologic map has been made of the entire Dinosaur Monument, the geologic map having recently been published (Utah Geological and Mineralogical Survey, University of Utah). All geologic information believed worthwhile at present is, therefore, at hand: It is probable that research on certain details in the Dinosaur Monument area will be made in the future

but it is entirely unreasonable to anticipate that any impediments to research will be thrown up as a result of the dam construction and the impounding of the waters back of it.

Respectfully yours,

A. J. EARDLEY,
R. E. MARSELL,
WM. LEE STOKES,
F. W. CHRISTIANSEN,
N. C. WILLIAMS,
D. J. JONES,
Staff of the Department of Geology.

JANUARY 15, 1954.

President A. RAY OLPIN,
University of Utah, Salt Lake City, Utah.

DEAR PRESIDENT OLPIN: Since coming to Utah as dean of the College of Mines and Minerals Industries I have been vitally concerned with the natural mineral resources of Utah of which water is one. Power is another important aspect of the industrial utilization of the mineral resources of the State.

To one studying the problem it soon becomes evident that water is the most important single resource in the West, largely because of its scarcity in contrast to the abundance of many other raw materials essential to an industrial future. The development of the Colorado River water along sound engineering lines is the most important problem to be solved if the intermountain region of the United States is to contribute the maximum of its potential to the economic welfare of the Nation and the world. It is my firm belief, based on considerable study, that the recommendation of the Bureau of Reclamation is the best engineering solution to this problem and that this proposed program of development was not influenced by motives other than the best possible engineering practice directed to obtaining the maximum productive result from the development of the waters of the Colorado drainage basin.

For this reason I am firmly convinced the Echo Park Dam should be constructed at the earliest possible date.

I am completely at a loss to understand the thinking back of the opposition which has arisen in the name of conservation. One wonders if the stated reason is the real reason for the opposition. The important part of the Dinosaur National Monument—the dinosaur quarry—will in nowise be disturbed since the lake will form up the river from this quarry. Furthermore, the river above the quarry is now practically inaccessible. Only a few river rats traverse the river at this place each year in rubber liferafts, and while traversing it they are much too busy fighting rapids to gain a safe passage through the river to enjoy any of the scenery offered by the sheer canyon walls. Hence this part of the monument offers very much less attraction than would a lake formed by the Echo Park Dam.

A word as to conservation. To me, the term "conservation of natural resources" implies the most beneficial use of these resources for a rapidly expanding national and world population. Not to develop the upper Colorado River in the manner outlined by the Bureau of Reclamation is to waste—fail to conserve—a tremendous natural resource of water and potential power which could be a benefit to thousands everyday. All this would be lost so that a dozen or so citizens yearly might enjoy a ride in a rubber liferaft over dangerous rapids in a river running between sheer walls of barren rock.

For true conservation and for the best interests of a rapidly developing and growing Nation, we must have a sound engineering development of the upper Colorado River. This contemplates the construction of the Echo Park Dam at an early date.

I hope you will communicate this thought to those interested in the resolving of this problem.

Sincerely,

CARL J. CHRISTENSEN,
Dean, College of Mines and Mineral Industries.

SOME VIEWS OF THE WASATCH MOUNTAIN CLUB, SALT LAKE CITY

The Echo Park-Split Mountain controversy, when its relationship to the development of the upper Colorado River watershed is concerned, quickly loses its deceptive aspect of simplicity. The popular impression of a bureaucratic monster suddenly bent upon a dam-building foray, while superior sites are available elsewhere, is likely to undergo substantial revision.

Not only is this area in our backyard—the current dispute is not without an ominous portent for our front ones as well.

Some persons will learn, to their surprise, that the first reconnaissance undertaken in behalf of the Dinosaur Monument expansion found the Bureau of Reclamation already planning for a dam at Echo Park. Test drilling for the dam's foundation antedated by more than a year the inclusion of the area in the monument.

National park officials assured the inhabitants of the region that development of water resources would not be impeded, and a stipulation for construction was included in the order for the monument's expansion. As quoted by the Secretary of the Interior, "It contemplated the use of the monument for a water project."

The present conflict between inherently idealistic organizations presents a golden opportunity to enemies of the Bureau, and these implacable foes, now cloaked by association in a mantle of righteousness, contribute insidiously to gain their own unholy ends. Thus it is not surprising that the zealous conservationist should lapse into the line of attack of his predatory allies.

One favored subject is construction costs which exceed project estimates. The intended inferences are probably a lack of reliability in the Bureau's cost data, and deliberate underestimating to more easily secure congressional approvals.

Some embarrassment from estimate errors is freely admitted, but when a completed project report is subjected to committee hearings, investigations, etc., for a period often exceeding 4 years, before it is even presented to Congress, this type of error, during an inflationary period, can hardly be regarded as reprehensible. If there be any real basis for the second innuendo, it becomes less a reflection on the integrity of the Bureau of Reclamation than on the vision of Congress, which, in its dereliction, is ever mindful of the desires of the powerful taxpaying utilities, and has shackled this category of public works with heavy repayment requirements.

Other comparable endeavor, such as noncompetitive harbor activity and the levee-building antics of our flood-control specialists, the Army Corps of Engineers need make no repayment at all.

One example of increased project cost which is cited employs a strategem worthy of a politician. The Colorado-Big Thompson project was plagued with difficult construction problems, and ran the gamut of the inflationary spiral as well. It is truly stated that the increase in costs over the original estimate is too large to be accounted for in this manner, but omitted, in the best tradition of the half truth, is any reference to the power-generating facilities, including two reservoirs, which were added later, with congressional approval, to meet the rapidly growing demands of the region.

Competing for a place in the rhetorical war is the ridicule which is bestowed upon evaluation of reservoir evaporation losses. A single decade has wrought startling changes in our concept of science, but the roles of air temperature, humidity and motion, and exposed area still seem reasonably secure as the major factors to be considered in the determination of evaporation from any open body of water. Wind and weather conform to broad general patterns, and little is left, including the very minor amount by which this evaporation might increase the precipitation returning to the system, to introduce appreciable error.

As determined by academic methods, the evaporation losses from the best combination of substitute reservoirs exceeds by more than 300,000 acre-feet, the system minimum, which would be realized by the construction of the "stepchild" dams. This figure may not seem impressive to outsiders, but it has greater significance for the water-conscience region which was handed the bill by the Colorado River compact.

There is more to the problem than water storage, power generation, and cost, but this trio alone seems more than capable of promoting endless contention. With some help from Senator Watkins, Gen. U. S. Grant III publicly acknowledged one of the errors of his ways. The general is somewhat handicapped by his lack of knowledge of the Colorado River system and his dependence upon reports which he had no hand in preparing. Costs which he found to his liking

for his favorite projects, Bluff, New Moab, and Desolation, were taken from a report compiled in 1940, but for an Echo Park and Split Mountain comparison he went to a 1949 report. Although both were plainly dated, the transition from a prewar to a postwar economy, where construction costs were more than doubled, was neglected in his figures.

Too little is known about these commonly, and it seems, hastily chosen substitutes:

Bluff.—A small project of relatively short life, unless protected by upstream reservoirs, on the silt-laden San Juan.

New Moab.—The joker of the trio, inundating, as it does, portions of the Arches National Monument. The waters of a reservoir of the size contemplated by General Grant would sever a large portion of the monument, including the famous Delicate Arch. If restricted in size to prevent monument encroachment, both storage capacity and power generation become negligible.

Desolation.—Here a reservoir of 7 million acre-feet capacity, but little more than that required in combination with the foregoing as substitutes for Echo Park and Split Mountain, would have a surface area of 115,000 acres, or about three times that of the Echo Park Reservoir. When other disadvantages of the Desolation site—higher temperature, lower humidity, and more wind—are considered it becomes obvious that Reclamation's concern over evaporation loss is not idle conjecture.

To placate those who recognize the validity of reservoir evaporation comparisons, still another phase of the chameleonic attack is resorted to. It is claimed, in direct contradiction of the Bureau of Reclamation's records of river flow, that there is ample water available for upstream needs. Unexpected exposures of this fallacy and substantiation of the Bureau's data came with the disclosure, during the Mexican treaty deliberations of 1945, of the Hoover Dam document.

To all appearances the Bureau of Reclamation confidently expects full vindication of its methodical procedures and conclusions; but, not being permitted to publicize its case, can only await congressional hearings. The opposition has received relatively profuse publicity and, paradoxically, little scrutiny of its discomfitures and nebulous counterproposals; and, it seems, may need even more generous treatment in each subsequent encounter with reality.

Mr. ASPINALL. The Chair recognizes and calls Mr. Kay.

STATEMENT OF DR. LEROY J. KAY, CURATOR OF VERTEBRATE PALEONTOLOGY, CARNEGIE MUSEUM, PITTSBURGH, PA.

Mr. KAY. Mr. Chairman and members of this committee, my testimony here today deals only with the Dinosaur National Monument. I realize fully the need for conservation of water, as would anyone who has visited the deserts and badlands of the West, unless their vision is impaired from the bright sun or they have become mummified from dehydration.

For the conservation of this water by reclamation projects, I leave to the engineers of the reclamation service who have done such an excellent job in the past.

I have given considerable thought to the development of Dinosaur Monument even before the enlargement was made, dating back to the days when the Carnegie Museum was excavating dinosaur fossils from the original 80-acre monument, where Earl Douglass discovered the deposit of fossil bones in 1908.

My interest in this matter was undoubtedly inspired by Douglass, a great naturalist, who many times wrote about it in the local papers and told the crew and visitors to the quarry, as we called it in those days, that someday he would like to see dinosaur bones reliefed and left in the matrix as a great outdoor museum, and that a dam be built at the mouth of Split Mountain Canyon, which we called the Green River Gorge, for the development of electric power, and so that the people coming to the monument could boat up the river to study the geology and other natural history found in the canyon.

At that time excavations were being made at the canyon mouth for bedrock relative to the construction of a dam. The remains of this excavation is still visible.

The area abounds in natural history and is truly a naturalist's paradise, but few people ever visit it, due to the inaccessibility at present.

The bibliography of the papers written on the general area dealing with the geological features alone consists of over 200 titles.

Of course, the cost of building dams at Echo Park and Split Mountain sites, which would make easy access to the canyons of the monument, would be prohibitive for the development of the park alone.

But so long as it is practical to build the dams for irrigation, power, and conservation of water, why not let these features pay for making the monument one of the Nation's outstanding attractions.

I have been interested in the discussions here before this committee as to the costs of the various projects and when and how the cost would be returned to the Government. It seems to me that the revenues from the new wealth created by the development of the natural resources of the area, such as the mountains of phosphate, coal, iron, copper, lead, zinc, and, the newest, the uranium family, oil shales, and the hydrocarbon group, gilsonite, wurtzilite, lusterite, ozokerite, and others not found in any other place in such large quantities, if at all, would be a continued return of money in taxes to the Government.

Aside from the electric power needed for the development of these resources, many places where this natural wealth occurs there is not enough water for culinary use, to say nothing of water for developing these resources.

The opponents of Echo Park Dam have used the words "destroy" and "obliterate," if the dam is built.

After spending all or part of 39 years in the area, I certainly do not agree. I claim that the Echo Dam will create great material and cultural wealth that cannot be accomplished in any other way.

I would like to read one thing from my main paper.

I received a letter from a former Californian who is now in a university in the East, who described the beauty of the area of Dinosaur National Monument in glowing terms and stated that he would like to visit the place someday but:

"I would be most discouraged to find thouands of people visiting such places by boat on still water, cluttering up a once beautiful wilderness area."

The conclusion I have come to after listening to and reading the statements of the Echo Park Dam opponents are that they would like to preserve it for a few hundred, or less, people that would make the trip each year for the boat ride rather than the thousands that would enjoy the area each year if the dam is built.

Mr. ASPINWALL. Thank you very much, Dr. Kay.

Unless there is objection, Dr. Kay's statement will be made a part of the record.

Hearing none, it is so ordered.

Dr. KAY. Thank you.

(The complete statement of Dr. Kay is as follows:)

STATEMENT OF DR. J. LEROY KAY, CURATOR OF VERTEBRATE PALEONTOLOGY, BEFORE THE INTERIOR AND INSULAR AFFAIRS COMMITTEE OF THE HOUSE OF REPRESENTATIVES

Mr. Chairman and members of this committee, I am J. LeRoy Kay, curator of vertebrate paleontology, Carnegie Museum, Pittsburgh, Pa. I spent 8 years at the dinosaur quarry as assistant to the late Earl Douglass who was in charge

of the work there for the Carnegie Museum. I was charged with keeping the catalog of all speciments and drawing the maps on which all fossil bones were shown as well as directing the work of removing the fossil bones under the supervision of Dr. Douglass. Since that time I have spent a part of each year in the monument and surrounding area.

Mr. Chairman, from the testimony given here last year in regard to Dinosaur National Monument, there seems to be some confusion as to just how the Dinosaur Monument came to be. I would like to quote in part from the annual report of the director of the Carnegie Museum to the trustees as of March 31, 1916:

"Apprehensive that some wondering prospector might file a claim to the tract upon which we were working and then proceed to levy tribute upon the museum, your director instructed Mr. Douglass to take the steps to file a claim to 80 acres under the mineral laws of the United States, we having been advised by eminent legal authorities that such a procedure was proper. After all the necessary steps had been taken we were somewhat surprised on being informed by the authorities in Washington that fossils, according to their construction of the law, are not mineral, and though constrained not to give us title to the land under the mineral laws, the Secretary of the Interior, realizing the importance of the aims of this museum, and the desirability of allowing our scientific investigations to proceed, recommended to the President that the 80 acres above mentioned should, under the act of June 8, 1906 (34 stat., 225), be set apart and withdrawn from entry, the tract being designated as the National Dinosaur Monument. By proclamation of the President under date of October 4, 1915, the recommendation of the Secretary of the Interior was carried into effect, and subsequently the application of the Carnegie Museum for permission to carry on the work which it had commenced was granted."

The Carnegie Museum continued the work at the Dinosaur Monument until 1923, and upon discontinuing the work we left two skeletons in relief at the quarry. These were collected by the United States National Museum and one of these, a diplodocus, can be seen at the museum on Constitution Avenue. The other, a barosaurus, was exchanged by the United States Natural Museum for other material to the American Museum and can be seen in that museum in New York. The University of Utah next worked the quarry and the material they collected can be seen at the University of Utah Museum, Salt Lake City. The Carnegie Museum has exchanged specimens with other museums. An apatosaurus is at the Los Angeles Museum, a diplodocus at the Denver Museum, a stegosaurus at the Nebraska University Museum, Lincoln, Nebr., a diplodocus at the Royal Ontario Museum, Toronto, Canada, and a camerasaurus at the National Museum here in Washington. I think the distribution of duplicate dinosaur material, or any other material of scientific value, after study should be encouraged so that it may be enjoyed by the greatest number of people. At the present time the United States National Park Service is reliefing dinosaur bones at the monument to be viewed in situ by visitors to the monument.

During the years since the discovery of dinosaur bones in 1908 by the Carnegie Museum's late Earl Douglass, the staff members of the various sections of Carnegie Museum have made collections of the birds, mammals, plants, insects, fossils, and other natural history objects. The Denver Museum collected archeological material along the Yampa. In fact most of the scientific institutions in the country have made collections from the upper Colorado River Basin. I doubt if there is another area in the country which is better represented by preserved natural history specimens than this area. So I do not agree with the opponents of Echo Park Dam who maintain that all this information will be lost to future generations. Also, it is the policy of our Government to collect data and specimens from areas to be flooded by dam construction prior to the inundation.

The opponents of the Echo Park Dam use, or refer, to the 500 feet of water in the canyon of Green and Yampa Rivers regardless of what part of the canyons they are speaking, whereas the water will only be that deep at the dam and get less and less in depth farther up the canyons. They also use the terms "destroy," "obliterate."

I would like to quote from the statement made here last year by Fred M. Packard, executive secretary of National Parks Association:

"Burying the canyons under 500 feet of water would certainly destroy the present character of the area, hiding from view most of the stupendous escarpment that provides the awe-inspiring spectacle that is the monument's chief feature. It would end forever the possibility of enjoying the extraordinary boat trips down the rivers, which are unique in the national park system, hardly dupli-

cated elsewhere in America. Representatives of the Sierra Club and the Izaak Walton League of America, who have made such trips have described them and analyzed their unique importance as a recreational asset. Geological values of significant scientific importance would be lost, valuable archaeological sites inundated, and other educational assets destroyed, and there would also be destroyed wildlife values and certain other recreational values. The very purpose for which the canyons were preserved would be negated completely."

I certainly do not go along with that type of reasoning.

Is 500 feet, or less, which would be the depth of the water behind Echo Park Dam, most of the 2,000 to 3,000 feet of the geological strata exposed along the canyons? I never knew that one-fourth or one-sixth was most of anything.

I certainly do not think that geological values of significant scientific importance would be lost. Geologists have been concerned with the area since Powell's trip down the river and the geology of the area is well known, but maybe some additional small details could be learned if it was more accessible. However, these same geological strata are found in many places in and outside the park and would in no way be affected by the impounding of water behind Echo Park Dam.

I feel that the advantages to be derived from being able to visit, view, and study those parts of the canyons by easy boating on still water which are not accessible at present and will not be in the future unless the Echo Park Dam is built. It is true that a few people will each year go down those rivers in boats, but if so there are many places where one will be too concerned about the boat and the river to study or even view the canyon walls or other scenery. Certainly from a naturalist's viewpoint I would much rather be able to visit the place conveniently going either up or down the canyons stopping at will than to try to study the area by a boating trip down the stream as one must do at present and then only for a short period each year.

Mr. Brower, executive director, Sierra Club, made this statement in his testimony here last year.

In speaking of the Yampa River he stated that:

"The Yampa River really did a good job here in the course of some 90 million years entrenching itself in a giant meander right in the heart of the Uinta Mountains."

I wonder where Mr. Brower got that 90 million years. That long ago there were no Uinta Mountains and all the geological evidence points to the fact that the Yampa River did not start cutting its present channel until several geological epochs later, which would be millions of years later. In fact, as late as the Upper Miocene epoch, some 1½ million years ago, there was a great upward movement of the area which tilted the Brown Park sediments at a steep angle. These Brown's Park sediments are the key formations of the geological history of the area's upheaval and they would be covered if the proposed alternate Brown's Park and cross-mountain dams were built.

The opponents of the Echo Park Dam would lead one to believe that all the present flora and fauna would disappear from the scene if the dam was built, but practically 100 percent would still live on in the monument.

During the course of my geological studies in Montana the past few years, I have had occasion to make the boat trip through the Gates of the Canyon of the Missouri River. This boating trip is made possible by the construction of a dam at the lower end of the canyon. This area is not in the national park system but a recreational one in the Helena National Forest. While this canyon is not as long nor the canyon walls nearly as high above the water as those of the Green and Yampa canyons will be when the Echo Park Dam is built, I have seen more people boat through the Gates of the Canyon in one day than have gone through the Green and Yampa canyons in all time.

I received a letter from a former Californian who is now in a university in the east, who described the beauty of the area of Dinosaur National Monument in glowing terms and stated that he would like to visit the place some day but "I would be most discouraged to find thousands of people visiting such places by boat on still water, cluttering up a once beautiful wilderness area."

The conclusion I have come to after listening to and reading the statements of the Echo Park Dam opponents are that they would like to preserve it for a few hundred, or less, people that would make the trip each year for the boat ride rather than the thousands that would enjoy the area each year if the dam is built.

It is true that flooding the bottoms of the Green and Yampa river canyons will change their appearance to some extent but there will still be a minimum of four-fifths of the canyon walls above the water, which will distract very little from the beauty of the area that is so glowingly described by the opponents of Echo Park Dam. To me there seems only one practical way to make an attractive area of Dinosaur National Monument so that it can be safely visited by the greatest number of people and that is to cover the present rapids with still water for safe boating.

Of course, the cost of building these dams would be prohibitive for the development of the monument for its scenic and educational values alone, but so long as it is practical to build the dams for irrigation, power, and conservation of water, and the power will pay most of the cost, why not build the dams where they will do the most good.

I feel sure that the building of Echo Park Dam and Split Mountain Dam, and the reliefing of the Dinosaur bones at the Dinosaur Quarry will make the Dinosaur National Monument one of the outstanding attractions of our national parks and monuments, and that this can be accomplished in no other way.

Mr. ASPINALL. The next witness appearing at this time is Mr. Herbert Smart.

We are glad to have you, Mr. Smart.

STATEMENT OF HERBERT F. SMART, MEMBER, STATE LAND BOARD, STATE OF UTAH; SECRETARY AND PAST PRESIDENT, UTAH WILDLIFE FEDERATION

Mr. SMART. Thank you, Mr. Chairman and gentlemen of the committee, my name is Herbert F. Smart, I am land commissioner of the State of Utah. As such I have the direct responsibility for the management and administration and conservation of over two million acres of land in the State of Utah.

I have been interested in conservation from the time I was a youth.

For more than 15 years I have been a member of the conservation organization in my State. I have served as its president and I have been a member of the National Conservation Organization, and I am also a member of one of its committees.

My purpose in appearing before you today is to let you know that all conservationists are not opposed to the construction of the Echo Park Dam. Those conservationists who live in the area and who are the most informed and concerned with the problem of conservation favor this project. I have here an analysis of fish and game aspects, both present and project and postproject, which has been prepared by Mr. Thomas L. Kimball, director of the Fish and Wildlife Department of the State of Colorado, in which analysis has been made of the Echo Park project.

Mr. Kimball has given me permission to have this published and used and I would like to have it made a part of my presentation along with my prepared statement.

I did not have this in time to include it in the mimeographed copy.

In this, Mr. Kimball shows that at the present time there is one fish in this water which may be considered as a game fish, that is the channel cat. Very few people fish for it.

He further finds that in this area, the Echo Park area, no more than 200 fisherman days per year are spent on fishing in the area.

He finds that on the basis of the United States Fish and Wildlife Service river basin manual of evaluation, the present value of the area—

Mr. ASPINALL. I am sorry, the second quorum bells have announced that we should be over there answering the quorum call. So we will be in recess until 15 minutes of 4.

(A short recess was taken.)

Mr. ASPINALL. The Chair wishes to say that he had asked Senator Watkins to make his presentation at this time, but because of the lateness of the hour and because of the necessity of taking care of the Indian representatives he has asked Senator Watkins to wait until another meeting.

I would like the committee to know that the Senator does have a presentation which will be valuable to the committee and as soon as we can make arrangements to have the Senator come before our committee, we will have a special meeting for that purpose, or as part of one of our general meetings.

Senator WATKINS. Thank you very much. I do not want to interfere with the other witnesses testifying who have come a long way.

Mr. SAYLOR. I understand Senator Watkins has done a great deal of reasearch which he wants to present to this committee.

I would urge when the Senator has arranged to be heard that word be sent out and that efforts be made to have every Member of the House present.

Senator WATKINS. Thank you, Mr. Chairman.

Mr. ASPINALL. Thank you, Senator, for your patience.

The Chair would ask permission that the committee might be allowed to stay in session until 5:30 to arrange to finish with these witnesses.

Is there any objection?

It is so ordered.

Are there any questions now of the witnesses at the witness table?

Mr. SAYLOR. The first question I have is directed to Untermann.

Mr. Untermann, the document which you asked be made a part of the file and not a part of the record is written by G. E. Untermann and B. R. Untermann.

I have noticed that your initials are G. E. Untermann. Would you be so good as to tell the committee who B. R. Untermann is?

Mr. UNTERMANN. That is Mrs. Untermann, Billie Roople being her maiden name.

Mr. SAYLOR. I am cognizant of the fact that your good wife assisted you in this and I wanted to get some credit for her on the record.

Mr. UNTERMANN. Thank you very much.

Mr. SAYLOR. What is your capacity with the Utah Geological and Metallurgical Survey as an affiliate with the College of Mines and Metallurgy industries?

Mr. UNTERMANN. They are merely the publishers. I have no affiliation with them whatsoever.

Mr. SAYLOR. Now, you live, I believe, in Vernal?

Mr. UNTERMANN. That is correct.

Mr. SAYLOR. If my recollection is correct a great many of the people who live in your area are members of the church known as the Latter Day Saints?

Mr. UNTERMANN. That is correct.

Mr. SAYLOR. Commonly known as the Mormon group, a great Christian group in this country?

Mr. UNTERMANN. Correct.

Mr. SAYLOR. In addition to that there are many other churches in that immediate area?

Mr. UNTERMANN. Yes, sir.

Mr. SAYLOR. As near as you know, the reputation of the people in that area is at least as good, and probably better, than that in some other sections of the country which you have referred to in your report?

Mr. UNTERMANN. As far as I know, that holds true.

Mr. SAYLOR. Then certainly, Mr. Untermann, you would not want to have that good group of people doomed to eternal punishment, would you?

Mr. UNTERMANN. In just what way?

Mr. SAYLOR. In your report you said on page 3, referring to the reply of the Sierra Club:

"We don't want to be saved; we want to be damned," and you spelled it d-a-m-n-e-d.

Now, the definition of "damned," as Mr. Webster tells us, is to doom eternal punishment, as damned souls.

Certainly it is not your intention or the intention of the people of Vernal to have that punishment visited upon those good people.

Mr. UNTERMANN. No, not in that sense. Perhaps I should have spelled it damed, d-a-m-e-d.

Mr. SAYLOR. There is the old rule that if a word ends in a consonant and preceded by a vowel the consonant should be doubled before adding "ed" or "ing," so you would want it spelled d-a-m-m-e-d.

Mr. UNTERMANN. That is right.

Mr. DAWSON. I want to thank the gentleman from Pennsylvania for clearing the record up.

Mr. Smart, what did you say your connection was with the State fish and wildlife association?

Mr. SMART. I have no connection with the State fish and wildlife department. I am a former president of the Utah Wildlife Federation and I am at present secretary. That organization is an affiliate of the National Wildlife Federation.

Mr. DAWSON. Are you speaking here officially on behalf of that organization?

Mr. SMART. I am.

Mr. DAWSON. It is my understanding they have gone on record as favoring the construction of the Echo Park Dam?

Mr. SMART. That is true; they have. Inasmuch as I did not get a chance to finish my statement, I would like to say they have and the States of New Mexico, Arizona, Wyoming, who are concerned with this project and who will be the ones best able to judge from a conservation point of view as to its effects, have gone on record.

The fish and game directors and commissioners of the 11 Western States——

Mr. DAWSON. Does that include California?

Mr. SMART. That includes California.

At their convention last May considered the aspect of whether this would be an invasion, whether it would set a precedent for invading any other national park, and what were the gains to be had from building a project such as this to fish and wildlife, after considering those things came out with a resolution favoring this project and the Echo Park Dam.

Mr. DAWSON. Who was the representative from California?

Mr. SMART. That was Mr. Seth Gordon.

Mr. DAWSON. Did he make any comments at that time?

Mr. SMART. He did. He was instrumental in helping to prepare the resolution.

I am not quoting him verbatim. But I am quoting the substance in which he said that he recognized that there was a commitment to use this area for water and power purposes at the time the monument boundaries were extended. He said that right was right and he favored this project.

Mr. DAWSON. Regardless of consequence?

Mr. SMART. Regardless of consequence, and he referred to a particular club in his State.

Mr. DAWSON. Mr. Smart, you are also acquainted with the fishing in the area of the Echo Park Dam site?

Mr. SMART. Yes, I am.

Mr. DAWSON. Could you tell us what type of fishing, if any, there is now in that area?

Mr. SMART. The best analysis of that is in this statement of Mr. Kimball's which I would like to have made a part of the record as part of my statement.

He finds that there is only one game fish of any consequence in that area. That is the channel catfish.

He finds that the total fisherman days used so far as this area is concerned is not more than 200 fisherman days per year for the entire reserveoir area.

Taking an evaluation based on United States Fish and Wildlife Service river basin manuals, he evaluates that as approximately $1,500 per year in its present state as compared to the post project benefits, he finds, using the very minimum figuers of 1 pound to the creel per surface acre per year on the basis of a partially drawn down reservoir of 20,000 acre-feet, that the yield on an annual monetary evaluation would be $81,600 for a trout fishery, or $54,400 for a bass and walleye fishery.

That is compared with its present evaluation of $1,500 a year, or an increase of more than 50 times as a trout reservoir and better than 30 times as a bass and walleye resource.

This is particularly significant because Mr. Kimball was formerly the director of the Arizona Fish and Game Department and, as such, he made intensive studies and surveys through the duties which were placed on him in connection with Lake Mead when he was in the Arizona Game Department.

So that he is familiar with this entire aspect and what a reservoir can do to enhance the fish and the wildlife resources on the arid lands that the Colorado River flows through.

Mr. DAWSON. Now, would you care to comment on what effect, if any, the construction of the dam might have on game in the area?

Mr. SMART. The big game in that area are of two types, deer and some mountain sheep. There will be no adverse effect on either because the steep canyons do not provide either a winter or a summer range for deer. There will be no effect that will be detrimental on deer.

The mountain sheep stay high, way above what the water will ever be, and, as a matter of fact, Mr. Kimball in his report recommends

that we put additional sheep into that area even though the dam goes in.

Mr. DAWSON. What effect, if any, would it have on the development and aid to migratory birds?

Mr. SMART. There are in the present area as it now is some small areas that are devoted to nesting of geese. The dam, as such, if it goes in, will, of course, flood those particular areas, but it is anticipated and, as Mr. Kimball so finds, that the additional water will attract many more and that the additional swamp areas which are created will make greater nesting areas, so that we anticipate with that dam, together with the others which are a part of the project, we will have a great influx and increase in our water fowl migration.

I, myself, have used as an analogy to this to some extent that which happened in the Tennessee Valley as a result of the dams there where it made their fishing and it made their migratory bird population in that area.

Mr. DAWSON. Mr. Smart, you and others in the western area who are connected with these conservation associations, have been around to various conventions discussing these problems with members from other States.

How do you account for the opposition which you find to the Echo Park Dam site from these members?

Mr. SMART. I answer that question this way: that we had no idea in the West that there would be aroused the conservation opposition as a result of this project because knowing the good that comes to our wildlife resources from projects of this type in our arid southwestern land we could not conceive of this type of opposition.

So it has been only in the last year, since the matter came to a focus at the hearings a year ago, we have been carrying on quite extensive campaigns to let people in other areas know the true facts insofar as this is concerned.

We find, and I have found in talking with many of them, from these States, that when they find and learn the values to fish and wildlife resources that comes from this type of project, their attitude changes. There is so far as I have been able to determine, very little of the attitude among most conservationists of having preservation per se. They think in terms of evaluation of what the increased recreational and wildlife resource will be from a project and as to whether or not it will increase or decrease what is presently there.

In this particular project, however, the opposition has built up a definite feeling within the minds of these individuals that the construction of the Echo Park Dam within the confines of these extended boundaries, the Dinosaur National Monument, is merely a beginning by which they can then invade any national park or any national monument.

In other words, it is not the construction of Echo Park Dam that they are concerned about as such. It is the effect as they say, that it will have on others; that is, the opening date and the opening wedge.

Now, I think that the fallacy of that is this, and I have prepared in my statement the background of the establishment of this to show that it would not constitute a precedent, but other winesses having gone into that, I am not going to repeat it, but what I do want to say is this: I think that attitude does not give full credence to the fact that

Congress, after all, can judge each one on its own merits and if this particular project would be considered on the merits of what it will do for conservation, taking aside this idea that we are just trying to do this so that you can get into all national parks and monuments, that the conservation organizations would not oppose this project.

Mr. DAWSON. Thank you, Mr. Smart.

Now, Dr. Kay, I want to tell you how grateful we are to have you here from the Carnegie Museum, especially, coming from the State of Pennsylvania, I presume it will bear considerable weight with my colleague who also comes from Pennsylvania.

The fact that you have spent a good many years, I think probably more years than any other man, out in that area in digging up the dinosaurs, your testimony is considerably enhanced by reason of all that.

I would like to know if in your opinion alternate dam sites could be found to take the place of Echo Park Dam, would you then favor building at alternate sites rather than at Echo Park?

Dr. KAY. I would not, and may I qualify that?

Mr. DAWSON. I wish you would give your reasons.

Dr. KAY. This is based on either full or partial 39 years in the district and comparison with other like places, like the Hoover Dam, Lake Mead, Grand Coulee, or there is one little one that is not in the park that I mentioned, Gates of the Canyon of the Missouri River in Montana. I think it is the only way that the Dinosaur National Monument can become a real asset to the country as a recreational area and a place for studying nature.

I think that when the dinosaurs are reliefed, as they are doing now, and if they build the Echo Park Dam so as to make the area accessible, that it will be one of the great attractions in our national monuments and parks.

Mr. DAWSON. I think you agree with many of us from that area that as it stands now and has stood since 1915, it is not much of an attraction, is it?

Dr. KAY. No, it is not.

Mr. DAWSON. I think that is all, Mr. Chairman.

Mr. ASPINALL. The gentleman from California, Mr. Hosmer.

Mr. HOSMER. I want to help out Mr. Untermann a little bit on that problem you have of counting the visitors in the Dinosaur National Park, those half humans you had difficulty with.

I have been reading some of the Utah and Colorado papers lately. From what I can gather from them I think they belong to southern California because we are called half humans or things less favorable than that by your papers.

That is all.

Mr. ASPINALL. Mr. Saylor.

Mr. SAYLOR. There is one question I would like to ask Dr. Kay.

Dr. Kay, you are here on your own; is that correct?

Dr. KAY. Yes.

Mr. SAYLOR. In other words, although you are curator of vertebrate paleontology, in Carnegie Museum, you are not representing the museum as such?

Dr. KAY. No, I am not. Although I would like to say that most of the naturalists who have collected in that area are botanists, mam-

malogists, entomologists, and many other naturalists that have been there and seen it are in favor of the dam, but there are several of them, including our present director, who has been director about a year, who are not in favor.

Mr. DAWSON. Might I ask another question, Mr. Chairman? Has the director been out there?

Dr. KAY. No, he is one of our staff who has not been in the park. He has been to Utah and been in the Uinta Mountains. He is a herpotologist. I was with him and conducted him to a lake on Moseby Mountain.

I remember it very well because he fell into the lake trying to get a salamander.

Mr. DAWSON. How do you account for the fact that of all the people who have been out there and seen it, most of the scientists are in favor of the dam and those who have never been out there are opposed to it?

Dr. KAY. That is one of the things I cannot understand. In testimony that I have read in the record, most of the people who yell the loudest are the ones who have never been there and they paint glowing pictures of the beautiful country and so on and never have seen it.

Like this one fellow I quoted from in my testimony here today. I couldn't have done anywhere near the job he did in painting a picture of the beautiful area. Then he came out and said he hoped some day he could visit it and hoped when he did that it would not be littered up with tourists.

Mr. SMART. Mr. Chairman, my statement and Mr. Kimball's may be included in the record?

Mr. ASPINALL. Unless there is objection, the statement of Mr. Smart and the statement of Mr. Kimball will be made a part of the record.

It is so ordered.

(The statements referred to are as follow:)

FISH AND GAME ASPECTS—ECHO PARK RESERVOIR

By Thomas L. Kimball, director, Game and Fish Department, State of Colorado

The Echo Park Dam is planned as a concrete arch-type structure 525 feet in height above the river bed elevation of approximately 5,050 feet mean sea level. The maximum water surface elevation is 5,570 feet. The water surface area at this elevation will be approximately 43,000 acres. The reservoir will be of the narrow canyon type and, when full, will back water 63 miles up the Green River and 44 miles up the Yampa River.

The permanent outlet elevation (penstock height) is at elevation 5,325. This elevation represents the maximum draw-down point of the reservoir and will leave a permanent water depth of 275 feet at the dam.

The outlet works consist of an intake tower of the type constructed at Hoover Dam supplying the power penstock. The maximum discharge capacity will be 20,000 second-feet.

In 1951 the fish research division of the Colorado Game and Fish Department stationed two men in this area to gather physical data and make fish population inventories on the lower Yampa River and its tributaries. The findings showed the lower limits of trout and whitefish habitat to be in the vicinity of Craig, Colo. Siltation and high water temperatures evidently preclude the presence of cold water species in the lower sections of the Yampa River.

The fish species which were inventoried in the portion of the Yampa to be inundated by Echo Park Reservoir are as follows:

Channel catfish	Bullhead catfish
Colorado River squawfish	Roundtail chub
Bonytail chub	Carp
Northern Creek chub	Colorado speckled dace
Flannelmouth sucker	Northern bluehead mountain sucker

This list is undoubtedly incomplete, but represents the major species now inhabiting this water. The same species are present in the Green River portion of the reservoir area although no collections were made in the Green River.

It will be noted that the only game fish of consequence abiding there at present is the channel catfish. The Colorado River squawfish is occasionally sought by anglers for its large size.

The fishing pressure in this area as it is now is quite low, possibly no more than 200 fisherman days per year for the entire reservoir area.

Using United States Fish and Wildlife Service River Basin Manual evaluations, this usage amounts to a project monetary fishery evaluation of approximately $1,500 per year.

A series of water and air temperatures were taken daily at various points along the lower Yampa River in 1951. The significant temperature stations with relation to Echo Park Reservoir were at Lily Park and Pat's Hole. The highest air temperature recorded was 91° F. and the highest water temperature was 79° F. These occurred in the last week in July 1951. Water temperature stayed below 60° F. until early in July.

Water temperatures above 70° F. lasted from mid-July to the second week in August at which time they slowly began to cool to 65° in early September.

This temperature data points up the fact that it would not take an excessive drop in temperature to make these waters within temperature tolerance ranges of cold water game fish species such as trout and whitefish.

It is felt that the construction of Echo Park Reservoir would drop water temperatures at least in the lower and central strata to well within trout temperature tolerances.

In all probability other game fish with greater temperature tolerance ranges such as walleyed pike and largemouth black bass would create a significant fishery in the upper strata of the lake.

Utilization of a fishery in this area would not be as great when compared to reservoirs near larger centers of population; however, the eventual quality and quantity of the fishery would play a large part in its popularity and usage.

Using the very minimum figure of 1 pound of fish to the creel per surface acre per year on the basis of a partially drawn-down reservoir of 20,000 acres (43,000 acres full) the reservoir would yield an annual monetary evaluation of $81,600 for a trout fishery or $54,400 for a bass and walleye fishery (River Basin Manual evaluation figures).

This evaluation is considered for the reservoir fishery only. The stream fishery below the dam would develop into an excellent trout fishery if the water is drawn from underneath the surface of the lake as is planned in the schedule of operations. The Colorado River below Hoover Dam is a case in point here.

There is no attempt made to evaluate the stream fishery as only a short portion is in Colorado; however, it should be a valuable adjunct to the State of Utah.

This water suitability for trout should extend downstream as far as Jensen, Utah, due to the canyon terrain and absence of silt-carrying tributaries.

There can be no other conclusion drawn than the fact that the construction of Echo Park Dam would provide significant enhancement to the region from the fisheries standpoint.

The following is a summary by specie as to the effect the construction of the Echo Park and Flaming Gorge Dams will have on wildlife. This portion of the report has been made by Gilbert N. Hunter, game manager for the Colorado Game and Fish Department.

1. *Deer.*—Generally, from studying the water levels, as well as the vegetative type, and deer populations within this area, I do not feel there will be a great amount of loss in the available deer range, because in the upper Green, namely around Smith Ferry, the depth of the water is not great, and the bottom lands that will be covered in this particular area have been severely overgrazed by domestic stock. The same condition applies in Little Brown's Park and Big Brown's Park. Furthermore, in these areas observations would indicate that the deer are inclined to hold more to the slopes rather than the bottoms. The general type is pinion juniper and sage, and outside of sage there is a very small amount of palatable browse. In the main canyons, that is from Ladore on the Green River, down to Echo Park Dam site, and the Yampa from Cross Mountain to Pat's Hole, the canyons are very steep and narrow, and inaccessible to large numbers of deer. The big wintering concentration on the Yampa will not be materially affected, due to the fact that deer generally winter well above the proposed high-water line.

2. *Mountain sheep.*—The area in Ladore Canyon is the only location where at present mountain sheep exist. Naturally they are on the slopes far above the water level and will not be affected. This is the area where a transplant should be made, and has been recommended.

3. *Migratory birds.*—The Green and Yampa Rivers have a very good population of the greater Canadian geese. At the present time the heavy nesting areas are confined in Big Brown's Park, and along the little shelves immediately adjacent to both the Yampa and the Green Rivers. Ducks are generally common throughout the area. It was observed that in the Yampa Canyon from Lily Park down, the concentration of geese was not as heavy as that of the Green. This can be attributed to the fact that again the canyon walls rise abruptly from the water, and there is little or no area suitable for nesting. It is felt that by flooding the Brown's Park area that other swampy areas will be created, which should, unless the water level varies too much at the time of the nesting period, greatly increase the number of geese and ducks within this area.

4. *Beaver.*—In the upper portions of the Green River, that is above Ladore Canyon, beaver are quite common. They are bank beaver, and a great deal of their habitat will be destroyed; however, on the other hand, it may be that they will adapt themselves to the situation by moving to higher elevation, which in all probability will in time be reseeded by willows. If the water level does not vary too much this should not cause any great loss as pertaining to the beaver.

STATEMENT OF HERBERT F. SMART, SALT LAKE CITY, UTAH, BEFORE THE HOUSE SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS IN SUPPORT OF THE UPPER COLORADO RIVER PROJECT AND ECHO PARK DAM AS AN INTEGRAL PART THEREOF

My name is Herbert F. Smart, Salt Lake City, Utah. I am a member of the State Land Board of the State of Utah and have the direct responsibility for the management and administration of more than 2 million acres of land in the State of Utah. I am secretary, and a past president, of the Utah Wildlife Federation, a statewide conservation organization, which has been in existence for over 25 years.

This statement is made in support of the Colorado River storage project, and my statement relates particularly to the endorsement and support of Echo Park Dam as a part of such project, and the development of the recreational, fisheries, and wildlife resources as contemplated by the Department of the Interior's recommendations.

Newspaper and periodical releases would lead one to believe that every conservation organization is opposed to the construction of the Echo Park Dam. Such information is misleading. The conservation organizations most immediately concerned, informed and affected by the proposal are not opposed to the construction of the Echo Park Dam. The Arizona Game Protective Association, the New Mexico Wildlife Federation, the Utah Wildlife Federation, and the Wyoming Federation of Sportsmens' Clubs have all endorsed this project. The directors and commissioners of the fish, game, and conservation departments of the 11 Western States have endorsed this project.

These organizations have considered the construction of the Echo Park Dam on a basis of whether (1) such construction within the Dinosaur National Monument would invade our national park and monument principles, and (2) whether it would constitute a precedent for invading national parks or monuments, and (3) what wildlife and recreational benefits over and above that which presently exists in the area would result from this project. In each instance, an unbiased approach leads one inevitably to the conclusion that the project, considered on its own merits, is in the interest of conservation principles and ideals.

The original Dinosaur National Monument was established in 1915 and consisted of 80 acres. It is in this area that the dinosaur quarry and specimens of prehistoric animals have been found. No part of this area is or would be affected by the construction of this dam. The area which would be affected by the dam was not included in the Dinosaur National Monument until July 14, 1938, when President Roosevelt by proclamation extended the boundaries from the original 80 acres to an area of over 209,000 acres.

Prior to the time that the President extended these boundaries, the area had been investigated for both power and reclamation purposes. A résumé of these

withdrawals and other pertinent information regarding the extension of the monument boundaries is as follows:

1910—Power sites reserved in this area—Power reserves Nos. 5, 30, 42, 54, 107, 121.
1916—Department of Interior reported 5 dam sites in this area. Water supply paper 395.
1921—Federal power withdrawal—Project No. 165.
1930—Echo Park Dam site emphasized by Bureau of Reclamation. Water supply paper 618.
1934—August 9, National Park Service asked Federal Power Commission to give up its power withdrawal for the monument area enlargement.
1934—December 13, Federal Power Commission refused Park Service request, but said it would not object to boundary enlargement, subject to prior rights for power purposes.
1935—November 6, Secretary Ickes again asks Federal Power Commission to surrender power withdrawals.
1936—January 9, Federal Power Commission refused Secretary Ickes request, but stated "the Commission will not object, however, to the creation of the monument if the proclamation contains a specific provision that power development under the provisions of the Federal Water Power Act will be permitted."
1936—Meetings were held at Craig, Colo., and Vernal, Utah, at which David H. Madsen representing the National Park Service stated to the audience that if the monument boundaries were extended, power and reclamation development would not be prejudiced and existing grazing conditions would be continued (grazing continues in that area to this day).
1938—July 14, proclamation signed enlarging the boundaries from 80 to over 209,744 acres, subject to power withdrawals and reclamation.

After the boundaries were extended, the people of the intermountain area by newspaper release of Harry J. Brown, under Washington dateline July 29, 1938, were advised through an article appearing in the Salt Lake Tribune that "under the order enlarging the monument, grazing will continue in the areas which previously had been used by stockmen and power and irrigation rights will be recognized."

Mr. Newton B. Drury, Director of the National Park Service, in a letter to Dr. J. E. Broaddus under date of May 2, 1946, recognized the withdrawals which preceded the extension of the boundaries of the Dinosaur National Monument. He said in part: "The extensive river basin surveys now being conducted by the several agencies of the Government are of concern to us, as some proposals may adversely affect areas of the national park system. Dinosaur is one of the few areas in the system established subject to a reclamation withdrawal and this may have some bearing on the proposed Echo Park project * * *."

Secretary of the Interior Oscar S. Chapman in his order of June 27, 1950, authorizing this project recognized the distinguishing features incident to Dinosaur National Monument. He said: "(b) The order establishing the extension of the monument in the canyons in which the dams would be placed contemplated use of the monument for a water project and my action, therefore, will not provide a precedent dangerous to other reserve areas."

It is my opinion that the conservationists opposed to Echo Park Dam have fallen into the error of not considering the facts and conditions incident to the inclusion of this area within the confines of the monument boundaries. They have adopted an attitude of saying we oppose all dams, without first considering whether or not conditions incident to a particular dam might not, in the interest of fair play, require that they not oppose a given project. Certainly this is the case when one considers the facts of the Echo Park Dam.

Conservationists opposed to the construction of this dam say there is a principle involved. Yet actually the only principle involved is one of the integrity of the Government and the people, including conservationists, in keeping promises and assurances, and abiding by conditions incident to the enlargement of the Dinosaur National Monument. The question of the inviolability of a national monument is not at issue here. The question of the inviolability of promises incident to the enlargement of the boundaries is involved. The integrity of our national park system is predicated upon good faith, and conservationists interested in preserving the inviolability of our national park system should be the first to recognize and, in good faith, insist upon compliance with the conditions under which the Dinosaur Monument boundaries were extended, namely, subject to power and reclamation withdrawals.

An impartial approach to the postproject, recreational and wildlife aspects of Echo Park Dam would again lead conservationists to support this project. An evaluation of the postproject fish and game benefits has been made by the Game and Fish Department of the State of Colorado. Mr. Thomas L. Kimball's statement regarding this matter, I understand, is being introduced for this committee's consideration. He finds that from a fishery evaluation, the postproject benefits are more than 40 times the benefits in its present state, and he finds no material adverse effect on big game. He finds that the migratory bird population will most likely be greatly enhanced.

The same conclusion has been reached by other fish and game experts. Lester Bagley, game and fish director of the State of Wyoming, who has ridden through this entire area on horseback, concluded a letter to our organization with the following words: "I am firmly convinced that the area as it now stands is so inaccessible—and will always remain so unless large sums of money are spent for roads—that wildlife potential would be increased manyfold if these proposed dams were constructed."

This was also the conclusion reached by the Western Association of State Game and Fish Commissioners when at their annual meeting last May they passed a resolution going on record as approving the report of the Secretary of the Interior recommending the development of the upper Colorado River storage project, including the construction of Echo Park Dam, and in which resolution they said: "The postproject wildlife and recreational values of the upper Colorado River project will be far greater than the undeveloped river now possesses." These are the men charged by law with the duty of protecting our wildlife resources. They are the ones best qualified to judge. They are the practical guardians of conservation in the West.

Conservationists opposing this project have said that the water will inundate scenery. It is true that the portion of the canyons and rocks that will be under water will be inundated. What is overlooked by such opponents is that there will still be areas with hundreds of feet of canyon walls above the water level. They overlook that the Lodore section of the Green River will be affected but little, and that there will be placid water on which thousands of people will be able to see the beauty of these canyons, and particularly of Lodore, who will never see this area unless such a placid waterway is made possible. They overlook that in the Mountain States there will still be hundreds of miles of river for those who want to run rapids and white water. They overlook the fact that in the State of Utah alone we have set aside Zion National Park with its incomparable Great White Throne, Bryce National Park, the Arches National Monument, and Cedar Breaks National Monument with their comparable scenery. They overlook the fact that the Grand Canyon National Park and the Grand Canyon of the Yellowstone, and parks in Colorado and other Western States are of similar structure and to many more aweinspiring. They overlook that our western land abounds with deep chasmal canyons and magnificent monoliths. They overlook the recreational and boating aspects as postproject benefits. They overlook the conservation of the West's greatest resource—and that which we have the least of—water.

To many of us who have been a part of the conservation movement in the West, we are at a loss to understand the motives of conservationists opposing a project which will result in such a material gain to conservation objectives and principles. In the best tradition of Gifford Pinchot, the passage of the Colorado river storage project will mean the greatest good to the greatest number for the longest period of time.

Mr. ASPINALL. The next witnesses to appear before the committee will be the delegation from the Navaho Indian Tribe.

The present chairman of the council, Mr. Ahkeah, will be the first witness. He will be followed by Mr. Howard Gorman, followed by Mr. Grey Valentine who will also read a short statement of Mr. Yellowman.

You gentlemen, of course, are not strangers to this committee. We are glad to have you with us at this time.

We wish that we might have more time, but as it so happens we do not.

We will be glad to listen to your presentation.

You may proceed, Mr. Ahkeah.

STATEMENT OF SAM AHKEAH, CHAIRMAN, NAVAHO TRIBAL COUNCIL

Mr. AHKEAH. Mr. Chairman, I would like to insert my statement in the record and make a few comments.

Mr. ASPINALL. Do you have a copy of your statement?

Mr. AHKEAH. Yes.

Mr. ASPINALL. That may be done.

Do you have any additional copies?

You may proceed to make your oral presentation while we look at your statement.

Mr. AHKEAH. Mr. Chairman and members of the committee, as a Navaho tribe we do appreciate what the Government is doing for us Navahos in the way of appropriation money to help us and Congress' long-range program.

We have about 22,960 children in the school up to now. By fall we will have about 9,000 more in school.

Now, we are very much interested in this San Juan-Shiprock project, the Navaho Dam. The San Juan-Shiprock project would mean a lot to the Navaho people because it would create many farms which we don't have now and which will give us a better living and probably make better trade in the area in the way of farm crops.

It would also increase the capacity of the sheep over the reservation.

We are not lazy people; we work hard, and we do make a living, no matter how low it is, from the land that we have, which is desert land.

We feel that we can make a better living with this San Juan-Shiprock project which would create many acres of good farming land.

Up to date we have not very much farming land. We did have a few acres of farmland along the San Juan River which we built ourselves and also we still maintain and these are very small projects, but we do make good farms with whatever we have in the way of irrigated farms.

I am a farmer myself, and our grandfathers dug the ditches after they got back back from Fort Sumner, and we still us the canals to irrigate our farms.

So with the San Juan-Shiprock project, our farms would be greatly increased, and we would like Government help to realize this San Juan-Shiprock project and also South San Juan project.

I thank you, Mr. Chairman.

Mr. ASPINALL. Thank you very much.

As soon as we have heard from the other representatives we will have some observations to make and some questions to ask.

Is there any objection to making Mr. Akeah's full statement a part of the record?

Hearing none, it is so ordered.

(The statement referred to is as follows:)

STATEMENT OF SAM AHKEAH

CHAIRMAN, NAVAHO TRIBAL COUNCIL

Mr. Chairman and members of the committee, my name is Sam Ahkeah, and I am chairman of the Navaho Tribal Council. I'm here to explain to your briefly what the San Juan-Shiprock project means to us Navaho people.

There are now about 79,500 of us. Our average cash income is $150 a year per person. The national average is over $1,500. Our income isn't low because we're lazy; it's low because we don't have the resources to make it any higher, like good farmland or big industries.

Most of our people make their living from raising sheep and growing their corn by dry farming in little patches. It takes about 22 acres of our land to support 1 sheep for a year.

The Federal regulations forbid any Navaho family from keeping more than 350 sheep, but very few families actually own that many.

There is less than a third of an acre of dry farmland per person on the reservation. We use every little draw on the reservation where the soil is good enough and there is enough natural moisture to grow corn or squash. We aren't lazy; we have to work hard to make a living at all on the kind of land we have.

That is the Navaho problem you have heard a lot about—poor land and not enough education.

Now this year for the first time most of our Navaho children are in school. There are about 28,000 Navaho children of school age, and 22,960 are enrolled in school. So that half of the Navaho problem is being solved at least.

The big problem remaining is how we and our children are going to make a living.

This Navaho project will irrigate about 137,250 acres. This is the latest estimate. Right now that land supports less than 150 families, not more than 900 people at 6 per family.

The average Navaho family includes 5 or 6 people. These people live by raising sheep. The land without irrigation is some of the least productive on the reservation. If this Navaho project goes through, the same land will support on farms 1,110 families, or 6,660 people at 6 per family.

The Bureau of Reclamation says every person living on an irrigated farm will support 8 people in town—that is, 8 businessmen, grocers, garage mechanics, carpenters, bankers, and so on, and their families. If ony 2 out of the 8 are Navahos, the Navaho project will support 12,000 Navahos in towns that will be built up near the farms. That is a total of 19,980 Navahos, figuring 6 people per family, or more than a quarter of our total population. At 5 people per family the total is 16,650 people—or about one-fifth of our population. These people won't live from hand to mouth the way we Navahos live now. They will live just as well as white farm owners. And if that many people move out of the dry parts of the reservation. the people that are left behind can run more sheep, and their standard of living will go up, too.

We Navahos want to farm. We want to do anything reasonable to make a better living for our children. Ever since there have been Navahos we have farmed little draws and damp places to grow corn and squash and watermelons for our own use. Where we can get irrigation water we use it now.

We used to farm both sides of the San Juan River until we were persuaded by the Army to go to Fort Sumner in 1863; and when we came back the first thing we did was to dig our own irrigation ditches on the south side of the river with wooden shovels. We weren't allowed to go back north of the river.

I am a farmer myself from Shiprock, and my farm is still watered by a ditch my grandfather and his neighbors dug. After the upper Fruitland project was built some of us got water from it, but until then we all got water in ditches we built ourselves. But without this Navaho project there are only about 33,500 acres of irrigated land on the reservation. That is less than a half acre per person.

I have been talking about the whole Navaho project. There are two parts to it—the Shiprock division of 109,000 acres, all in the reservation, and the South San Juan division of 28,250 acres. This division is off the reservation, but most of the people who live there now are Navahos, and the State of New Mexico has suggested that only Navahos be allowed to get farms there. That would take action by you Senators. The Shiprock division will give farms to 1,110 Navaho families. And if only Navahos are allowed to settle in the South San Juan division that will give farms to 290 more Navaho families. That makes up the total of 1,400 families I was talking about.

All the 137,250 acres of the Navaho project are class 1 and class 2 land. There isn't any poor land, class 3 or worse, included in the project. Most of the Navaho people don't know much about irrigated farming, but they know a lot about raising sheep. So we plan when they first go on the new farms they can put them into irrigated pastures and raise sheep. That way, instead of needing 22 acres for a sheep, they can keep 150 sheep on 90 acres and have feed left over

for 15 cows. This will also build up the fertility of the land. Then, as they get used to irrigated farming, they can put in whatever crops will bring the most money.

I said most of the Navahos don't know much about irrigated farming yet. That is because most of us have never had any experience running irrigated farms, but when we have a chance we make good farmers.

The Federal Government has spent many million dollars on us Navahos since 1860, and it hasn't solved our problems yet. In fact, until the Navaho-Hopi Rehabilitation Act of 1950 our problems kept getting worse. All this money has been paid out, and there has been no return. This Navaho project is different. It will cost, total, about $212 million. All but about $1,700,000 of that is reimbursable, and will be repaid to the Government in 50 years. Even the nonreimbursable costs will be repaid after that from power revenues of the upper Colorado project, and finally, there will be a profit to the Government. In other words, this one project will do more toward making the Navaho people self-supporting, equal citizens than anything else the Government has ever done, and in the long run it won't cost the Treasury a cent.

Mr. ASPINALL. Now we will hear from Mr. Gorman.

STATEMENT OF HOWARD GORMAN, MEMBER, NAVAHO TRIBAL COUNCIL, CHAIRMAN, COMMITTEE ON RESOURCES

Mr. GORMAN. My name is Howard Gorman. I am a member of the Navaho Tribal Council and chairman of its committee on resources.

My home is at Ganado, Ariz., more than a hundred miles southwest of the proposed irrigation project.

I don't expect to get one of the irrigated farms myself, but all the people in my district will be benefited by this project, even those who don't move away to the new farms.

I'll tell you how we live out around Ganado. We raise sheep and some cattle, and we go and get seasonal jobs off the reservation.

But we usually get most of the food to keep us alive from our gardens. You have heard our chairman's statement that the average cash income of a Navaho is $150 a year. Well, when your cash income is that low, you have to raise your own food or starve to death.

We are all farmers, dry farmers. We use all the little draws that have good soil and some moisture, and we plant corn about a foot deep. Hybrid corn will not come up if it is planted that deep, but we have old Navaho corn that will, and we have to plant it that deep so that it can get enough moisture. We have to plant corn seeds about 6 feet apart, because if we planted the corn in rows, there wouldn't be enough moisture for all the cornstalks.

That means we have to have an excessive area to grow crops by dry farming. There just is not enough fertile land on our reservation for us to make any but a bare subsistence living from dry farming. We have less than a half acre of dry farmland per person on the reservation, in a wet year more, in a dry year a lot less. We dig ridges and trenches across our gardens to spread the moisture, and we make our own dams in dry washes to catch floodwater; nevertheless, many years we lose most of our crops because of not enough rain. The average yearly rainfall at Ganado is 11 inches. Here in Washington it is 42 inches.

I am telling you all this to show that Navahos are farmers, good farmers. Take a farmer from Virginia or Maryland out to Ganado and he would starve to death; but we produce crops out there, and we live on them.

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A lot of people think Navahos make their living by raising sheep or selling rugs to tourists. We do raise a lot of sheep, though not many for all the population we have, and our women do make good rugs; but most of our food comes from our gardens. And it always has.

Richard Van Valkenburg and Lee Correll, two archeologists, who work for the tribe, have studied historical records back into the 1500's and have found out that farming has always been the main support of the Navaho people. In fact, until about 1800 we did not go in for stockraising in a big way. We lived almost entirely by farming.

There were maybe 10,000 of us a hundred years ago. We could make a fairly good living then by dry farming and raising sheep. Now, there are nearly 80,000 of us. We have to have more farmland to support ourselves.

The opponents of the Navaho project say the cost per acre is higher than it would be in some other areas. Well, other irrigation projects are in unpopulated country. If the Government does not build the dam, it does not cost it anything.

But the Navaho country is densely populated—as population goes in rural areas in the West. If this project does not get built, the Government will have to pay millions and millions in relief. Now we have a $50 million Navaho-Hopi rehabilitation program. That is to run until 1960.

If this project does not go through, there will have to be another and another rehabilitation program. I tell you this frankly, gentlemen: unless we get the farmland to support ourselves, we are going to have to keep depending on the Government for relief. All these relief payments are dead loss to the Treasury. The Navaho project is over 99 percent reimbursable.

Actually, the Government in the long run will get back 100 percent and even make a profit. It is really a loan from the Government to the Navaho people. It is something that will really get us off relief. It will help every part of the reservation. People from all districts will be resettled on the irrigated farms, and the people who stay behind will get the grazing and dry farmland they leave.

This one project will get us off the dole. It will not cost the Government money; it will save the Government money.

This Shiprock project has been talked about for many, many years by the Navaho people. Dagal Chee Bekis, a member of our first tribal council of 1923, used to say that he hoped to live long enough to eat an apple from a fruit tree watered by this project, with his full set of teeth; if not, he would like at least to drink the juice from the fruits of the trees before he died. But he never got to do either. He died this January at about 90 years of age. The Navaho people are looking with great hope toward the day when the Navaho Dam will be completed and water in the Shiprock project brought down. That will bring a new day for the Navahos.

Mr. ASPINALL. Thank you very much, Mr. Gorman.

We will now have the presentation of Mr. Valentine, and you will read Mr. Yellowman's statement.

STATEMENT OF GREY VALENTINE, MEMBER, NAVAHO TRIBAL COUNCIL, AND ADVISORY COMMITTEE, CHAIRMAN, COMMITTEE ON LOANS OF THE TRIBAL COUNCIL

Mr. VALENTINE. Mr. Chairman and gentlemen of the committee, my name is Grey Valentine. I am a member of the Navaho Tribal Council, and Advisory Committee and am chairman of the committee on loans of the tribal council.

In private life I am a farmer. I have 15 acres at Shiprock, where I have a new peach orchard that produced its first crop last year. I have 3 acres in permanent pasture, and I can keep 30 sheep on it.

If I had more acres, I would keep more sheep than that. I have a grazing permit to run sheep on the reservation off my farm, but I can't use it because there is no feed on the range.

I tell you all this so that you will know I am a practical farmer and know what I am talking about.

Gentlemen, you can't make a living on only 15 acres. I make about $1,200 a year, gross, from my farm. The only way we live is that my wife has a job with the Indian Service, and I have my salary as a tribal councilman. I am a lot better off than the average Navaho.

We Navahos are no different from any other Americans. We want to support ourselves independently. When any non-Indian community in this country has an unemployment problem, the people try to help themselves, and if that is not enough, they look to Washington. Maybe they get a new defense plant, or airbase, or permanent industry. They get on their feet then, and they don't need unemployment compensation. They support themselves by their own work.

That is what we want to do. We don't like to have to take relief any more than you like to give it.

The Navaho irrigation project is different from other irrigation projects. With most of them, someone says, "Wouldn't it be nice to have farms here in the desert?"

So when the project is built, people come from all over the country and start farms where there were no people before. That is good; but this proposed project is different. The people are already there. They are going to be there whether the project is built or not.

The question is, Are they going to be poor, almost starving, on relief, a burden to the State and the Federal Government; or are they going to be self-supporting citizens, contributing something to the Nation?

Opponents of this project say there are crop surpluses now and this project will only cause more. There are two answers to that.

One is that it will raise our Navaho income so much we will be able to buy our fair share of the crops that are now surplus.

The other answer is that the new farmland won't start producing until 1962, and all of it won't be in production until 1972.

Dr. Byron T. Shaw, Administrator of the Agricultural Research Administration, has said the country will need 100 million more acres of cropland to support its population in 1975 than in 1950.

The whole country by that time will be getting into the situation we are already in on the Navaho Reservation. The population will be outdistancing the food supply. That is another reason this project is needed.

The statements of the other Navaho delegates, I hope, show that we are willing to help ourselves when we can. Of course, nobody but the Federal Government would be able to finance the Shiprock-San Juan project; but we will help all we can.

The present law, the Leavitt Act, says irrigation reimbursement will be deferred so long as Indians own the land. We will undoubtedly not object to repeal of that law as soon as our people get established on their new farms. We believe they should repay the Federal Government, starting, say 10 years after they settle on the new farms.

During the first 10 years, the people will have a hard enough time buying seed, building houses, and getting farm equipment. The Navaho people who will move onto these farms don't have any capital at all.

All white homesteaders who settle in reclamation projects must have some capital; but most of us Navahos have only a few sheep and the clothes on our backs.

The new Navaho farmers will have to borrow money to get started. If they can't get it from regular banks, and they probably can't, the tribe will lend it to them. We passed a resolution to that effect on the 14th of January (No. CJ-6-55).

We will do our part. We ask help from the Government—real help that won't just keep us alive like the relief measures in the past, but help that will keep us off relief permanently.

If the Government does its share, we will do ours.

Thank you.

Mr. ASPINALL. Thank you very much, Mr. Valentine.

Now, Mr. Gorman, will you read Mr. Yellowman's statement?

STATEMENT OF YELLOWMAN, MEMBER, NAVAHO TRIBAL COUNCIL, ADVISORY COMMITTEE OF THE TRIBAL COUNCIL

(The statement of Mr. Yellowman, as read by him in the Navaho language, is as follows:)

STATEMENT OF YELLOWMAN

Mr. Chairman and gentlemen of the committee, my name is Yellowman. I am a Navaho farmer and a member of the Navaho Tribal Council and the advisory committee of the tribal council. My people have asked me to give this statement to help in getting the Navaho project approved.

I am a farmer. I make my living that way. I am a completely uneducated man, so I won't discuss any technical matters, but just tell you what a Navaho farmer does and try to explain why this project is necessary for the Navaho people.

I live near Shiprock, N. Mex., on the same land my father and grandfather farmed. They say we Navahos are nomads, but that isn't true; the only time we move is when we have to, in order to make a living. I used to have about 18 acres of land by the San Juan River. It was watered until 1939 by an old canal that my grandfather and his neighbors dug. The Government didn't help them on this at all. Our grandfathers built it and our fathers and we maintained it. We did that so we could support ourselves and our children as independent people.

In 1939, the Government built the Fruitland Canal to replace some of our old Navaho canals, and I get my water now from the Curley lateral of the Fruitland Canal. The new canal was higher than the old one, so the water wouldn't drain off 10 acres of my land and it was ruined by alkali. Later the Indian Bureau assigned me 15 acres of other land, and I work that in connection with the 8 acres

left of my old land. My 2 married sons have 10-acre assignments next to mine and we work the total 43 acres as 1 farm.

Some of the opponents of this project say the climate is too cold to grow crops, so let me tell you what I grew last year. I sold 120 sacks of beans, and about a thousand bales of alfalfa. This is in addition to my garden crops that my family ate. I raised about $900 work of crops last year. Prices were down. In 1953, I raised $1,556 worth and in 1952, $1,640. This is on 23 acres. I rotate my crops, and get good production every year. I use commercial fertilizer and animal manure.

You see I make a living; but not a very good one. Twenty-three acres is a very inadequate farm to support a family. My sons, who have only 10 acres each, have to work outside to get along. Across the river, I can see the farms of the Mormon settlers—160 acres apiece. These people live well. They support themselves. You never hear of a Mormon problem. If we had as much good farmland per family, we would support ourselves just as well. Now Navahos come to Washington for every little thing, because we have to.

The Navaho project will be more than another irrigation project. It will be a permanent substitute for repeated unfruitful relief measures for the Navaho people. I hope my own example will show you that we can support ourselves with dignity when we have farmland. Here I am not even able to speak English, and I think there are few farmers anywhere who can do better on 23 acres.

Mr. ASPINALL. May I say to the representatives of the Navaho tribe that you have made an excellent presentation at this time. You have made it brief, but you have ably presented your position.

May the Chair say that as you know, he is a neighbor of yours and has been for over 50 years, representing the area right north of part of your reservation.

And at one time not too long ago a cousin of mine by the name of Everett Dickinson was superintendent of your farm at Shiprock.

Since that time I have taken a great deal of interest in your problems and have visited your reservation and visited with your people.

Now, I can testify, Mr. Ahkeah, and the rest of you, that the Navaho people are not lazy. They come into my country to help us harvest the fruit and they have also run up and down our hills that you know, just recently, helping take care of the spruce bark bettle infestation.

We have not had any better people to do that kind of work. You have worked often on the railroads in my area, so that anyone who has that idea we can dispel that at once.

I can also say this, that the instances that I have been upon personal visitations to your area, to the farm of Mr. Yellowman, where he has made a wonderful contribution in farming, show what the Navaho people can do.

I only hope that we do not have so many people and will not have too little land so that we will find our land overfarmed and become barren country as some of you have suggested it might be in the future if we are not careful.

Mr. Ahkeah, at one place in your statement you referred to a half acre of dry farming land per person. Now, you meant a half acre of land which could be dry farmed fairly economically. You did not take into consideration any grazing land which you cannot farm at all?

Mr. AHKEAH. It is farm to raise crops.

Mr. ASPINALL. It is land on which you try to raise crops?

Mr. AHKEAH. Yes.

Mr. ASPINALL. You only have a half acre of such land per member of the tribe?

Mr. AHKEAH. That is correct.

Mr. ASPINALL. Also, you referred to the San Juan-Shiprock project in some of your presentation. That is the same as far as the hearing of the committee is concerned as the Navaho project, is it not?

Mr. AHKEAH. That is right.

Mr. ASPINALL. I think that is all that the Chair will ask.

The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. I want to join with the chairman in congratulating you men upon the presentation which you have made. While I have not been as familiar with you over the years as the chairman, it has been my pleasure to visit your reservation and to see some of you personally there. You have all made excellent presentations, but I would particularly like to congratulate Mr. Grey Valentine because of a statement which he has put into his statement on the second page. It is something which indicates to me the attitude of the Navaho people.

I feel certain that he speaks not only for himself, but as a member of the tribal council and advisory council and committee on loans.

It is an unusual statement. It is true that the present Leavitt Act says that as long as the land is held by the Indians it need not be repaid, but by your statement you are willing as a tribal representative to have that restriction removed once your people have a farm, indicates to me, that you are really sincere and looking forward toward the future of your people.

I want to congratulate you on that.

Mr. VALENTINE. Thank you.

Mr. SAYLOR. One question I would like to ask. There will not be enough land for all of the Navaho families to be taken care of. What system would the tribal council use in determining the manner in which the farms in the new area would be allocated?

Mr. AHKEAH. Congressman, we have a number to come in who are now in school getting the training for the farm. They will be scientific farmers. We feel that those young men that they can then teach the neighbors how to farm, those who have not had the training, and then the rest of the people over the reservation can have more rangeland to raise more sheep and also some of the Navaho families are getting land west of us that the Government is giving them farm assignments, and then, too, we have any number of families getting jobs off the reservation in Utah, California, Arizona, and other States.

There are many families working out there now and they are very much satisfied with their work and surroundings.

We hear on the radio from Los Angeles from some of the people that have been down there maybe 4, 6 years, telling others to come down; there is good living down here.

So I think the Navahos will go where they can make more money as soon as they have enough education, and certainly in this is the first time for many years that we have all our Navaho children of school age in school.

So we feel after they get out of school they will be more eligible to compete with the outside world.

I think we are getting there now where the Navaho Tribe will not be such a problem.

Mr. SAYLOR. Now, Mr. Ahkeah, Yellowman said that he is farming 23 acres, together with his 2 sons having an allocation of 10 acres a

piece. That makes 43 acres for the 3 families. Do you have any idea as chief of the tribal council as to how large a tract of land should be given in the Navaho and the San Juan-Chama projects if they should be authorized?

Mr. AHKEAH. We figured that in the Shiprock project there should be enough land so a Navaho could get good living, should get 80 acres.

Mr. SAYLOR. Do the other members of the tribal council feel that your people could make a living on 80 acres?

Mr. GORMAN. I think that figure is 10 points low. I think 90 acres is what I think subsistence living would bring. That would very easily take care of the number of people that we want to place on those irrigated farmlands.

Mr. SAYLOR. Do you feel if they were divided up into 90-acre tracts or 100-acre tracts, that that would take care of all the tribal members who desired to farm?

Mr. GORMAN. Yes, sir; I do.

Mr. SAYLOR. Now, I have one other question which has nothing to do with your statements here. Is the tribal council receiving its fair share of revenue from the uranium which is being found upon your reservation?

Mr. AHKEAH. You mean the council body?

Mr. SAYLOR. Yes, your royalties.

Mr. AHKEAH. The royalty goes to the tribal fund, 10 percent mainly, on the mining business.

Mr. GORMAN. The individual Navaho that make assignments to people with money get about 2 to 5 percent overriding royalty while the tribe gets a flat 10-percent rate, 10 percent of all the dry ore processed.

Mr. SAYLOR. Is it the opinion of the council that that is a sufficient royalty for the uranium that has been found on your reservation?

Mr. GORMAN. Well, we are not satisfied with that percentage. It has been, I think, long practice and custom by others, it has just been set on that basis by the regulation that we had to approve that was presented us by the Interior Department.

Mr. SAYLOR. Now, I notice that you stated here in your combined statements that now there are about 79,500 members of the Navaho Tribe, which is an increase from the 10,000 in the early 1860's.

Do you have an up-to-date tribal roll of those 79,500.

Mr. AHKEAH. We count this number through the census numbers that are being given out each year when the members of the family wants to be enrolled. This count is taken from this census roll of the tribe.

Mr. SAYLOR. Do you have a tribal roll that is up to date?

Mr. AHKEAH. Yes.

Mr. SAYLOR. That is all, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the gentleman from Utah.

Mr. DAWSON. No questions, Mr. Chairman, except to congratulate the members of the Navaho Tribe for the very splendid presentation they made here before the committee.

Mr. ASPINALL. Thank you very much for your testimony.

At this point, without objection, there will be placed in record Senate Joint Memorial No. 4, State of New Mexico, and resolutions

from the Farmington Chamber of Commerce and the San Juan Reclamation Association, N. Mex., in support of the Navaho project:

TWENTY-SECOND LEGISLATURE, STATE OF NEW MEXICO

SENATE JOINT MEMORIAL NO. 4

Introduced by Senator Guido Zecca

BY THE 22D LEGISLATURE OF THE STATE OF NEW MEXICO MEMORIALIZING THE CONGRESS OF THE UNITED STATES OF AMERICA TO ENACT LEGISLATION AUTHORIZING THE SECRETARY OF THE INTERIOR TO CONSTRUCT, OPERATE, AND MAINTAIN THE NAVAHO PROJECT AS ONE OF THE PARTICIPATING PROJECTS IN THE COLORADO RIVER STORAGE PROJECT

Whereas there has been introduced in the 84th Congress of the United States a bill to authorize the Secretary of the Interior to construct, operate, and maintain the Colorado River storage project and participating projects; and

Whereas the foregoing proposed legislation includes the Navaho project in New Mexico, as one of the participating projects, for the irrigation of reservation and nonreservation lands located on the Navaho Indian Reservation and adjacent thereto; and

Whereas the Navahos are at present a low-income, underprivileged group, numbering more than 75,000, whose population is steadily increasing, and whose economic condition is steadily declining because of the extreme drought existing on the Navaho Reservation; and, recognizing that where a group of people exist under such adverse economic conditions as do our neighbors, the Navahos, it affects the whole economy of the surrounding area; and

Whereas the proposed Navaho project will irrigate reservation lands which will provide for approximately one-fifth of the present Navaho Indian population with a living standard equal to that of non-Indian agriculturists within the area, and will greatly improve and better the economic condition of our neighbors, the Navahos: Now, therefore, be it

Resolved by the Legislature of the State of New Mexico, That the Congress of the United States be and is hereby respectfully memorialized and urged to enact legislation authorizing the Secretary of the Interior to construct, operate, and maintain the Navaho project as one of the participating projects in the Colorado River storage project; and be it further

Resolved, That copies of this memorial be sent to each Senator and Member of the House of Representatives from New Mexico.

JOE M. MONTOYA,
President of the Senate,
EDWARD G. ROMERO,
Chief Clerk of Senate,
DONALD D. HALLAM,
Speaker, House of Representatives,
FLOYD CROSS,
Chief Clerk, House of Representtives.

Approved by me this 31st day of January 1955.

JOHN F. SIMMS,
Governor, State of New Mexico.

TO THE HOUSE OF REPRESENTATIVES, UNITED STATES CONGRESS, WASHINGTON, D. C.

RESOLUTION

Whereas legislation is now before the Congress of the United States to authorize the Secretary of the Interior to construct, operate, and maintain the upper Colorado River storage project and participating projects; and

Whereas included in said legislation is the Navaho project in New Mexico which will utilize San Juan River waters, mainly to irrigate and rehabilitate a large section of land on the Navaho Indian Reservation; and

Whereas such rehabilitation, under the Navaho Indian project, will eventually be of great assistance to the Navaho Tribe in their struggle for survival, which assistance has heretofore been denied the Navaho Indians through the Nation's failure to comply with the treaty of 1868; and

Whereas the citizens of San Juan Basin of New Mexico are fully cognizant of the plight of this minority group and urge full support be given to that end: Therefore be it

Resolved, That the Farmington Chamber of Commerce of Farmington, N. Mex., expressing the wishes of the people of San Juan Basin in New Mexico, enthusiastically endorses and fully supports congressional action to authorize the upper Colorado River storage project and participating projects, and specifically the Navaho project.

FARMINGTON CHAMBER OF COMMERCE,
By ERNEST H. BRUSS,
President.

Attest:

A. S. ZIMMERMAN,
Secretary.

To House of Representatives, United States Congress, Washington, D. C.:

RESOLUTION

Whereas legislation is now before the Congress of the United States to authorize the Secretary of the Interior to construct, operate, and maintain the upper Colorado River storage project and participating projects; and

Whereas included in said legislation is the Navaho project in New Mexico which will utilize San Juan River waters; and

Whereas the Navaho project is mainly a Navaho Indian project which will ultimately result in great assistance to the tribe in solving a most serious economic problem, aside from rectifying some of this Nation's failures in compliance with the treaty of 1868; and

Whereas it is the desire and wish of all citizens of the San Juan Basin area of New Mexico that full support be expended toward the end of seeking congressional authorization of the Navaho project: Therefore, be it

Resolved, That the San Juan Reclamation Association of Farmington, N. Mex., expressing the wishes of the people of San Juan Basin in New Mexico, enthusiastically endorses and fully supports congressional action to authorize the upper Colorado River storage project and participating projects, and specifically the Navaho project.

SAN JUAN RECLAMATION ASSOCIATION,
By E. H. FOSTER, *President.*

Attest:

A. S. ZIMMERMAN, *Secretary.*

Mr. ASPINALL. At this time the Chair calls to the witness stand Mr. Zimmerman, Association of American Indians, who has a statement as I understand that will take just about 5 minutes.

Is that right, Mr. Zimmerman?

STATEMENT OF WILLIAM ZIMMERMAN, ON BEHALF OF ASSOCIATION OF AMERICAN INDIAN AFFAIRS, INC.

Mr. ZIMMERMAN. Yes, sir, Mr. Chairman.

In view of the lateness of the hour I would be quite happy to have your permission to file it. I haven't a prepared statement.

Mr. ASPINALL. If you can make your statement in 5 minutes the chairman would rather you make it rather than give permission to file it.

Mr. ZIMMERMAN. Then after my statement may I file with the committee a letter addressed to the chairman by the president of the association which will elaborate the points I want to make.

Mr. ASPINALL. Unless there is objection, the letter may be filed. Hearing no objection, it is so ordered.

(The letter referred to is as follows:)

ASSOCIATION ON AMERICAN INDIAN AFFAIRS, INC.,
Santa Fe, N. Mex., March 15, 1955.

Hon. WAYNE N. ASPINALL,
Chairman, Subcommittee on Irrigation and Reclamation,
Committee on Interior and Insular Affairs,
House of Representatives, Washington 25, D. C.

DEAR MR. ASPINALL: Your subcommittee has before it four bills authorizing the construction and operation of the Colorado River storage project. This letter is written to supplement Mr. Zimmerman's brief oral testimony, and to state more fully the position of this association on this project. This association's primary concern is that whatever bill is passed shall include language authorizing the construction and operation of the Navaho project, including both the Shiprock and south San Juan division. I ask that this letter be included in the record.

The Association on American Indian Affairs is deeply interested in these proposals because of their effect upon the Indians of New Mexico, and especially the Navaho Indians. The Navaho Tribe, with a population of about 75,000 people at the present time, increasing at a rate of close to 1,500 per year, has long been a subject of special concern to the Congress, the Executive, and the Nation at large. Although the Navaho Reservation is about as large as the State of West Virginia, it is so arid, and the land has been so abused through overuse and ignorance, that it cannot support the existing population except in a state of semistarvation or even utter destitution.

You and all your committee are well aware of these conditions, and know also that the Navahos have been so neglected, so deprived of education, that even today they are largely illiterate and non-English-speaking. Despite the best efforts that can be made, it will be a long time, at least several generations, before their difficult problem, made ever more acute by their increase in population, can be solved by any large movement of Navahos off the reservation.

The reclamation projects under the Navaho Dam promise greatly to ease the present critical condition of our greatest Indian tribe, and at the same time, to hasten the day when all members of that tribe can receive a standard American education as well as to reduce the cost of such education markedly.

The physical details of the projects have been presented to you by qualified Government engineers. I confine myself to a brief summation. The Shiprock area now supports about 128 Navaho families, who eke out a poor subsistence by grazing sheep in a desolation that requires 19 or 20 acres to support 1 sheep unit. These 128 families can earn an income of only a few dollars over $1,000 a year per family, or about $200 per capita. They can barely be called self-supporting; certainly the area they occupy is making no contribution to the Navaho Tribe or to the Nation. Under present conditions the lands to be irrigated in the Shiprock project support about 5,100 sheep units; under irrigation the same land, under average conditions, will support about 430,000 sheep units, year long.

It is calculated that the two projects, the Shiprock and the south San Juan will provide 1,400 farms of 90 acres or more; of these 1,100 would be on the Navaho Reservation. That means that 1,400 families, or 7,280 people, can be supported in the area, and supported at a tolerable level of American farm life. To these must be added the additional nonfarming families that will derive a livelihood from the development of a healthily prosperous community. In statements prepared by the Bureau of Indian Affairs, this second group has been estimated at twice the number of farm families, or another 2,800 families. As the Navaho farmers become proficient, as they improve their standards of living and modes of operation, and as, for the reasons stated below, the level of education arises, we may confidently expect that in time well over 20,000 people will be enabled to make a decent American-level living from these two projects. This is a conservative estimate.

The factors of education and health deserve your committee's careful attention. One of the reasons the Navahos are so deprived in both fields is that they live thinly scattered over a wild, rugged, and all but roadless land. Health services can be brought to them, or they to medical centers, only with great difficulty. To give them schooling, the Government has been forced into an expensive and difficult system of boarding schools and semiboarding schools, more than doubling the cost per pupil. Even the simplest and cheapest construction, when boarding facilities are involved, is not only extremely expensive, but so much

is required that, build as we may, the Nation has not yet caught up with the needs of the ever-increasing numbers of Navaho children.

The proposed projects would bring at least a fifth of the whole Navaho population into a relatively small area. Concentrated in that area, they could be served entirely by day schools, through high school. The economy would be tremendous. At a saving of $250 per year per pupil, it would amount to almost $1 million a year, without reckoning the initial saving in the capital investment in school construction. It would also facilitate and hasten the process of turning the education of these children over to the State under Johnson-O'Malley Act contracts. Similar economies and advantages would accrue in medical and public health services.

As an ordinary thing in this country, when we contemplate a reclamation project, we think only in terms of the cost of the project as against the value and probable yield of the land to be subjugated. Here we have a unique situation, in that these projects are inseparable from the problem of a shockingly large population of destitute people, underprivileged in every imaginable sense of that word, for which we have been trying to find a solution. In terms of common humanity, in terms of American citizens and the welfare of the Nation, and in terms of cold cash, we have here a situation that calls for a different point of view from the usual. We cannot figure the long-term return to our Treasury solely in terms of the cost of the project and probable ultimate repayments. The savings cut across budget headings and allocations, and when so considered, show these projects to be among the most economical we could possibly undertake.

The Association on American Indian Affairs does not believe in benefiting Indians at the expense of non-Indians, any more than it believes in the reverse. The Shiprock and San Juan projects, as they are now being presented, were in part shaped by consultations between the Navaho Tribe and the State of New Mexico in which both parties showed neighborly awareness of each other's interests. One result of this is the interrelation of these two projects to the proposed San Juan diversion, which would make that share of the waters of the San Juan River that is rightfully New Mexico's and not required by the tribe available to replenish the all too often inadequate flow of the Rio Grande.

This association is interested in that project, as well as the others, since seven of the New Mexico Pueblo Tribes depend upon the waters of the Rio Grande, to which they have a right similar to that of the Navahos to the waters of the San Juan. The Indians on the Rio Grande have seen their rights threatened by the demands of downstream users, and they, as well as Americans as a whole, have an interest in seeing the flow of that important river maintained and replenished. An argument has been made that the surplus waters of the San Juan should not be diverted into the Rio Grande, because to do so requires storage and control construction on the tributaries down which those waters would flow, and the State of New Mexico would use these structures wrongfully to hold back waters. It seems farfetched and picayune.

This association especially hopes that your committee will approve the Shiprock and south San Juan projects, so urgently needed, so obviously rich in their returns to the Nation, so vital to the welfare of our greatest tribe. It does also hold that the related diversion project is beneficial and desirable both to Indians and non-Indians, and should also be approved.

Yours sincerely,

OLIVER LA FARGE, *President.*

Mr. ZIMMERMAN. Mr. Chairman and gentlemen of the committee, my name is William Zimmerman. I represent the Association on American Indian Affairs. I am here to speak in behalf of 2 related projects, the Shiprock or Navaho project, which comprises 2 units, the Shiprock and the south San Juan, and the related project which is the Chama diversion, the San Juan-Chama diversion.

I want to make only three points and I can make them very briefly.

The first is that these projects have been studied for 50 years, the first engineering study was made in 1901.

The Department and State engineers and other engineers repeatedly studied this area and, of course, each new study has meant a review of the previous studies.

It is my belief, Mr. Chairman, that the Department now has, with the report that is available in Washington, but was not available when the hearings started, as I understand it, the Department now has available all possible information as to the feasibility of this project.

I call your attention to the fact that the Congress in 1950, in the Navaho Rehabilitation Act, provided particularly for a determination by the Department as to the feasibility of his project. It has been 5 years since the Congress passed that statute.

My second point relates to the water. All of the water which will be used by these two projects comes from the allocation under the compact to the State of New Mexico. The agreements have been reached between the Indians and the State officials with the conclusion that the State people are convinced that it is most beneficial to the State as well as to the Indians, that substantially the whole of the State's allocation of some 800,000 acre-feet of water should be used for these 2 projects.

My third point is one which has been brought to your attention perhaps more ably than I can by the Navaho witnesses themselves. This project is the keystone of the whole Navaho rehabilitation program. In 1947–48 when that program was being formulated, data were not available to justify a recommendation to Congress that the project be authorized at that time.

But there is no question that without this project or without the construction of these two related projects, that the Navaho rehabilitation program is incomplete.

These two projects in themselves will provide land for about 1,400 families. If the Bureau of Reclamation estimate is correct that each family on an irrigated farm in some way creates employment for two other families, then that means that somewhere in the neighborhood of twenty-odd-thousand people will be employed for this project.

I urge upon the committee that you give most careful consideration to those factors.

Mr. ASPINALL. May the chairman ask you this question:

Do you know of any way by which water can be used in that area by the Navaho Indians or non-Indians for that matter, unless you have some sort of development such as is proposed by the Navaho or what we might call the Shiprock-San Juan project?

Mr. ZIMMERMAN. There is no other way, Mr. Chairman, to use any substantial volume of water.

Mr. ASPINALL. Let me ask you this question:

Rather than continue the relief programs that we have, is it your feeling that the Federal Government could well afford to spend the money that is proposed for the Navaho part of this project as an outright grant so as to put the Navahos in an economical condition on which they would not have to call for additional help or as much help in the future as they have heretofore?

Mr. ZIMMERMAN. Based on the engineering studies I would say that an outright grant is not necessary. Certainly a substantial part of the total investment, somewhere in the neighborhood of $30 million at least, could be repaid by the land user over a 50-year term.

That, I think, is what the present estimate shows.

Now, there are many other subsidiary savings that would not occur in the ordinary reclamation project.

Mr. ASPINALL. Then, to follow that a little further, you feel that the Navaho and the non-Indians who will be benefited have a right to expect their share from the net revenues of the power installations that might be built at the storage projects on the Colorado River?

Mr. ZIMMERMAN. As one means of reducing their own indebtedness?

Mr. ASPINALL. Yes, sir.

Mr. ZIMMERMAN. Yes, sir; I do.

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. You heard Mr. Grey Valentine testify here and read a complete statement a few minutes ago, in which he stated that if this project were built there would be no objection to the repeal of the Leavitt Act as soon as the Navaho people were established on their farms.

Do you concur in that?

Mr. ZIMMERMAN. Not exactly, Mr. Saylor. I would like to say that the mere fact that they are established on the farm in my judgment would not necessarily warrant the repeal of the act.

I would expect there would be some falling by the wayside. I would be reluctant to see the act repealed just as the project is established, just as it begins operations. I think Indians generally recognize that the time must come when the Leavitt Act will be repealed, or amended in some way, so that they pay or the owner of the land repays the construction costs.

Mr. SAYLOR. I might say to you it seems very strange to me that when the members of the tribe, and not just mere people who belong, but members of the tribal council, advisory council, chairman of the committee on loans, appear before this committee and make that recommendation, it seems to me that they know their problems better than anyone else, it comes with rather poor grace to have someone say that these people, who have made so much progress, who have come in here and shown their willingness to do something, to have an organization such as you represent come in here and say they don't know what is good for them.

Mr. ZIMMERMAN. I certainly did not mean to imply that, Mr. Saylor. I surely did not say that.

Mr. SAYLOR. That is all, Mr. Chairman.

Mr. ZIMMERMAN. Thank you, Mr. Chairman.

Mr. ASPINALL. The Chair has four documents which he wishes to place in the record at this time. He has shown them to the gentleman from Pennsylvania. One is a telegram addressed to the chairman from the Denver Newspaper Guild, headquarters in Denver.

One is a letter addressed to the chairman from the Loveland Wildlife Association, addressed to the chairman under date of March 11.

Another is a letter from the same group, only signed by John A. Cross individually, under date of March 4.

Is there any objection to the placing in the record of these three documents which are supporting the legislation?

Mr. SAYLOR. Reserving the right to object, and I will not object, I just want to make sure that the chairman will be in a position to tell the people who come here in opposition who the residents of the Loveland District are.

Mr. ASPINALL. May the Chair inform his colleague that one of the finest agricultural areas in the eastern slopes of the Rocky Mountains is known as Loveland and these are residents of that very beautiful place.

The reservation having been withdrawn, the documents will be made a part of the record.

(The documents referred to are as follows:)

DENVER, COLO., *March 13, 1955.*

UNITED STATES REPRESENTATIVE WAYNE ASPINALL,
Chairman, Committee of Interior,
House of Representatives, Washington, D. C.:

Following resolution adopted unanimously today by Denver Newspaper Guild Executive Committee:

"The West is the most rapidly growing portion of the Nation. If this growth is to continue, even at a more moderate pace than that spectacularly demonstrated by the 1950 census, the West must have full use of the water and cheap power inherent in western rivers.

"The alternative is blight and decay—to the detriment of the entire Nation. Modern civilization and modern standards of living cannot exist in the arid West without careful husbanding of water, and progress cannot be achieved without cheap energy.

"Therefore, the Newspaper Guild of Denver, local 74, of the American Newspaper Guild (CIO), representing the bulk of the working newspapermen of the Rocky Mountain West, hereby endorses without reservation, the proposed development plan of the upper Colorado River Basin project and urges its authorization and prompt prosecution by the Congress."

Would appreciate you giving this resolution widest distribution possible.

DONALD W. MACMILLAN,
Executive Secretary, Denver Newspaper Guild.

LOVELAND WILDLIFE ASSOCIATION,
OFFICE OF PUBLICITY DIRECTOR,
Loveland, Colo., March 11, 1955.

HON. WAYNE ASPINALL,
Subcommittee Chairman, Interior and Insular Affairs,
House of Representatives, Washington, D. C.

DEAR SIR: It has been brought to our attention that the National Wildlife Federation of Colorado to which the above association belongs will probably see fit to stand neutral on what we feel is a vital issue, the Echo Park Dam and whatever sister dams might be included in that bill.

Our association of 375 members have gone on record unanimously as being in favor of this bill and we would like for this fact to become a public record. True, we do not like to go counter to our State and national federations, but we are all citizens and free men and women living in a land that needs all the natural resources available.

We take it as a silly utterance that it will spoil the beauty of the region—for whom? Fewer than 200 persons viewed the site yearly until talk of the project was started. One of our members who served on a former water board told us it is a land of desolation, sand, scrub cedar, and all that goes to make it a near desert. Wild, yes, but not beautiful.

If the opponents of this project could live here in Larimer County and see the far-reaching effects of the Big Thompson project they would be shortsighted and more to talk against any like project, no matter what the cost, and there, also, no agency but the Federal Government will ever have what it takes to promote and bring to completion this enormous endeavor.

The again one must view such accomplishments to understand just what a large body of water will do for a community. If the opponents of the bill from California and Pennsylvania could see the fishermen and boaters who enjoy Estes Park Lake and Horsetooth Reservoir, I believe they would have a different feeling for Echo Park Dam.

More power to you and the friends of this bill.

Sincerely yours,

L. E. LARSON, *President.*
Dr. E. P. EVANS, *Publicity Director.*

LOVELAND WILDLIFE ASSOCIATION,
Loveland, Colo., March 4, 1955.

Hon. WAYNE ASPINALL,
Congressman, Fourth District, Colorado,
House Office Building, Washington, D. C.

DEAR WAYNE: I have been requested by L. E. Larson, president of Loveland Wildlife Association, as legislative chairman of that group to write to you regarding the upper Colorado project, including Echo Park Dam.

The false impression has been widely circulated that all conservation groups are opposed to the construction of Echo Park Dam.

This is definitely untrue, and from our observation, true conservationists who have been fully informed have generally supported this project. Loveland Wildlife Association, with 400 members already paid up for 1955, has unanimously voted to support the project, including Echo Park Dam, and we wish our Senators and Congressmen to know that we are strongly behind them in their efforts to secure approval for this project.

It is the strong opinion of several of us who have personally inspected the site of Echo Park Dam that no true conservationist could sincerely oppose the dam on any grounds connected with conservation.

On the contrary, we feel that the greater portion of groups which are supposed to be interested in conservation, and who have opposed Echo Park Dam have been misguided and misinformed.

As I have stated, the vote of a general meeting of the Loveland Wildlife Association produced unanimous support, and in every case where I have had the opportunity to observe the effects of real and specific information being resented to fairminded people, including the Colorado Water Conservation Board when I was a member of it, the result of the fair and reasonable consideration of all factors clearly indicates that the construction of Echo Park Dam would be highly beneficial as a conservation measure, and in no important way would it be detrimental.

Respectfully,

JOHN A. CROSS.

Mr. ASPINALL. We also have a statement by Angus McDonald, Legislative Assistant of the National Farmers Union.

Mr. McDonald was present, but because of the lateness of the hour he had to leave.

The document favors support of the legislation.

Is there any objection to its being made a part of the hearing?

Mr. SAYLOR. No objection.

Mr. ASPINALL. Hearing no objection, it is so ordered.

(The document referred to is as follows:)

STATEMENT OF ANGUS MCDONALD, LEGISLATIVE ASSISTANT, NATIONAL FARMERS UNION, TO THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, IN SUPPORT OF THE UPPER COLORADO DEVELOPMENT, MARCH 16, 1955

Mr. Chairman and members of the committee, I am here to present the position of our organization in regard to S. 500 which authorizes the Secretary of the Interior to construct, operate and maintain the Colorado storage project and participating projects. We fully endorse this legislation and feel that it is entirely consistent with the policies of the National Farmers Union adopted by delegates of the biennial convention at Denver, Colo., March 15 to 19, 1954. Furthermore, endorsement of upper Colorado development is entirely consistent with policies adopted by previous Farmers Union conventions—local, county, State, and national.

I quote briefly from the policies adopted at our convention last year. At that time, the Farmers Union went on record as favoring a policy which would fulfill the responsibility of the Federal Government for assuring an electric power and water program that would fully serve the people's needs. We favored at the convention, the following principles:

"RURAL ELECTRIFICATION AND THE FEDERAL POWER PROGRAM

"(*a*) To fulfill the responsibility of the Federal Government for assuring an electric power program that fully serves the people's needs, we favor the following principles:

"(1) Establishment by Congress of the principle of Federal utility responsibility for that portion of regional power supply required to meet the expanding needs of present or future nonprofit electric systems and to support sound expansion of the regional economy.

"(2) Legal provisions requiring that preference be given to public and cooperative nonprofit agencies in sale of whole energy produced by Federal projects must not be impaired.

"(3) Establishment by Congress of regional development agencies which will recognize hydroelectric development as a primary objective of multiple-purpose river basin programs, but will also provide for the optimum conservation and development of all values, including flood control, navigation, irrigation, recreation, and others.

"(4) Construction by Federal agencies of steam-electric stations and transmission lines necessary to firm hydropower and meet power requirements of service areas, and to carry that power to load centers.

* * * * * * *

"(6) Full technical and financial support for the vertical as well as horizontal expansion of the rural electric program, including:

"Assistance to generation and transmission cooperatives where needed to provide the member cooperatives with an abundant power supply in the future, financial and technical assistance in acquisition programs; and * * *

"Removal of population limitations on communities which rural electric cooperatives may serve, which are creating serious problems in connection with annexations and community growth, and which deprive communities of a free choice as to who shall serve them.

* * * * * * *

"(f) The cause of the Central Valley of California, the New York-New England area, Hells Canyon, the Columbia Basin, the Tennessee Valley, the upper Colorado, including Echo Park, the Missouri, the Southwest, the Southeast and other areas is each the cause of everyone of us. * * *"

Development of our natural resources, as indicated by these resolutions, is necessary if farmers and other citizens are to be supplied with electric power and with sufficient water to irrigate the arid lands. This is particularly true in the upper Colorado watershed where the runoff varies widely from year to year. Records indicate the virgin flow per year has ranged from 5,640,000 acre-feet in the upper Colorado to a high of 24,027,000 acre-feet. This simply means that in dry years there is insufficient water and that in wet years water flows into the lower channel which should be impounded and held for future use. It is difficult to see how the region can be developed unless a number of water storage projects such as are called for in this bill are completed. Few will contend that conservation of the water resources is not absolutely necessary if development of the vast upper Colorado watershed area goes ahead. Conservation of water, of course, is the key that will unlock the door to hydroelectric industrial and agricultural development of the area.

I call attention to a sample study of 16 reclamation projects which was made by the Department of Interior to which reference is made on page 153 of the hearings before the House Subcommittee on Irrigation and Reclamation of the Interior Committee in January 1954. According to the conclusions reached in this study, benefits accruing to the Nation and to the areas affected by reclamation projects are far greater than the cost of the projects. It is estimated, based on this sample study of 16 projects, that by 1952, 59 reclamation projects had returned $2,700,000 to the United States Treasury. This is an amount greater than total reclamation expenditures for all reclamation projects from the beginning of the reclamation program to 1952 when the study was made.

Benefits from reclamation projects, of course, are not merely limited to dollars paid into the United States Treasury. Of greater value are the benefits in increased crop production, livestock raised, farm income, and industrial development. In every area where the Federal Government has made an investment in reclamation, it has resulted in increased payments to the Government by the beneficiaries in income taxes. The prosperity of an area affected directly by reclamation development can also be related to expanded business activities in adjacent and surrounding areas and in fact to every area and every segment of society throughout the Nation. The reclamation program has provided economic stability to the Nation and has made possible the development of areas which would be completely worthless without a reclamation program.

Turning to the specific problems in the upper Colorado area as they relate to the program which this bill would authorize it would appear that as a simple matter of economic justice that the people in the upper Colorado area are entitled to their share of the water in the Colorado River and its tributaries. According to testimony before the House committee and this committee, the lower basin has been using most of its share of the water under the 1922 compact but there is no comparable use in the upper Colorado area. More than two-thirds of the water which belongs to the people in this area is lost to them because they have no way to impound or use it. Under the 1922 compact, the water was fairly divided between the 2 regions, the lower region being entitled to an average of 7½ million acre-feet a year, over a 10-year period.

It seems a matter of commonsense to us that a way should be found to assure the people in the lower basin the right to their rightful share and at the same time provide a way for the people in the upper basin to utilize the water which rightfully belongs to them. Engineers tell us that over a long period of time, if the water can be conserved there is enough for all. They tell us also that any water-conservation plan must take into account the high evaporation losses that would result if projects were developed at so-called poor sites. The engineers and scientists in the Department have indicated that they cannot honestly recommend sites such as Desolation, Bluff, and Dewey either because they are economically unfeasible, would experience high evaporation losses or produce a relatively low amount of power.

Sites other than those recommended by the Department of Interior have been suggested because it was contended that the building of a dam at the Echo Park site would be an invasion of the national park system and would forever mar the natural beauty of the area. The record will show that the original monument created by President Wilson consisted of 80 acres which would not include Echo Park and when President Roosevelt expanded the monument by Executive order in 1938, that he provided that expansion of the monument should not bar the building of power projects. In other words, the Echo Park site has never been part of the national park system. The mere fact that it was called a park did not make it a national park. It is also contended that development of the water resources of the upper Colorado and the Echo Park site would impair it as a recreational center and that in some way it would disrupt the Dinosaur Monument. Geography indicates that the bones of the dinosaurs, if any, would not be disturbed because the dinosaur graveyard is down the river from the Echo Park site. Impounding water behind the Echo Park would not submerge a single dinosaur bone. On the contrary the proponents of the project tell us that the creation of a huge lake behind the Echo Park would enhance the recreational opportunities and that roads would be built into the area so that many more thousands of people could enjoy recreational activities, whereas at the present time, the area is relatively inaccessible.

Finally, we urge the approval of this legislation because of the enormous amount of cheap hydroelectric power that will be produced. It has been estimated that this power will be generated at an overall average cost of around 6 mills per kilowatt and that the power will be used, since there is a power shortage in the area and since the needs of the area for power is increasing by leaps and bounds. Power will make possible the development as a whole and all the funds which are invested in the projects will be returned with interest over a period of 50 years. Power revenues in part will be used to pay for that part of the irrigation projects which the participants in the projects are not able to pay. Thus, in the long run the Government will recover all of the money invested plus interest on that part of the project which is allocated to power.

In regard to the preference clause, we suggest that the language in section 3 of the bill be made more explicit or that the legislative history be made to show that Congress intends under this legislation for cooperatives and public bodies to have first call on power generated at any and all of the upper Colorado projects. We realize that only 10 percent of the power will be needed by cooperatives and public bodies, but we are anxious to see that they have every opportunity to fully utilize this power and thus preserve the principle of low cost power to the consumer. If the yardstick principle is preserved in the marketing of this power, it will have beneficial effect, not only on the rural electric cooperatives and public bodies but will have a healthy competitve effect throughout the area which will result in low-cost power to consumers served by private electric-power companies.

59799—55—pt. 2——19

(In accordance with the unanimous-consent request of March 28, 1955, the statement of Hon. Arthur V. Watkins, a United States Senator from the State of Utah, appears at this point:)

STATEMENT OF HON. ARTHUR V. WATKINS, A UNITED STATES SENATOR FROM THE STATE OF UTAH

Senator WATKINS. I want to say that this statement covers an investigation covering over a month into the records of the Federal Power Commission and the Department of the Interior with respect to Echo Park project and the controversy between those who claim to build this project the Echo Park Dam and the Split Mountain Dam would interfere with the national monument, with the national park program, be an invasion of their rights, and set a dangerous precedent.

I have been very much intrigued with the question as a matter of law, also as a matter of policy. For that reason I had my staff members work on it, and I have worked on it with them, and we have prepared this statement which I think goes into this very, very carefully. We tried to do it objectively. We realize in what we have said we have said some rather strong things, but we are saying them in the sense that we believe that people who have been making the objections to this great project do not know the facts and we want to get the record before them. That is one of the principal reasons for going into this in this fashion.

Mr. Chairman, I rise today to discuss a matter of great importance to the Intermountain West and all Americans who are interested in the development of our natural resources.

H. R. 3383, which has for its purpose the authorization of the Colorado River storage project and participating projects, is similar to S. 500 now pending before the Interior and Insular Affairs Committee of the Senate. Hearings have been held and action by the full committee is imminent.

A similar bill was before the Senate last year but was not acted upon although it was the pending business when the Senate took its recess last August.

A phase of this bill has been the subject of a great deal of discussion and debate. I am referring to the controversy over the so-called Echo Park Dam and Reservoir. The controversy also includes a much smaller storage project downstream from Echo known as Split Mountain. Both of these reservoir sites are on the upper Colorado River and its tributaries.

Proponents of the proposed giant reclamation program declare that these storage reservoirs—2 of 9 of the comprehensive program—are absolutely necessary to the successful operation of the project.

Opponents, essentially a southern California water lobby and a few vocal members of conservation and wildlife groups, deny this claim and assert that to permit the construction of the Echo Park and Split Mountain Reservoirs would be an invasion of a national park and would set a precedent which would endanger our national park system, of which the Nation is justly proud.

The debate is approaching fever heat. Other units of the program and the merits of this great reclamation project are being lost in the confusion of charges and countercharges. Members of Congress have been bombarded and now are being deluged with hundreds of pressure-type letters written, and in many cases mimeographed, by well-

meaning people who honestly believe the national park system is in real danger.

It is my purpose in this discussion to throw some much needed light on this badly muddled situation.

I shall begin by clearing away some misconceptions.

The words "Echo Park" are themselves misleading. There is not now and never has been a national park named "Echo." This will not be denied.

It was an old custom in the West to designate small areas on streams, in canyons, and in the national forests as "parks." All that was required to merit the local term "park" was a clearing, or a grassy plot of ground, or a meadow bordering on a stream, or a wider place in a narrow canyon, et cetera. Hence numerous small areas on the upper Colorado River were named "parks" by the pioneers. Island Park, Brown's Park and Echo Park are outstanding examples.

It is hardly necessary to add that this practice has given rise to a mistaken belief among many people that Echo Park is really a national park.

In view of these circumstances, how does the controversy over Echo Park arise? Let me review the developments chronologically:

In 1915 President Woodrow Wilson, under the Antiquities Act, set aside an 80-acre tract of land in northeastern Utah, where some skeletons of dinosaurs had been discovered, as a national monument.

This 80-acre tract was a part of the public domain. Many years later—on July 14, 1938, to be exact—President Franklin D. Roosevelt, by formal proclamation, added 203,885 acres of public land to the original 80 acres and declared it, subject to some significant exemptions, to be a part of the Dinosaur National Monument.

The new area extends roughly 40 miles upstream on the Colorado River tributaries. The monument extension embraced lands on both sides of the Green and Yampa Rivers, and the area named "Echo Park" by the pioneers is included within its boundaries.

The opponents of Echo Park and Split Mountain Dams contend that this 1938 proclamation made all the area along those streams, including the Echo and Split Mountain Dam sites, a part of a national monument, and they challenge not only the propriety but also the legal right of public use of these reservoir and dam sites.

This claim is challenged by the sponsors of the Colorado River project, who insist that valid existing rights to develop those water resources are specifically covered in the 1938 proclamation.

I am willing to go even further, and now state categorically, after an extensive search of Interior Department and Federal Power Commission records, that the areas now in controversy are not now and never have been under the exclusive possession and jurisdiction of the National Park Administration. In fact, it is extremely doubtful that the National Park Service has now, or ever has had, jurisdiction over said areas, except in a subservient capacity.

These conclusions furthermore are sustained by irrefutable documentary evidence from the records of the Federal Power Commission—an independent Federal agency set up by Congress and the Department of the Interior.

Based on my examination of the record evidence which I shall lay before this body, I declare without fear of successful challenge that the opponents of the Echo Park and Split Mountain Reservoirs are

attempting to invade areas which were withdrawn from the public domain and set aside for the specific purpose of water and power development and conservation, by duly constituted agencies of the United States many years before the extension of the Dinosaur National Monument was ever thought of. And these withdrawn areas enjoy the same status now as they did the day they were withdrawn.

This puts the shoe on the other foot. It is not a national monument that is being invaded—it is a matter of some misled or misinformed conservationists who are trying to urge that Uncle Sam violate his integrity and treat as mere scraps of paper solemn reservations in the public interest in the Dinosaur Monument area that precede the limited monument proclamation by 17 to 34 years. It ill-behooves honest conservationists to take such an untenable position, because we who love our parks and monuments should strive to preserve as honorable and legal commitments the reservations of public lands for such a noble and worthy use as parks and monuments. Therefore, how can we, in the same breath, ask that equally binding and legal reservations for water development, be invaded, especially when the monument proclamation itself recognizes and exempts from the Dinosaur Monument land reservation these previous withdrawals for water resource development?

Residents of the so-called public land States also have cause for concern lest the Congress accede to uninformed public pressure in this case, and, in effect, establish a precedent for violating reservations for power and water resource development. Most States in the western half of the country still have thousands of acres of public lands reserved under withdrawals similar to those now in effect in eastern Utah and western Colorado, and they should be concerned lest a bona fide precedent be established that would endanger future development of public water resources in the semi-arid West where water conservation has prime priority over all other resources.

The record evidence I bring before you today is known, or should have been known, to the leaders among the opponents of the Echo Park and Split Mountain projects. Even a casual research would have revealed this information to anyone, and it is a record which cannot be successfully challenged.

I charge, therefore, that these Echo Park opponents have consciously or unconsciously deceived and misled thousands of sincere and well-meaning American citizens into taking a position of opposition and hostility to a very meritorious and desperately needed water development program.

I shall now proceed to lay before you step-by-step the undisputed public record which governs the areas in dispute and determines their status:

1. The areas in controversy—when I say "the areas in controversy" I assume the committee knows what I am talking about. I do not want to take their time to describe them.

Mr. ASPINALL. I think the committee can take judicial notice of that.

Senator WATKINS. By this time I am sure it can.

1. The areas in controversy, originally a part of Mexico, became, at the time of the ratification of the treaty of peace with that country, a part of the public domain of the United States. These areas have been ever since that time and now are in Federal ownership and con-

trol, subject to whatever legal actions that have been taken with respect to them since that time.

2. From October 17, 1904, through April 16, 1925, 11 withdrawals or reservations of large tracts within the areas in controversy, and including the Echo Park and Split Mountain reservoir sites, were made either by the Secretary of the Interior or the Federal Power Commission (an independent agency set up by Congress to have authority and jurisdiction in such matters), for the purposes of water and power development in the public interest. These withdrawals for the purposes mentioned and in the order in which they took place, are as follows:

I would like at this point to have you look in the latter part of the statement and you will find 2 maps, 1 labeled "A" and 1 labeled "B." I would like them to be made a part of this record if it is possible to do so. When we use them on the floor of the Senate, as you know, tne printers will not print, the printing committee will not allow to be printed, maps and illustrations and all that sort of thing, but we have to have the chronological straight reading matter without illustrations.

(1) Reclamation withdrawal of Octover 17, 1904—Brown's Park reservoir site. There is not any dispute about that whatsoever.

(2) Power Site Reserve No. 5, May 26, 1909. The dates are very significant here, gentlemen.

(3) Power Site Reserve No. 42, August 27, 1909.

(4) Power Site Reserve No. 121, March 10, 1910.

(5) Power Site Reserve No. 721, July 11, 1919.

(7) Power Site Classification No. 3, May 17, 1921.

(8) Power Site Classification No. 60, February 21, 1924.

(9) F. P. C. Project No. 524, August 4, 1924.

(10) Power Site Classification No. 87, February 14, 1925.

(11) Power Site Classification No. 93, April 16, 1925.

Starting at 1904 there had been 11 withdrawals in the areas in controversy.

If you will turn to map A, gentlemen, you will have a map which shows land withdrawn for power purposes within Dinosaur National Monument, Colorado and Utah. Then you have a list of those power site withdrawals and the date of approval. That is in rather fine print. I do not intend to read those because they correspond with what I have just read with the exception of No. 1, and that was not a power site withdrawal, that was a reclamation withdrawal done by the Department of the Interior under existing law.

Then on the map in the broken lines you find indicated the outlines of the Dinosaur Monument as it was expanded in 1938 by the proclamation of President Roosevelt, and down in the lower left-hand corner you will note a little dark section down there, cross-hatched, and that is the original Dinosaur National Monument—80 acres. You will also note that there is some distance away from it the main portion or the expanded portion of that monument.

Now map B shows in black the area that was covered by these withdrawals, the last one of which was April 16, 1925.

Winding its way down you will note the river indicated by the light lines, runs down through these withdrawals, down to the point in the lower left-hand corner of the map just below the original 1915 Dinosaur National Monument withdrawal. That is indicated there with the red arrow pointing to it.

You will note that practically all—in fact, I may say all but probably a few acres of the entire area on the river, the Colorado and the two tributaries, the Green and the Yampa within the national monument were withdrawn, had been withdrawn under the withdrawals I have just listed. That was years and years before the expansion of the Dinosaur National Monument from 80 acres to two-hundred-two-thousand-some-odd acres.

Mr. Chairman, I believe it would be helpful to the Members of the Congress and any other interested, to have a further breakdown of these withdrawals with particular reference to the authority under which they were issued. For that reason I ask unanimous consent that exhibit No. 1, which I have prepared listing these withdrawals in one column and authority under which they were issued in an opposite column, be inserted in the record immediately following my main statement.

Before proceeding with other actions listed in the records with respect to the area in controversy, I desire to make some pertinent comments on the withdrawals I have just mentioned:

The question may naturally arise, "Are all of these withdrawals still in effect?" In other words, are they still in good standing?

The answer is "Yes."

I make that without any hesitation whatsoever because it is backed up by the record and by the law and by the opinions of the people and the intentions of the people who had to do with making these withdrawals and also expanding the national monument from 80 acres to over 202,000 acres.

This question was presented to the Federal Power Commission by one of my staff members in my behalf. Mr. Jerome K. Kuykendall, Chairman of the Commission, answered the question in a letter which I received recently.

I quote pertinent paragraphs from the letter, which I have made exhibit 2:

This is in furtherance to the telephone conversation of February 11 between Mr. McGuire of your office and Mr. Divine of the Commission's staff concerning the status of the lands withdrawn for power site purposes in and about the Dinosaur National Monument, Colorado and Utah.

Mr. McGuire also requested that you be advised as to: What was the status of the power withdrawals on July 14, 1938—

may I interpolate in the reading of this at this point, to observe that July 14, 1938 is the date when President Roosevelt issued the proclamation expanding the monument from the original size of 80 acres to the size now in existence—

and what is their status at this time.

In answer to that inquiry, the following power site withdrawals were in effect July 14, 1938, as to lands now within the monument boundaries and no appreciable change has been made in them since that date:

Withdrawals	*Date*
Power site reverse No. 5	May 26, 1909
Power site reserve No. 42	Aug. 27, 1909
Power site reserve No. 121	Mar. 10, 1910
Power site reserve No. 721	July 11, 1919
Power site reserve No. 732	Dec. 27, 1919
Power site classification No. 3	May 17, 1921
Power site classification No. 60	Feb. 21, 1924
Power site classification No. 87	Feb. 14, 1925
Power site classification No. 93	Apr. 16, 1925
Federal Power Commission project No. 424	Aug. 4, 1924

In response to the request for a sketch showing the extent of the power site lands within the monument area, I am attaching a copy of the topographic map of the Dinosaur National Monument upon which there has been superimposed the limits of the lands covered by each of the above-cited power withdrawals.

The pertinent paragraphs of this letter show that the inquiry was about the status of lands withdrawn for power purposes within the present boundaries of Dinosaur National Monument, Colorado and Utah. The answer is also plain—the 10 power site withdrawals were in effect July 14, 1938, and no appreciable change had been made in them since that date. The physical limits of these withdrawals are shown on a reduced reproduction of the FPC map, included with the documents on each member's desk.

In other words, their status as withdrawn lands is now the same as it was when they were withdrawn, and then the writer names the specific power withdrawals which I have already listed.

3. When the proposal to increase the 80-acre Dinosaur National Monument some 2,500 times in size was under consideration, the National Park Service of the Department of the Interior wrote the Federal Power Commission a letter outlining the proposed program of the Service. The letter is relevant to the discussion, so I shall read it in full:

DEPARTMENT OF THE INTERIOR,
NATIONAL PARK SERVICE,
Washington, D. C., August 9, 1934.

FEDERAL POWER COMMISSION,
Washington, D. C.

GENTLEMEN: We are studying the possibility of setting aside certain lands in northwestern Colorado as a national monument. The area considered is within the watershed shown on the map marked exhibit H(a), which accompanied an application of January 30, 1932, of the Utah Power & Light Co. for a preliminary permit, and which is on file in the Denver office of the Reclamation Bureau. The proposed monument would be affected by the Echo Park Dam site and the Blue Canyon Dam site, as indicated on the enclosed map of the proposed monument.

Such an area would be established by Presidential proclamation which would exempt all existing rights, and a power withdrawal is of course an existing right.

By way of interpolation, this is the Acting Director of the National Park Service speaking.

However, we feel that we should call this to your attention. If it is possible to release the power withdrawals that you now have in the area, our monument will be placed in a much better position from the standpoint of administration.

If you have any data or reports on this area we would appreciate very much receiving copies.

Very truly yours,

A. E. DEMARAY,
Acting Director.

A map accompanied the letter showing the location of the Echo Park and Blue Canyon Dam sites to be within the areas of the proposed expansion of the monument.

It will be interesting to take a look at that. It is in the exhibits as well. You will find them attached to the letter of Mr. Demaray in the exhibits. You will find this map and you will note on that map Echo Dam site, Blue Mountain Dam site, and indication of the proposed boundary of the expanded Dinosaur Monument is indicated. That was sent with Mr. Demaray's letter.

It will be noted this letter was dated August 9, 1934—many years after the 11 water and power withdrawals had been made by the Department of the Interior and the Federal Power Commission.

The Echo Park Dam site was specifically mentioned by the Park Service's Acting Director, and then he made this significant statement:

Such an area would be established by Presidential proclamation which would exempt all existing rights, and a power withdrawal is of course an existing right.

However, we feel that we should call this to your attention. If it is possible to release the power withdrawals that you now have in the area, our monument will be placed in a much better position from the standpoint of administration.

4. The Federal Power Commission, through its chairman, Mr. Frank R. McNinch, replied by letter under date of December 13, 1934, to the Park Service letter of inquiry. I shall read pertinent parts of the reply, reproduced in full as exhibit 3:

DEAR DIRECTOR CAEMMERER: Reference is made to Acting Director Demaray's letter of August 9, 1934, in which the Commission was advised that you were studying the possibility of establishing a national monument along the Green and Yampa Rivers, in northwestern Colorado, which would embrace lands withdrawn for the proposed Echo Park and Blue Mountain power developments included in the application for preliminary permit of the Utah Power & Light Co., designed as project No. 279.

Assurance was given in the letter that the Presidential proclamation establishing such a monument would exempt all existing rights, including power withdrawals, but a statement was added that if it were possible to release the power withdrawals the "monument would be placed in a much better position from the standpoint of administration." This implied request for a vacation of the power withdrawal has called for careful consideration because of the magnitude of the power resources involved and the fact that the permit application is still in suspended status pending conclusion of the comprehensive investigation of irrigation and power possibilities on the upper Colorado River and its tributaries by the Bureau of Reclamation, and a more definite determination of water allocations between the States of the upper basin. The power resources in this area are also covered by power site reserves Nos. 121 and 721 and power site classifications Nos. 87 and 93 of the Interior Department.

I think that that language is very significant indeed, directing attention to the fact that investigations are now going on and that the permit application, that is, the Utah Power & Light permit application, is still in suspended status pending the conclusion of the comprehensive investigation of irrigation and power possibilities on the upper Colorado River and its tributaries by the Bureau of Reclamation. That recognizes that an investigation is going on.

Then it brings this idea and this problem to the front:

and a more definite determination of water allocations between the States of the upper basin.

No compact had been made between the States of the upper basin. A full recognition is given by the Power Commission to the power probblems that are involved. The power resources have already been covered in the statement I just read.

In the application of the Utah Power & Light Co. the primary power capacity of the Echo Park site is estimated at 130,000 horsepower. This based on the development of a head of 310 feet at the dam and a regulated flow of 4,000 cubic feet per second obtained by storage in the proposed Flaming Gorge Reservoir on Green River and Juniper Mountain Reservoir on Yampa River. At Blue Mountain the primary capacity is estimated at 19,000 horsepower based on the development of 210 feet of head and a regulated flow of 1,100 cubic feet per second

Ralph R. Woolley in his report on Green River and its Utilization (Water Supply Paper No. 618, United States Geological Survey), proposes the development of 114,800 horsepower, primary capacity, at the Echo Park site, based on an average head of 290 feet and a stream-flow of 4,950 cubic feet per second. At Johnson's Draw, which is his designation for the Blue Mountain site, Mr. Woolley proposes a primary capacity of 43,200 horsepower based on a regulated flow of 1,800 cubic feet per second and a head of 300 feet. Either of these estimates would justify installations of something like 300,000 horsepower at Echo Park and at least 50,000 horsepower at Blue Mountain.

It is generally recognized that the Green and Yampa Rivers present one of the most attractive fields remaining open for comprehensive and economical power development on a large scale. Power possibilities on Green River between the proposed Flaming Gorge Reservoir and Green River, Utah, and on the Yampa River below the proposed Juniper Mountain Reservoir are estimated at more than 700,000 primary horsepower, which would normally correspond to 1,500,000 to 2 million horsepower installed capacity. Excellent dam sites are available, and as the greater part of the lands remain in the public domain, a very small outlay would be required for flowage rights. The sites we are considering are important links in any general plan of development of these streams.

Regardless of the disposition which may be made of the Utah Power & Light Co.'s application, and giving due consideration to the prospect that some time may elapse before this power is needed, the Commission believes that the public interest in this major power resource is too great to permit its impairment by voluntary relinquishment of two units in the center of the scheme.

And the two units mentioned were Echo Park and Blue Mountain, which, in effect, is substantially the Split Mountain project that has been proposed in the reports made by the Department of the Interior and the Bureau of Reclamation:

The Commission will not object, however, to the creation of the monument if the proclamation contains a specific provision that power development under the provisions of the Federal Water Power Act will be permitted.

If you will remember the words of President Roosevelt's proclamation, that is almost the language that he used in referring to this particular request or statement of the Power Commission.

I now proceed to comment on this letter. First I call attention to the fact that the "two units in the center of the scheme" were Echo Park and Blue Mountain dam sites.

It is clear that the Federal Power Commission clearly rejected the request for a vacation of the power-site withdrawals, pointing out that the request had—

called for careful consideration because of the magnitude of the power resources involved and the fact that the permit application (Utah Power & Light Co.'s application for a permit) is still in suspended status pending conclusion of the comprehensive investigation of irrigation and power possibilities on the upper Colorado River and its tributaries by the Bureau of Reclamation and a more definite determination of water allocations between the States of the upper basin.

It is interesting and important to note that in this letter Mr. McNinch recognized and called attention to the fact that here was a comprehensive investigation of irrigation and power possibilities taking place on the upper Colorado River and its tributaries by the Bureau of Reclamation. The truth is that this investigation had been going on for many years, a fact which was well-known not only to the Federal Power Commission but also to the National Park Service.

It was well known also that the States of the upper basin—to wit, Colorado, New Mexico, Utah and Wyoming—had not yet entered into a compact for the allocation of the water supply which each State would get out of that portion of the Colorado River awarded to the upper basin by the 1922 Colorado River compact.

Mr. McNinch, for the Commission, further declared that this area was "one of the most attractive fields remaining open for comprehensive and economical power development on a large scale" and that sites under consideration "are important links in any general plan of development of these streams."

The reply also emphasized—

that the public interest in this major power resource is too great to permit its impairment by voluntary relinquishment of two units (Echo Park and Blue Mountain dam sites) in the center of the scheme.

I quoted the letter at this point in my discussion for the purpose of showing that the Federal Power Commission was insisting that its withdrawals in the public interest were still in good standing and that fact was recognized in December 1934 by the National Park Service. Furthermore, the validity of these withdrawals was not questioned by the National Park Service at that time, and to my knowledge has not been challenged since then. In fact, the validity was affirmed specifically in the 1938 proclamation itself. I shall discuss the proclamation and its meaning and effect later at length.

5. Another letter under date of November 6, 1935, written by the late Harold L. Ickes, Secretary of the Interior, to Chairman Frank R. McNinch, Federal Power Commission, was a 1935 follow-up along the lines taken by the National Park Service.

Mr. Ickes said, in part, in that letter (exhibit No. 4):

The Utah Power & Light Co. filed an application in January 1932 for a preliminary permit for a power site reservation in the Yampa and Green River section. This application was on file in the Denver office of the Reclamation Bureau. Recently, however, the Utah Power & Light Co. voluntarily withdrew their application. This suggests that the power resources of the section may not be as important as originally believed.

I shall appreciate receiving your opinion as to the possibility of releasing the power withdrawals that exist in the area. By such action the proposed monument would be placed in a much better position from the standpoint of administration.

In this communication no less an authority than the Secretary of the Interior recognizes that valid power-site withdrawals existed in the area of the proposed Dinosaur Monument extension. Secretary Ickes also recognized that the Federal Power Commission had jurisdiction over those extensive reserved areas by virtue of the Federal Water Power Act of 1920.

At this point I call attention to two maps, copies of which have been placed on each Member's desk.

Map A shows the location and the boundaries of the 10 power withdrawals to which I have already directed your attention. It also has indicated the boundaries of the enlarged Dinosaur National Monument.

Map B was prepared, for illustrative purposes, from map A. The withdrawals are colored black for emphasis.

The Brown's Park reclamation withdrawal—No. 1 in the list previously offered—is not shown on this map. It started at a point about 6½ miles south of the monument's north boundary and extended for approximately 20 miles up the Green River.

Interesting features of this map are the location and the relative size of the original 1915 Dinosaur Monument withdrawal as compared with the enlarged monument. The small original withdrawal of 80 acres is colored red on map B.

It will be seen that virtually the entire river area within the enlarged Dinosaur Monument is covered by the prior water and power withdrawals. In fact, the withdrawals also extend a considerable distance on either side of the river at many points.

It also should be noted that the controversial Echo Park and Split Mountain Dam sites are located on the map, both clearly within the withdrawn areas. The number and date of the withdrawals also are printed on the map. This map should be helpful in understanding the proclamation issued by President Roosevelt in 1938, increasing the size of the Dinosaur National Monument from its original 80 acres some 2,500 times to its present area of over 203,000 acres.

6. On January 6, 1936, Chairman McNinch of the Federal Power Commission, replied to Secretary Ickes. The complete text of his reply is reproduced as exhibit 6.

In the letter Mr. McNinch rejected the Interior Secretary's request to vacate the power withdrawals and quoted from his own 1934 letter the paragraph which explains why the FPC could not, in the public interest, release the reservations preserving power resources of such magnitude.

7. Although chronologically out of place, the next document (exhibit No. 5) which should be considered is the proclamation issued by President Woodrow Wilson under date of October 4, 1915, creating the Dinosaur National Monument. From it I quote the "Whereas" paragraph:

> Whereas, in section twenty-six, township four south, range twenty-three east of the Salt Lake meridian, Utah, there is located an extraordinary deposit of Dinosaurian and other gigantic reptilian remains of the Juratrias period, which are of great scientific interest and value, and it appears that the public interest would be promoted by reserving these deposits as a National Monument, together with as much land as may be needed for the protection thereof.

After using the necessary language to set this area aside as a national monument, the President makes this statement:

> While it appears that the lands embraced within this proposed reserve have heretofore been withdrawn as coal and phosphate lands, the creation of this monument will prevent the use of the lands for the purposes for which said withdrawals were made.

You will note that this proclamation makes no reference to "valid existing rights," and to my knowledge no power or reclamation withdrawals ever applied to this 80-acre area. In fact, the above language effectively rescinds mineral reservations which previously had applied to these lands. This gave the original 1915 monument a tight land reservation and no one has ever challenged it.

Back in 1915 President Wilson decided that the 80-acre land reservation was adequate to protect the "extraordinary deposits of Dinosaurian and other gigantic reptilian bones." Twenty-three years later President Roosevelt, under the prodding of Interior Secretary Ickes, decided that the protection of these bones required 203,885 acres in addition to the 80 acres originally set aside. This twenty-five-hundred-fold extension ultimately was ordered, in spite of the fact that practically all of the known deposits of bones in the original 80-acre site had been excavated and removed from the monument. The 1938 action seemd to be a case of setting aside many more acres to protect a greatly reduced number of dinosaur bones.

In my opinion, President Wilson and his advisers, in issuing the 1915 monument order, were keeping strictly within the powers of the President under the Antiquities Act. On the other hand, it is extremely doubtful that the 1938 proclamation of President Roosevelt can be sustained as a matter of law. A casual reading of the Antiquities Law of June 8, 1906, and of this latter proclamation will be sufficient to point up what I am saying. However, I am not urging that this unjustified expansion of the Dinosaur Monument be upset, because it is my view that the area in controversy can be used both for reclamation and national monument purposes, and those uses are both in the interests of the public

8. We now come to the Dinosaur National Monument expansion proclamation issued by President Franklin D. Roosevelt in July 1938, which I quote in full, except for the land description:

PROCLAMATION—JULY 14, 1938 (53 *Stat.* 2454)

ENLARGING THE DINOSAUR NATIONAL MONUMENT, COLORADO AND UTAH

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

Whereas certain public lands contiguous to the Dinosaur National Monument, established by proclamation of October 4, 1915, have situated thereon various objects of historic and scientific interest; and

Whereas it appears that it would be in the public interest to reserve such lands as an addition to the said Dinosaur National Monument;

Now, therefore, I, Franklin D. Roosevelt, President of the United States of America, under and by virtue of the authority vested in me by section 2 of the Act of June 8, 1906, chapter 3060, 34 Stat. 225 U. S. C., title 16, sec. 431), do proclaim that, subject to all valid existing rights, the following-described lands in Colorado and Utah are hereby reserved from all forms of appropriation under the public-land laws and added to and made a part of the Dinosaur National Monument:

* * * * * * *

aggregating 203,885 acres.

Warning is hereby expressly given to any unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

The reservation made by this proclamation supersedes as to any of the above-described lands affected thereby, the temporary withdrawal for classification and for other purposes made by Executive Order No. 6584 of August 12, 1931, and the Executive Order of April 17, 1926, and the Executive Order of September 8, 1933, creating Water Reserves No. 107 and No. 152.

The Director of the National Park Service, under the direction of the Secretary of the Interior, shall have the supervision, management, and control of this monument as provided in the Act of Congress entitled "An Act to establish a National Park Service, and for other purposes," approved August 25, 1916, 39 Stat. 535 (U. S. C., title 16, secs. 1 and 2), and acts supplementary thereto or amendatory thereof, except that this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920 (41 Stat. 1063), as amended, and the administration of the monument shall be subject to the Reclamation Withdrawal of Octover 17, 1904, for the Brown's Park Reservoir Site in connection with the Green River project.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the City of Washington this 14th day of July, in the year of our Lord nineteen hundred and thirty-eight, and of the Independence of the United States of America the one hundred and sixty-third.

[SEAL] FRANKLIN D. ROOSEVELT.

By the President:

CORDELL HULL,
The Secretary of State.

First, it will be noted that this proclamation was issued many years after the eleven reclamation and water and power withdrawals previously referred to were ordered by legally-constituted authorities.

In the first paragraph it will be noted how weak the case is for increasing the monument acreage some 2500 times in size, when the best the President can say is that the areas are contiguous to the Dinosaur National Monument and "have situated thereon various objects of historic and scientific interest." Contrast that statement with the specific description in the opening paragraph of the Wilson proclamation heretofore cited.

In the third paragraph, President Roosevelt makes the monument "subject to all valid existing rights." There is not the slightest doubt that officials in the Interior Department, Park Service and the Secretary of the Interior, had in mind the water and power withdrawals which I have listed and discussed previously. It will be remembered that Acting Director of the National Park Service, A. E. Demaray, made this statement in his letter of August 9, 1934, to the Federal Power Commission, in which he discussed the proposed extension of Dinosaur National Monument:

> Such an area would be established by Presidential proclamation which would exempt all existing rights, and a power withdrawal is of course an existing right.

The Park Service and Secretary Ickes did all they could to get the Federal Power Commission to cancel the power withdrawals, but failed, as the record shows. The proclamation accordingly was prepared for the signature of the President, who ordered that the expanded monument would be "subject to all valid existing rights." There is not the slightest doubt as to what rights were intended by that statement.

The President in the next to the last paragraph of the proclamation directs that the National Park Service shall have the supervision, management and control of this monument—

> except that this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920 as amended, and the administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904 of the Brown's Park Reservation site in connection with the Green River project.

Once again let me say that the National Park Service and the Secretary of the Interior's office, including those who drafted this proclamation, clearly had in mind the listed withdrawals which had been made by the Secretary of Interior and the Federal Power Commission in the area of the proposed expansion of the Dinosaur National Monument. They doubtless also had in mind that these exempted reservations were for public use, to-wit: The building of water power and reclamation projects, the latter including water and power developments in accordance with the Reclamation Act. The Reclamation Bureau is a part of the Department of Interior, and certainly no Secretary of the Interior who was on the job as vigorously as Mr. Ickes was, could have escaped knowing that the entire river area within the proposed expansion of the Dinosaur National Monument had been, and was at the time, under intense planning operations for Federal reclamation projects.

In fact, Mr. Ickes' Park Director was so advised in a letter from FPC Chairman McNinch, previously introduced as exhibit No. 3.

By incorporating those specific exemptions for water and power reservations, therefore, the Interior Department and President Roosevelt must be given credit for attempting to protect the programs which were then being worked out for the benefit of the upper basin States in order that they might put to a beneficial use the water allotted to them under the Colorado River Compact of 1922.

Also it should be remembered that the United States was a party to that compact, and the responsible officials in the Interior Department at the time knew that in order to put that water to use the upper basin States would have to have projects built under the United States reclamation laws. For that purpose, the Federal Government itself would be the responsible agent in building that project. This means that there would be no necessity for licensing of dams by the FPC in this particular area. It would be necessary for Congress to authorize the construction of such dams, which it has full authority to do, and all the talk about the restriction of FPC licensing authority under the 1921 and 1935 amendments to the Federal Water Power Act of 1920 has just been a legal smokescreen to obscure the facts.

Another phase of what would be "existing rights" in this particular instance is extremely interesting. It is no doubt well known by members of the Congress that withdrawals for reclamation projects, including water and power development, reserve public lands for the building of storage dams, reservoirs, conduits, powerplants, transmission lines, canals and all incidental facilities required or used in connection with reclamation projects.

All of these needs, of course, are equally well known to the Department of the Interior, Bureau of Reclamation, and to the National Park Service, both agencies within the Department.

With such uses in mind, it would be physically impossible for the Park Service to have the dominant interest in the Dinosaur Monument area if this water development project should be built.

That doesn't mean, however, that a program for very effective recreational use of the areas which are not inundated by the water in the reservoirs—and this would be about nine-tenths of the monument area—cannot be successfully undertaken. The reverse is true, as many competent witnesses have reported to congressional committees. In fact, plans have been made for expenditure of some $21 million to develop a great recreational area at Dinosaur Monument, which will be available for the use of all.

It is significant also that this 1938 proclamation is absolutely unique among the more than 100 national monument proclamations which my staff and I have examined. Nowhere else in the proclamations and laws pertaining to national parks and monuments have I been able to find another order which contains specific exemptions of both power and reclamation withdrawals. A few monument proclamations contain reclamation exemptions—notably to protect water supplies of the Southwest Indians—but no other monument proclamation, to my knowledge, contains a specific exemption of power withdrawals as does the Dinosaur Monument extension order of 1938.

Our staff study also disclosed that at least 12 national parks are covered by provisos inserted in legislation pertaining to them, expressly stating that the terms of the 1920 Federal Water Power Act do not apply to the lands embraced then and "in the future" in those

respective parks. Such a legislative proviso, incidentally, was written into an act of June 20, 1938 (52 Stat. 781), pertaining to Hawaii National Park, so it is apparent that the Congress in that year was familiar with the fact that valid existing public land reservations under the Federal Power Act may apply to park and monument land withdrawals, and that Congress may recognize one or the other.

9. Important and relevant to this discussion is an opinion written by Nathan R. Margold, Solicitor of the Interior Department. The opinion is dated December 5, 1939, a little over a year after President Roosevelt's proclamation expanding the Dinosaur National Monument. Mr. Margold was solicitor during most of Harold L. Ickes' term of office as Secretary of the Interior, and, specifically, he was the Department Solicitor at the time of the 1938 proclamation, enlarging the Dinosaur National Monument.

The opinion involves two questions. The first and most important is:

> May a national monument be created subject to the reclamation withdrawals and power site classifications and thereby preserve and continue the effectiveness of the withdrawals and classifications?

Since the opinion itself will point up matters under consideration here and the reasons for the decision, I will quote it in full at this point:

> DEPARTMENT OF THE INTERIOR,
> OFFICE OF THE SOLICITOR,
> *Washington, December 5, 1939.*

The Honorable the SECRETARY OF THE INTERIOR.

MY DEAR MR. SECRETARY: My opinion has been requested concerning certain legal questions arising out of the proposal to establish by proclamation the Sawtooth National Monument in Idaho. The lands involved in the proposed national monument are within the Boise, Challis, and Sawtooth National Forests. Certain of the lands have been withdrawn pursuant to section 3 of the act of June 17, 1902 (32 Stat. 388), for reclamation purposes in connection with the Boise project. In addition, certain of the lands are affected by four power-site classifications made by the Secretary of the Interior pursuant to the act of March 3, 1879 (20 Stat. 394). The questions presented for my consideration are:

1. May the national monument be created subject to the reclamation withdrawals and power-site classifications and thereby preserve and continue the effectiveness of the withdrawals and the classifications?

2. In the event that the national monument is created subject to the classifications, will the Federal Power Commission thereafter be authorized to grant licenses affecting the classified lands pursuant to the Federal Water Power Act (41 Stat. 1063), as amended?

It is my opinion that the first question must be answered in the affirmative and the second question in the negative.

The act of June 8, 1906 (34 Stat. 225), provides in part as follows:

"That the President of the United States is hereby authorized, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and may reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected * * *."

It may be seen from the foregoing statute that the sole requirement concerning the status of lands included within national monuments is that such lands be "owned or controlled by the Government of the United States." There can be no doubt that the lands here in question are so owned and controlled. There is nothing in this statute nor in any other statute with which I am familiar that would prohibit lands, otherwise appropriate, from being included in a monument subject to prior reservations and classifications of the character here involved. The practice of establishing monuments in connection with lands subject to prior reservations for other purposes is one that has existed from the very inception

of the national monument legislation. In 1908 the proclamation creating the Grand Canyon National Monument (35 Stat. 2175) provided as follows:

"The reservation made by this proclamation is not intended to prevent the use of the lands for forest purposes under the proclamation establishing the Grand Canyon National Forest, but the two reservations shall both be effective on the land withdrawn, but the national monument hereby established shall be the dominant reservation."

In the case of *Cameron* v. *United States* (252 U. S. 450), the Supreme Court of the United States approved the validity of this national monument and, in so doing, stated (p. 455):

"The tract is on the southern rim of the Grand Canyon of the Colorado, is immediately adjacent to the railroad terminal and hotel buildings used by visitors to the canyon and embraces the head of the trail over which visitors descend to and ascend from the bottom of the canyon. Formerly it was public land and open to acquisition under the public land laws. But since February 20, 1893, it has been within a public forest reserve established and continued by proclamation of the President under the acts of March 3, 1891 (c. 561, sec. 24, 26 Stat. 1095, 1103) and June 4, 1897 (c. 2, 30 Stat. 34–36) and since January 11, 1908, all but a minor part of it has been within a monument reserve established by a proclamation of the President under the act of June 8, 1906 (c. 3060, 34 Stat. 255). The forest reserve remained effective after the creation of the monument reserve, but insofar as both embraced the same land the monument reserve became the dominant one. * * * "

In the proclamation of January 13, 1908 (35 Stat. 2176), establishing the Tonto National Forest it was provided that "since the withdrawal made by this proclamation and any withdrawal heretofore made for national irrigation works are consistent, both shall be effective upon the land withdrawn, but the withdrawal for national irrigation works shall be the dominant one and may, when necessary, be changed to a withdrawal for irrigation from such works." This practice has been followed through the years to the present time. As recently as July 14, 1938, the proclamation relating to the Dinosaur National Monument provided that the administration of the monument was to be subject to a prior reclamation withdrawal.

In the light of this long and persistent practice, there can be no reasonable doubt as to the legal propriety of establishing national monuments subject to prior reservations for other purposes (see *United States* v. *Midwest Oil Company* (236 U. S. 459)).

The second question involves the authority of the Federal Power Commission pursuant to the Federal Water Power Act (41 Stat. 1063), as amended by the Federal Power Act (49 Stat. 838). It is clear that the Federal Power Commission is by statute expressly prohibited from granting licenses for power works within national monuments. Section 3 of the Federal Water Power Act, as amended by section 201 of the Federal Power Act. In my opinion of August 19, 1938 (M. 29936), I so held. It follows that if the lands affected by the power-site classifications are included in the national monument, the Federal Power Commission will be without authority to grant licenses affecting them. Any attempt to preserve this authority in the Commission by specific provision in the national monument proclamation would be ineffective since the authority of the Commission has been prescribed by Congress and cannot be extended by provisions in an executive proclamation of this character.

I am, accordingly, of the opinion that the proposed Sawtooth National Monument may be established subject to the reclamation withdrawals and power-site classifications affecting certain of the lands therein, thereby preserving and continuing the effectiveness of the withdrawals and classifications, but that the Federal Power Commission will thereafter be without authority to grant licenses pursuant to the Federal Water Power Act, as amended, relating to the lands given a national monument status.

Respectfully,

NATHAN R. MARGOLD, *Solicitor.*

Approved: December 5, 1939.

OSCAR L. CHAPMAN,
Assistant Secretary.

My first comment on this opinion is to point up the fact that Mr. Margold was in full agreement with the procedure that had been carried out in the Dinosaur Monument proclamation of 1938.

After quoting the statute under which the President of the United States would act in creating a national monument, Mr. Margold declares:

> There is nothing in this statute nor in any other statute with which I am familiar that would prohibit lands, otherwise appropriate, from being included in a monument subject to prior reservations and classifications of the character here involved. The practice of establishing monuments in connection with lands subject to prior reservations for other purposes is one that has existed from the very inception of the national monument legislation.

Several instances are cited in support of the opinion.

The second question discussed by Mr. Margold was:

> In the event that the national monument is created subject to the classifications, will the Federal Power Commission thereafter be authorized to grant licenses affecting the classified lands pursuant to the Federal Water Power Act (41 Stat. 1063), as amended?

This question is not really material to the present controversy for the reason that in the case of the area under controversy the withdrawals were all made a long time prior to the expansion of the Dinosaur National Monument.

Furthermore, there is no reason why there should be any licenses issued by the Federal Power Commission in this case. When the Echo Park and Split Mountain Dams are built, they will be constructed by the United States through the Bureau of Reclamation. No private individuals, corporations or entities are asking for FPC licenses to build these reservoirs and power facilities. The United States owns the lands; they have been reserved by proper authority.

It should be made clear that when the Federal Government is to build and operate reclamation works, including water facilities and powerplants, it does so in its sovereign capacity and is not under the necessity of going to any of its own agencies, such as the FPC, for a license to perform those functions. A mere statement of the case makes it abundantly clear that this is the correct position.

The act creating the Federal Power Commission, incidentally, not only gave the FPC power to issue permits and licenses for power resource development on public lands, but also gave it jurisdiction over public lands reserved for potential power development. I have shown that the FPC and the Bureau of Reclamation retain such jurisdiction over reserved river lands of the Dinosaur Monument, and Mr. Margold's opinion bears out my conclusion. Licensing of projects by the FPC in this area is not proposed and is not an issue in this matter.

The conclusion that must be drawn from this documentary study is that the Dinosaur Monument canyon lands, which conservationists have been mistaken in believing were in the exclusive possession of the National Park Service, actually have never been so possessed. The scenic canyons of the Green and Yampa Rivers which uninformed or misled conservationists have been praising in manifold and expensive propaganda brochures and national publications, actually have been reserved and protected all along by the Bureau of Reclamation and the Federal Power Commission and are under the jurisdiction of these agencies today. The national monument lands, reserved in that extremely limited monument proclamation of 1938, merely surround these canyons, which themselves have been reserved as a public trust for water-resource development since the early 1900's.

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Furthermore, it is obvious that if the Congress recognizes these older and well-established water resource development rights over the 17-year-old inferior monument rights of the 1938 proclamation, no precedent would be established to endanger the national park system. This is obvious, because, as I have stated, no other park or monument act or proclamation contains similar exceptions to the double exemption found in the Dinosaur Monument proclamation of 1938. These exemptions clearly establish that the rights to water resource development in this desert area have both legal and historical precedence over the greatly restricted monument land reservation.

Former Secretary of the Interior Oscar L. Chapman also reached the conclusion that no precedent was involved, after a thorough study of this matter in 1950. Following a hearing on the proposed construction of the Echo Park and Split Mountain Dams as part of the overall development of the upper Colorado River Basin, he made this significant statement in a memorandum dated July 27, 1950:

> Weighing all the evidence in thoughtful consideration, I am impelled in the interest of the greatest public good to approve the completion of the dams in question, because:
>
> (*a*) I am convinced that the plan is the most economical of water in the desert river basin and therefore in the highest public interest; and
>
> (*b*) The order establishing the extension of the monument in the canyons in which the dams would be placed contemplated use of the monument for a water project, and my action, therefore, will not provide a precedent dangerous to other reserved areas.

Similar conclusions have also been reached by the present Secretary of the Interior, Douglas McKay, and by President Eisenhower, both of whom wholeheartedly endorse the Colorado River storage project.

I hope that I have successfully dispelled the false invasion charges and myths that have been built up around the Dinosaur Monument area. It is also my sincere hope that honest conservationists and nature-lovers will study this documentary proof and conclude with me that the Federal Government's integrity in reserving desert areas for water resource development must be recognized and respected—especially when they are so recognized in a proclamation affecting a national monument.

If we do not respect such authority and such legally correct precedents for including the Echo Park and Split Mountain Dams in the eminently sound and vitally needed Colorado River storage project, then the structure of laws and precedents built up to protect the national parks and mountains, that I and most other American love and appreciate, may itself be placed in jeopardy.

In conclusion, let me remind you:

1. That the Echo Park Reservoir is second in efficiency, both in the storing and the conserving of water and in the production of electric energy, among the nine proposed storage reservoirs in the Colorado River project.

2. That Echo Park is strategically located between Denver, Colo., and Salt Lake City, Utah, the largest power consuming centers of the four-State area.

3. That Echo Park Reservoir is in the center of a group of lesser reservoirs—Flaming Gorge, Juniper, and Split Mountain—and by reason of its location and size, it improves the efficiency of these other reservoirs.

4. That the Echo Park Dam site will make deep storage of water possible, thereby cutting down drastically on evaporation losses. It is estimated that use of the Echo Park Dam site will save at least 120,000 acre-feet of water over any of the so-called alternate sites.

5. That 120,000 acre-feet of water is sufficient to supply the needs of a city the size of Denver, with its population of over 400,000 people. The total population of Utah is only approximately 750,000.

6. That the upper Colorado River States urgently need and could use beneficially at least twice the amount of water they are allocated under the Colorado compact (7,500,000 acre-feet a year).

7. That the four upper Colorado States—Colorado, New Mexico, Utah, and Wyoming—now have within their borders reservations of public lands for parks, monuments, national forests, wilderness areas, et cetera, all for the enjoyment of the people of the United States, to the extent of over 43 million acres. That is an area larger than the combined areas of all the New England States.

8. That the construction of the upper Colorado River storage project with all its units—at least a 50-year job—will be a great regional and national investment that will provide a great increase in homes, jobs, national-tax income, and individual contentment, as well as provide a second line of civil and military defense for the Nation as a whole.

This list, while impressive, does not include all the benefits that will come from a full realization of all the possibilities of the Colorado River storage project, for which I solicit the support of all Members of Congress.

Mr. Chairman, I will conclude by requesting unanimous consent that the following exhibits be made a part of the record, following my remarks:

1. Authority for withdrawals pertaining to Dinosaur National Monument area.

2. Letter to Senator Arthur V. Watkins from Chairman Jerome K. Kuykendall of the Federal Power Commission.

3. Letter of December 13, 1934, from FPC Chairman Frank McNinch to Director Caemmerer of the National Park Service.

4. Letter of November 6, 1935, from Interior Secretary Harold L. Ickes to FPC Chairman Frank R. McNinch.

5. Letter of January 9, 1936, from FPC Chairman McNinch to Secretary Ickes.

6. Proclamations of 1915 and 1938 pertaining to Dinosaur National Monument.

7. Memorandum of March 16, 1955, to Senator Arthur V. Watkins from the American Law Division of the Library of Congress.

Maps A and B, showing areas on the Green and Yampa Rivers reserved for power development prior to the 1938 extension of the Dinosaur National Monument and in effect today.

(The exhibits accompanying Senator Watkins' statement follow:)

EXHIBIT No. 1

AUTHORITY FOR PUBLIC LAND RESERVATIONS (WITHDRAWALS) APPLYING TO AREA INCLUDED WITHIN DINOSAUR NATIONAL MONUMENT, WHICH WERE IN EFFECT IN 1938 WHEN THE MONUMENT WAS EXTENDED, AND WHICH ARE IN EFFECT TODAY

WITHDRAWAL	AUTHORITY
1. Reclamation withdrawal of October 17, 1904 (ordered by Secretary of the Interior)	1. Act of June 17, 1902 (32 Stat. 388) section 3
2. Power Site Reserve No. 5, May 26, 1909 (Secretary of the Interior)	2. Temporary withdrawal made by the Secretary under the implied powers of his office. It was ratified and made permanent by Executive order of the President July 2, 1910 under authority of act of June 25, 1910 (36 Stat. 8)
3. Power Site Reserve No. 42, August 27, 1909 (Secretary of the Interior)	3. Same as in 2 above
4. Power Site Reserve No. 121, Mar. 10, 1910 (Secretary of the Interior)	4. Same as in 2 above
5. Power Site Reserve No. 721, July 11, 1919 (Secretary of the Interior)	5. Act of June 25, 1910 (36 Stat. 847) as amended by act of Aug. 2, 1912 (37 Stat. 497)
6. Power Site Reserve No. 732, Dec. 27, 1919 (Secretary of the Interior)	6. Same as in 5 above
7. Power Site Classification No. 3, May 17, 1921 (Secretary of the Interior)	7. Act of March 3, 1879 (20 Stat. 394) and act of June 10, 1920 (41 Stat. 1063)
8. Power Site Classification No. 60, Feb. 21, 1924 (Secretary of the Interior)	8. Same as in No. 7 above
9. F. P. C. Project No. 524, Aug. 4, 1924 (order issued by Federal Power Commission)	9. Act of June 10, 1920 (41 Stat. 1063) section 24
10. Power Site Classification No. 87, Feb. 14, 1925 (Secretary of the Interior)	10. Same as in No. 7 above
11. Power Site Classification No. 93, Apr. 16, 1925 (Secretary of the Interior)	11. Same as in No. 7 above

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EXHIBIT No. 2

FEDERAL POWER COMMISSION,
Washington 25.

Hon. ARTHUR V. WATKINS
United States Senate,
Washington 25, D. C.

DEAR SENATOR WATKINS: This is in furtherance to the telephone conversation of February 11 between Mr. McGuire of your office and Mr. Divine of the Commission's staff concerning the status of the lands withdrawn for power site purposes in and about the Dinosaur National Monument, Colo. and Utah.

In reply to Mr. McGuire's inquiry as to the power value of the Green and Yampa Rivers as was discussed in Chairman McNinch's letters to Director Caemmerer and Secretary Ickes dated December 13, 1934 and January 9, 1936, respectively, the situation as summed up in those communications remains substantially the same as of this date. However, whereas those letters may be interpreted to indicate that a withdrawal of lands had been effected pursuant to the filing by the Utah Power & Light Co. of an application for project No. 279, an examination of available records at this time fails to show that such a withdrawal was made.

Mr. McGuire also requested that you be advised as to: What was the status of the power withdrawals on July 14, 1938, and what is their status at this time.

In answer to that inquiry, the following power site withdrawals were in effect July 14, 1938 as to lands now within the monument boundaries and no appreciable change has been made in them since that date:

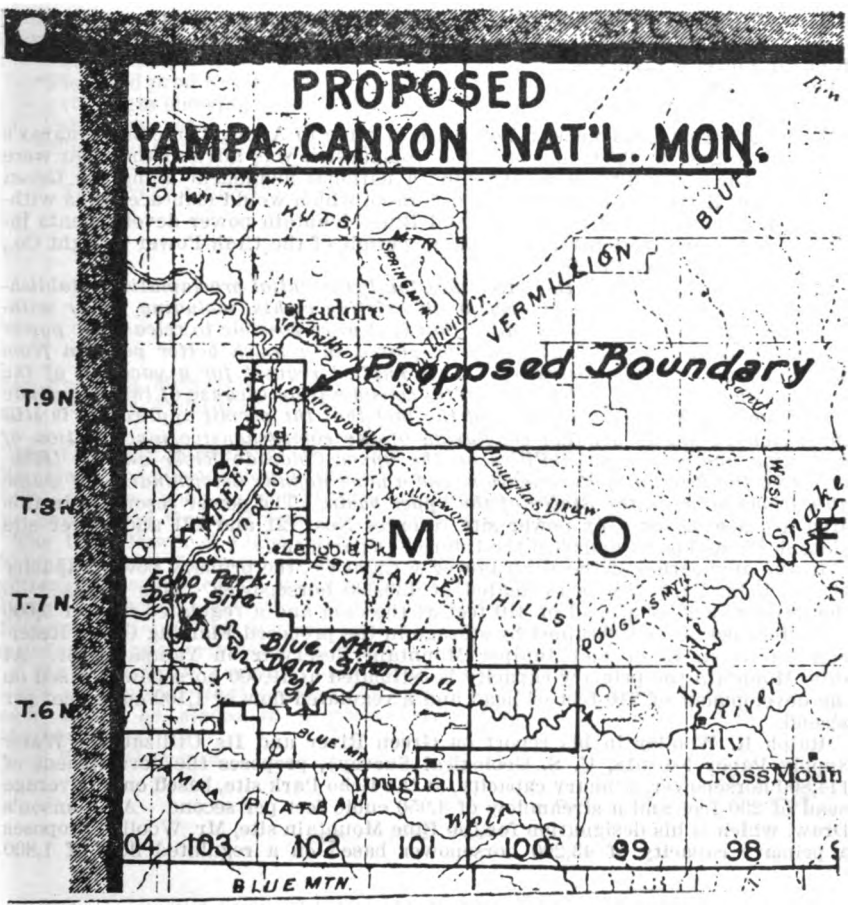
Withdrawals

	Date
Power site reserve No. 5	May 26, 1909
Power site reserve No. 42	August 27, 1909
Power site reserve No. 121	March 10, 1910
Power site reserve No. 721	July 11, 1919
Power site reserve No. 732	December 27, 1919
Power site classification No. 3	May 17, 1921
Power site classification No. 60	February 21, 1924
Power site classification No. 87	February 14, 1925
Power site classification No. 93	April 16, 1925
Federal Power Commission project No. 524	August 4, 1924

In response to the request for a sketch showing the extent of the power-site lands within the monument area, I am attaching a copy of the topographic map of the Dinosaur National Monument upon which there has been superimposed the limits of the lands covered by each of the above-cited power withdrawals.

Sincerely yours,

JEROME K. KUYKENDALL,
Chairman.



DEPARTMENT OF THE INTERIOR,
NATIONAL PARK SERVICE,
Washington, D. C., August 9, 1934.

FEDERAL POWER COMMISSION,
Washington, D. C.

GENTLEMEN: We are studying the possibility of setting aside certain lands in northwestern Colorado as a national monument. The area considered is within the watershed shown on the map marked "Exhibit H9a," which accompanied an application of January 30, 1932 of the Utah Power & Light Co. for a preliminary permit, and which is on file in the Denver office of the Reclamation Bureau. The proposed monument would be affected by the Echo Park dam site and the Blue Canyon dam site, as indicated on the enclosed map of the proposed monument.

Such an area would be established by Presidential Proclamation which would exempt all existing rights, and a power withdrawal is of course an existing right.

However, we feel that we should call this to your attention. If it is possible to release the power withdrawals that you now have in the area, our monument will be placed in a much better position from the standpoint of administration.

If you have any data or reports on this area we would appreciate very much receiving copies.

Very truly yours,

A. E. DEMARAY,
Acting Director.

EXHIBIT No. 3

FEDERAL POWER COMMISSION,
December 13, 1934.

Re Utah Power & Light Co.
The DIRECTOR,
National Park Service.

DEAR DIRECTOR CAEMMERER: Reference is made to Acting Director Demaray's letter of August 9, 1934, in which the Commission was advised that you were studying the possibility of establishing a national monument along the Green and Yampa Rivers, in northwestern Colorado, which would embrace lands withdrawn for the proposed Echo Park and Blue Mountain power developments included in the application for preliminary permit of the Utah Power & Light Co., designated as project No. 279.

Assurance was given in the letter that the Presidential proclamation establishing such a monument would exempt all existing rights, including power withdrawals, but a statement was added that if it were possible to release the power withdrawals the "monument would be placed in a much better position from the standpoint of administration." This implied request for a vacation of the power withdrawal has called for careful consideration because of the magnitude of the power resources involved and the fact that the permit application is still in suspended status pending conclusion of the comprehensive investigation of irrigation and power possibilities on the upper Colorado River and its tributaries by the Bureau of Reclamation, and a more definite determination of water allocations between the States of the upper basin. The power resources in this area are also covered by power site reserves Nos. 121 and 721 and power site classifications Nos. 87 and 93 of the Interior Department.

In the application of the Utah Power & Light Co. the primary power capacity of the Echo Park site is estimated at 130,000 horsepower. This is based on the development of a head of 310 feet at the dam and a regulated flow of 5,000 cubic feet per second obtained by storage in the proposed Flaming Gorge Reservoir on Green River and Juniper Mountain Reservoir on Yampa River. At Blue Mountain the primary capacity is estimated at 19,000 horsepower based on the development of 210 feet of head and a regulated flow of 1,100 cubic feet per second.

Ralph R. Woolley in his report on Green River and Its Utilization (Water Supply Paper No. 618, U. S. Geological Survey), proposes the development of 114,800 horsepower, primary capacity, at the Echo Park site, based on an average head of 290 feet and a streamflow of 4,950 cubic feet per second. At Johnson's Draw, which is his designation for the Blue Mountain site, Mr. Woolley proposes a primary capacity of 43,200 horsepower based on a regulated flow of 1,800

cubic feet per second and a head of 300 feet. Either of these estimates would justify installations of something like 300,000 horsepower at Echo Park and at least 50,000 horsepower at Blue Mountain.

It is generally recognized that the Green and Yampa Rivers present one of the most attractive fields remaining open for comprehensive and economical power development on a large scale. Power possibilities on Green River between the proposed Flaming Gorge Reservoir and Green River, Utah, and on the Yampa River below the proposed Juniper Mountain Reservoir are estimated at more than 700,000 primary horsepower, which would normally correspond to 1,500,000 to 2,000,000 horsepower installed capacity. *Excellent dam sites are available, and as the greater part of the lands remain in the public domain, a very small outlay would be required for flowage rights. The sites we are considering are important links in any general plan of development of these streams.*

Regardless of the disposition which may be made of the Utah Power & Light Co.'s application, and giving due consideration to the prospect that some time may elapse before this power is needed, the Commission believes that the public interest in this major power resource is too great to permit its impairment by voluntary relinquishment of two units in the center of the scheme. The Commission will not object, however, to the creation of the monument if the proclamation contains a specific provision that power development under the provisions of the Federal Water Power Act will be permitted.

I inclose a copy of the portion of the application of the Utah Power & Light Co. which describes the proposed development, and blueprints of exhibits H (a), H (b), and H (c) showing the location of the various units of the plan, river profiles, and cross-sections of the dam sites. The Commission has no special reports on the area under consideration, but if you are not already familiar with them, it is suggested that you obtain the following publications of the Geological Survey:

Water Supply Paper No. 618 (previously referred to).

"Plan and profile of Yampa River, Colo., from Green River to Morgan Gulch" (5 sheets showing river profile and topography and 1 sheet of special dam site surveys).

"Plan and profile of Green River, Green River, Utah, to Green River, Wyo." (16 sheets—10 plans and 6 profiles).

Yours very cordially,

FRANK R. MCNINCH,
Chairman.

EXHIBIT No. 4

THE SECRETARY OF THE INTERIOR,
Washington, November 6, 1935.

Hon. FRANK R. MCNINCH,
Chairman, Federal Power Commission,
Washington, D. C.

MY DEAR MR. MCNINCH: For some time the National Park Service of this Department has been studying the possibility of setting aside, as a national monument, certain lands in northwestern Colorado and northeastern Utah along the Yampa and Green Rivers. Enclosed is a map of the area.

The Utah Power & Light Co. filed an application in January 1932 for a preliminary permit for a power-site reservation in the Yampa and Green River section. This application was on file in the Denver office of the Reclamation Bureau. Recently, however, the Utah Power & Light Co. voluntarily withdrew their application. This suggests that the power resources of the section may not be as important as originally believed.

I shall appreciate receiving your opinion as to the possibility of releasing the power withdrawals that exist in the area. By such action the proposed monument would be placed in a much better position from the standpoint of administration.

Sincerely yours,

HAROLD L. ICKES,
Secretary of the Interior.

EXHIBIT No. 5

FEDERAL POWER COMMISSION,
January 9, 1936.

Re Utah Power & Light Company.

Hon. HAROLD L. ICKES,
Secretary of the Interior,
Washington, D. C.

MY DEAR MR. SECRETARY: Reference is made to your letter of November 6, 1935, in which you inquire as to the possibility of releasing the power withdrawals existing in the area along Yampa and Green Rivers, in Colorado and Utah, in which the National Park Service desires to establish a national monument.

The Utah Power & Light Company did, as you state, withdraw its application for preliminary permit covering the power sites in this area in March 1935 but this withdrawal was not based on any reduced appraisal of the power resources. The action was taken because the Commission was unwilling to carry the application any longer in suspended status, and the growth of the company's power market did not justify the construction of any of the plants within the comparatively brief period which could have been allowed under the Power Act after the issuance of a permit. Nothing has occurred to change the status of the Power Commission withdrawal, or power site reserves Nos. 121 and 721, and power site classifications Nos. 87 and 93, which are also involved.

In reply to a similar request made by the National Park Service, a letter was sent to the Director on December 13, 1934, in which the power value of Green and Yampa Rivers was discussed in some detail and the position of the Commission was summed up as follows:

"*Regardless of the disposition which may be made of the Utah Power & Light Company's application, and giving due consideration to the prospect that some time may elapse before this power is needed, the Commission believes that the public interest in this major power resource is too great to permit its impairment by voluntary relinquishment of two units in the center of the scheme. The Commission will not object, however, to the creation of the monument if the proclamation contains a specific provision that power development under the provisions of the Federal Water Power Act will be permitted.*"

Since receipt of your letter this whole subject has been given further study but no information has been developed to change the views of the Commission as expressed in the above quotation. For your further understanding of the Commission's position I inclose copies of my letter of December 13, 1934.

Yours very cordially,

FRANK R. MCNINCH, *Chairman.*

EXHIBIT No. 6

2. ESTABLISHMENT OF DINOSAUR NATIONAL MONUMENT

Dinosaur National Monument was established by Presidential proclamation, pursuant to the 1906 act, in 1915, and as originally established covered an area of 80 acres. [Italics supplied.]

"PROCLAMATION OF OCTOBER 4, 1915 (39 STAT. 1752)

"By the President of the United States of America

"A PROCLAMATION

"Whereas, in section twenty-six, township four south, range twenty-three east of the Salt Lake meridian, Utah, there is located an extraordinary deposit of Dinosaurian and other gigantic reptilian remains of the Juratrias period, which are of great scientific interest and value, and it appears that the public interest would be promoted by reserving these deposits as a National Monument, together with as much land as may be needed for the protection thereof.

"Now, therefore, I, Woodrow Wilson, President of the United States of America, by virtue of the power in me vested by Section two of the act of Congress entitled, 'An Act for the Preservation of American Antiquities', approved June

8, 1906, do hereby set aside as the Dinosaur National Monument, the unsurveyed northwest quarter of the southeast quarter and the northeast quarter of the southwest quarter of section twenty-six, township four south, range twenty-three east, Salt Lake meridian, Utah, as shown upon the diagram hereto attached and made a part of this proclamation.

"*While it appears that the lands embraced within this proposed reserve have heretofore been withdrawn as coal and phosphate lands, the creation of this monument will prevent the use of the lands for the purposes for which said withdrawals were made.* Warning is hereby expressly given to all unauthorized persons not to appropriate, excavate, injure or destroy any of the fossil remains contained within the deposits hereby reserved and declared to be a National Monument or to locate or settle upon any of the lands reserved and made a part of this monument by this proclamation.

"IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

"Done at the city of Washington, this fourth day of October, in the year of our Lord one thousand nine hundred and fifteen and the Independence of the United States the one hundred and fortieth.

"[SEAL] "WOODROW WILSON.

"By the President:
"ROBERT LANSING,
"*Secretary of State.*"

"PROCLAMATION—JULY 14, 1938 (53 STAT. 2454)

"ENLARGING THE DINOSAUR NATIONAL MONUMENT, COLORADO AND UTAH

"By the President of the United States of America

"A PROCLAMATION

"Whereas certain public lands contiguous to the Dinosaur National Monument, established by Proclamation of October 4, 1915, have situated thereon various objects of historic and scientific interest; and

"Whereas it appears that it would be in the public interest to reserve such lands as an addition to the said Dinosaur National Monument:

"Now, therefore, I, Franklin D. Roosevelt, President of the United States of America, under and by virtue of the authority vested in me by section 2 of the act of June 8, 1906, chapter 3060 (34 Stat. 225 U. S. C., title 16, Sec. 431), do proclaim that, *subject to all valid existig rights, the following-described* lands in Colorado and Utah are hereby reserved from all forms of appropriation under the public-land laws and added to and made a part of the Dinosaur National Monument:

* * * * * * *

aggregating 203,885 acres.

"Warning is hereby expressly given to any unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

"The reservation made by this proclamation supersedes as to any of the above-described lands affected thereby, the temporary withdrawal for classification and for other purposes made by *Executive Order No. 5684 of August 12, 1931,* and the Executive order of April 17, 1926, and the Executive order of September 8, 1933, *creating Water Reserves No. 107 and No. 152.*

"The Director of the National Park Service, under the direction of the Secretary of the Interior, shall have the supervision, management, and control of this monument as provided in the act of Congress entitled 'An act to establish National Park Service, and for other purposes,' approved August 25, 1916, 39 Stat. 535 (U. S. C., title 16, secs. 1 and 2), and acts supplementary thereto or amendatory thereof, *except that this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920 (41 Stat. 1063), as amended, and the administration of the monument shall be subject to the Reclamation Withdrawal of October 17, 1904, for the Brown's Park Reservoir Site in connection with the Green River project.*

"IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

"Done at the city of Washington this 14th day of July, in the year of our Lord nineteen hundred and thirty-eight, and of the Independence of the United States of America the one hundred and sixty-third.

"[SEAL] "FRANKLIN D. ROOSEVELT.
"By the President:
"CORDELL HULL
"*The Secretary of State.*"

EXHIBIT No. 7

THE LIBRARY OF CONGRESS,
Washington 25, D. C., March 16, 1955.

LEGISLATIVE REFERENCE SERVICE.

To: Senator Arthur V. Watkins. Attention: Mr. Jex.
From: American Law Division.
Subject: Dinosaur National Monument.

We regret that because of previously assigned work and the necessity to meet other deadlines, we have been unable to devote the time requisite to a complete answer to your questions. In response to the urging of Mr. Jex, we have stated below for your consideration the tentative results of our study. Preliminarily we quote and answer your questions as follows:

"1. Are the conclusions of Committee Counsel George W. Abbott (Colorado River storage project hearings * * * Committee on Interior and Insular Affairs. House * * * 83d Cong. * * * on H. R. 4449, H. R. 4443, and H. R. 4463 * * * p. 719) acceptable?" They are.

"2. Did the 1938 enlargement of Dinosaur National Monument leave the power sites subject to the Federal Power Commission's withdrawal authority?" We think it did.

"3. Under the Federal Power Act, are management and control of the power sites reserved in the Commission?" We think they are, especially in view of the *Roanoke Rapids decision, Chapman* v. *F. P. C.* ((1953) 345 U. S. 153). The turning point in that case was that Congress had not withdrawn the jurisdiction of the Federal Power Commission to issue a license (pp. 156–172). The basis for the other answers will appear in the following presentation.

The act of March 3, 1921 (41 Stat. 1353–1354) provided:

"That hereafter no permit, license, lease, or authorization for dams, conduits, reservoirs, powerhouses, transmission lines, or other works for storage or carriage of water, or for the development, transmission, or utilization of power, *within the limits as now constituted* of any national park or national monument shall be granted or made without specific authority of Congress, and so much of the act of Congress approved June 10, 1920, entitled 'An Act to create a Federal Power Commission; to provide for the improvement of navigation; the development of water power; the use of public lands in relation thereto; and to repeal section 18 of the River and Harbor Appropriation Act, approved August 8, 1917, and for other puposes,' approved June 10, 1920, *as authorizes licensing such uses of existing national parks and national monuments by the Federal Power Commission is hereby repealed.*"

The import of the words of this act, insofar as Dinosaur National Monument is concerned, is that it was to apply to existing national (parks and) monuments within their limits as then constituted. Dinosaur National Monument, as it then existed under the proclamation of October 4, 1915, consisted of, and was limited to, 80 acres. That is the area taken from the possible jurisdiction of the Federal Power Commission. This interpretation coincides with the codified versions later appearing in the United States Code.

The 1934 edition of The Code of * * * the United States * * * as published by the Government Printing Office carries a codification of the statute in the following language (U. S. C. 16: 797):

"*Provided further*, That after March 3, 1921, no permit, license, lease, or authorization for dams, conduits, reservoirs, powerhouses, transmission lines, or other works for storage or carriage of water, or for the development, transmission, or utilization of power, within the limits as constituted, March 3, 1921, of any national park or national monument shall be granted or made without specific authority of Congress:"

This same wording appears in the 1925 Code of * * * the United States * * * (44 Stat. pt. 1) and in the note United States Code Annotated 16: 797. While the

act of March 3, 1921, has some bearing as an indication of congressional policy at that time, we perceive of no present applicability to the monument in dispute. Its present status appears to be that of a dangling provision of law specifically saved from repeal by the proviso of section 212 of the amended Federal Power Act of August 26, 1935 (49 Stat. 847). See hearings * * * page 729. This points up and narrows we believe the conclusion on page 730 by Mr. Abbott. It indicates that the act was limited to parks and monuments "*as constituted*" on March 3, 1921.

We do not know the relative standing of the present Dinosaur National Monument area among the great scenic regions of the earth and we do not intend to assume a position bearing on the merits of conservation or reservation in this instance. We do know that the area is still Dinosaur National Monument. It is neither Echo Park National Park nor is it Echo Park National Monument.

The standard established by Congress for the establishment of a national monument is "the smallest area compatible with the proper care and management of the objects to be protected." This was 80 acres under the proclamation of October 4, 1915, and it apparently sufficed for nearly 23 years for the protection of "an extraordinary deposite of Dinosaurian and other gigantic reptilian remains of the Juratrias period." As an existing national monument on March 3, 1921, its area was withdrawn from the jurisdiction of the Federal Power Commission with the 890-acre limits as then constituted. When the reservationists sought enlargement of the monument, there was unyielding opposition by the Federal Power Commission to the inclusion of certain dam sites, and an agreement was reached or at least an arrangement made, which obviously was intended to reserve the sites or at least the authority of the Federal Power Commission with respect to power sites. The new boundaries of the monument were otherwise described by sections, surveyed and unsurveyed.

It is to be presumed that the President did not intend a nugatory act when he included in the proclamation of July 14, 1938 (53 Stat. 2454) the exception "that this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920 (41 Stat. 1063), as amended, and the administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904, for Brown's Park Reservoir site in connection with the Green River project." As a matter of hindsight, perhaps it would have been preferable to designate specifically the power site reserves. However, it is our understanding, after perusing the hearings and materials submitted, that there were a number of favorable sites and variant possibilities for locations, and therefore the exception was made in general language by reference to the Federal Power Act.

We have presumed that the President did not intend a nugatory act. Courts frequently have indulged in such a presumption with respect to legislative and other acts. A court is not always confined to the statutory written word. Construction is sometimes to be exercised as well as interpretation. *U. S.* v. *Fareholt* ((1907) 206 U. S. 226, 229). In dealing with Congress, judges are not to be curious in nomenclature if Congress has made its will plain, nor allow substantive rights to be impaired under the name of procedure. *Atlantic Coast Line R. Co.* v. *Burnette* ((1915) 239 U. S. 199, 201). Every legislative enactment is to be given effect if possible (ut res magis valeat quam pereat), "that the thing may rather have effect than be destroyed." *Unity* v. *Burrage* ((1880) 103 U. S. 447, 457). Even where the construction of a deed is doubtful, courts will always prefer that which will confirm to that which will destroy any bona fide transaction. *Griffith* v. *Bogert* ((1855) 18 How. 158, 163). It would be harsh indeed, and not consonant with accepted practice, to hold that an administrative act, having standing similar to a legislative act, was not entitled to the same considerations in its interpretation or construction as a legislative or even private act.

We indicated earlier that under section 2 of the act of June 8, 1906 (34 Stat. 225; U. S. C. 16:431) the President is authorized, "in his discretion" to reserve as national monuments "parcels of lands, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected." It is our understanding that the President also is authorized to reduce the area of a national monument. Op. Sol. July 21, 1947, M-34978 (60 I. D. 9-10). If this is so, can he not establish or enlarge a monument subject to limitations or reservations? We think he can.

We do not know the extent, number or the exact status of the power site reserves within the extended boundaries of Dinosaur National Monument. We assume that they come within the purview of section 24 of the Federal Power Act (U. S. C. 16: 818) and remain reserved under the jurisdiction of the Federal Power Commission until otherwise disposed of by the Commission or by Congress. Indeed it has been held by the Interior Department that the language of the Federal Power Act is clear and decisive. "Under the first sentence of section 24 the mere filing of an application for water-power privileges operates automatically to withdraw water-power sites from entry, location, or disposal under other laws 'until otherwise directed by the commission or by Congress.' It is clear beyond question that the jurisdiction of this department over any lands of the United States included in any proposed project under the provisions of said act automatically terminates upon the filing of an application therefor with the Federal Power Commission, and this department has no further control of the lands until and unless jurisdiction is restored by the commission or by Congress." Nevada Irrigation District (on rehearing) (June 4, 1908) 52 L. D. 377, 378.

In view of the nonapplicability of the act of March 3, 1921 and the reservations existing at the time of the amendment of the Federal Power Act of August 26, 1935 (see the letters of the Chairman, Federal Power Commission dated December 13, 1934, and January 9, 1936, * * * (Hearings * * * pp. 728 and 731) we do not see how these sites could have been included in Dinosaur National Monument on July 14, 1938 except either by a release by the Commission or by an act of Congress. We have found neither.

It is true that the definition of "reservation," as enacted in section 201 of the Federal Power Act of August 26, 1935 (49 Stat. 838; U. S. C. 16: 796(2) excluded national monuments and reservations. The provision was explained as follows:

* * * The definition of the former term ("reservations") has been amended to exclude national parks and monuments. Under an amendment to the act passed in 1921, the Commission has no authority to issue licenses in national parks or national monuments. The purpose of this change in the definition of "reservations" is to remove from the act all suggestion of authority for granting of such licenses * * * (H. Rept. 1318, 74th Cong., p. 22)."

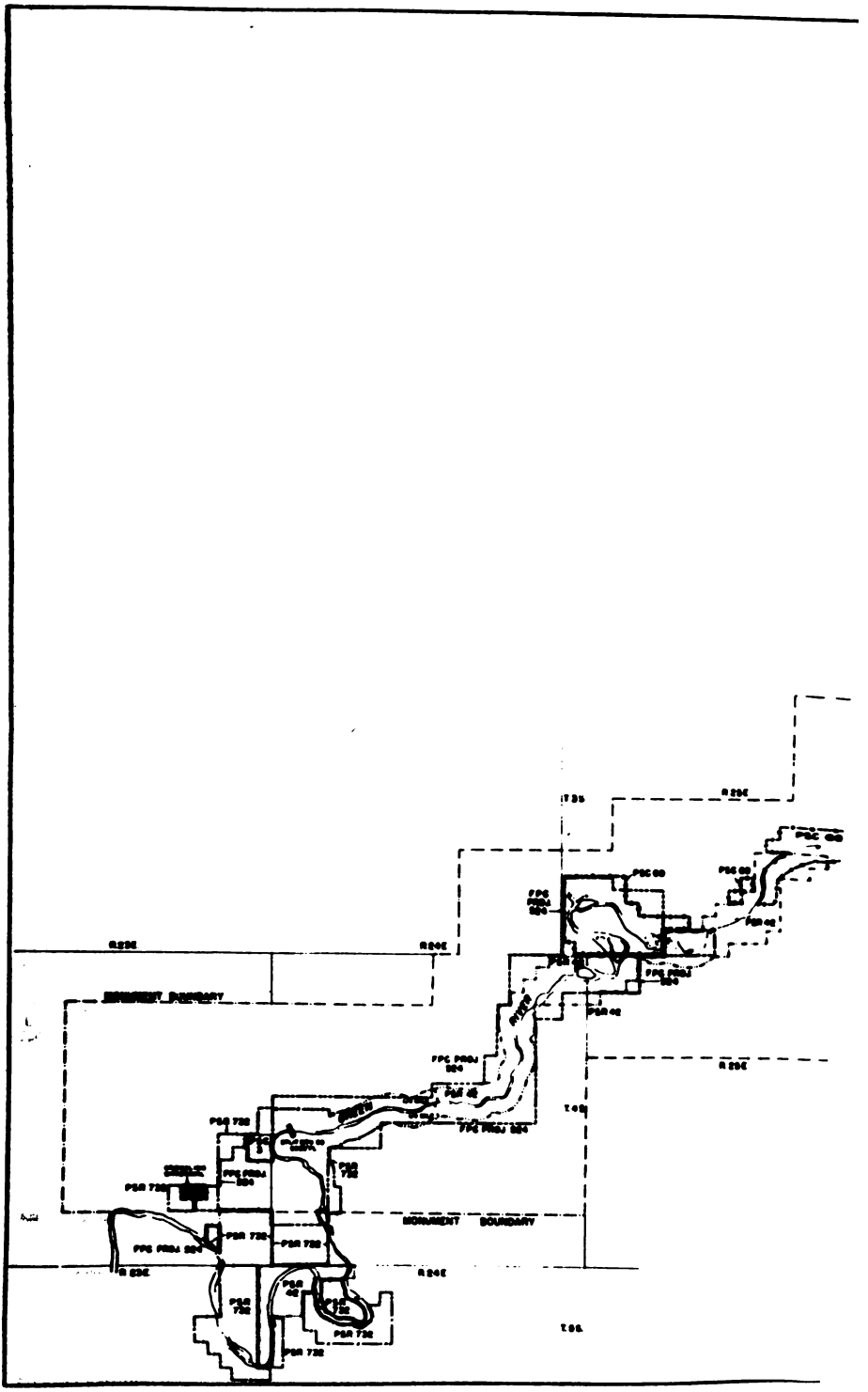
However, we have already shown that the power sites were not, indeed could not be, included in the Dinosaur National Monument, and there is nothing in this definition which changes that status.

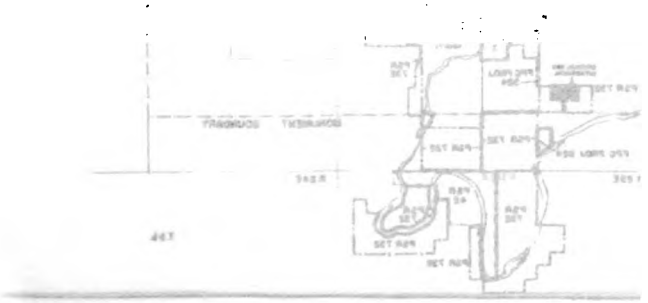
FRANK B. HORNE,
American Law Division.

MARCH 17, 1955.

Mr. ASPINALL. The committee will now stand adjourned until tomorrow morning at 10, at which time the opponents of the legislation will give their testimony.

(Thereupon, at 5: 30 p. m., the subcommittee was recessed, to reconvene at 10 a. m., Thursday, March 17, 1955.)





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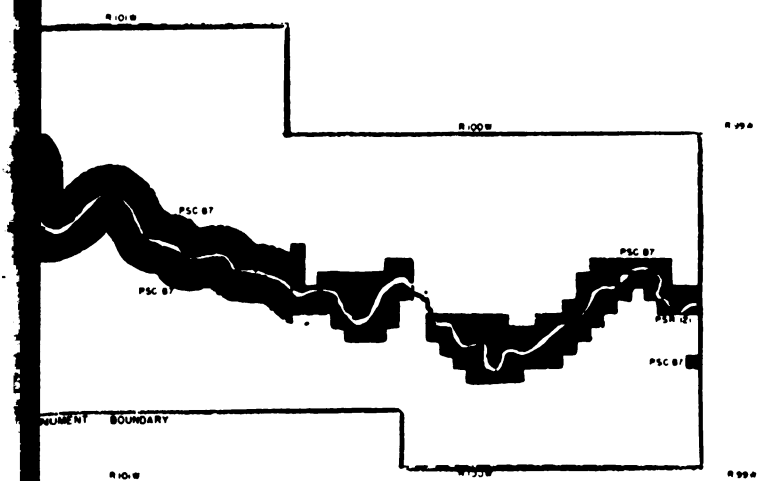
LANDS WITHDRAWN FOR POWER PURPOSES WITHIN DINOSAUR NATIONAL MONUMENT COLORADO - UTAH

POWER SITE WITHDRAWALS	DATE OF APPROVAL
RESERVE No 5	MAY 26, 1909
" 42	AUG 27, 1909
" 121	MAR 10, 1910
" 721	JULY 11, 1919
732	DEC 27, 1919
CLASSIFICATION No 3	MAY 17, 1921
" 60	FEB 21, 1924
" 87	FEB 14, 1925
" 93	APR 16, 1925
F P C PROJECT No 524	AUG 4, 1926



FEDERAL POWER COMMISSION
MARCH 9, 1955

COLORADO RIVER STORAGE PROJECT

TUESDAY, MARCH 17, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:05 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for the further consideration of the legislation having to do with the authorization of the upper Colorado River storage development program.

The Chair wishes to state we have now had the testimony from those who advocate the passage of the legislation. We have used almost 12 hours in the presentation of the statements and in the cross-examination. It will be the purpose of the Chair to see that the opponents, who begin to place their testimony on record this morning, have a like time.

The Chair wishes to thank those who appeared before the subcommittee in support of the program on the manner in which they presented their evidence and took care of cross-examination. He wishes to thank the members of the committee also for their cooperation and ask of the committee the same cooperation, and of the witnesses, the same dispatch in the presentation of their testimony as we have had heretofore.

This morning we shall hear from three witnesses: Gen. U. S. Grant III, representing the American Planning and Civic Association; former Gov. Leslie A. Miller, of Wyoming; and David Brower, representing the Sierra Club of California. It is the Chair's wish that the three witnesses be permitted to make their statements as they see fit, and then to appear together before the committee for for questioning. Is there any objection to this procedure?

Hearing none, it so ordered.

At this time the Chair is pleased to welcome to the witness stand Gen. U. S. Grant III, who has appeared before this committee many times and whose interest in conservation and other matters in the welfare of the country is well known. General Grant, you are a most welcome witness.

STATEMENT OF GEN. U. S. GRANT III, REPRESENTING AMERICAN PLANNING AND CIVIC ASSOCIATION

General GRANT. Thank you, Mr. Chairman. We appreciate very much your giving us this opportunity to lay before you a few facts which we think should convince the committee of the inadvisability of authorizing the construction of the Echo Park Dam.

I think it would save the committee's time if I read my prepared statement. Also there are some corrections I find that have to be made as we go along. It was gotten out in a good deal of a hurry.

Our association would favor a sound and economically justified storage program for the upper Colorado Basin, but is opposed to inclusion of the Echo Park Dam because it will be a violation of a wise policy enunciated in the National Park Service Act of 1916, confirmed in the 1935 amendment to the Federal Power Act, and heretofore observed for 38 years; because it will destroy unique and inspiring natural scenery that can never be recovered, as well as rare recreational values; and finally because such a violation of the established policy can only be used as a precedent on which to secure permission for other similar encroachments on the national park system in the future.

We submit that the arguments for the necessity of this dam are specious, based on erroneous assumptions and analysis of the facts, and therefore misleading. For the sake of emphasis, permit me to again reiterate that we concur in the President's request that—

> the Congress approve the development of the upper Colorado River Basin to conserve and assure better use of precious water essential to the future of the West.

The wise policy heretofore followed should not be violated now.

The National Park Service Act of 1916 provides:

> The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations * * * by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which is to conserve the scenery and natural and historic objects and the wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

In view of the quantity of words that have been expended in pointing out that the Dinosaur Monument is not a national park—as if that made any difference—I may be pardoned for stopping to emphasize that the law, which your predecessors in Congress so wisely passed in 1916, specifically includes national monuments.

This policy was confirmed in 1935 by amendment to the Federal Power Commission Act of 1921, which provided that the "reservations" in which the Commission might grant permits for power developments "shall not include national monuments or national parks." Surely, it is contrary to sound public policy to permit a Bureau of the Federal Government to destroy a part of the Nation's heritage, which is denied private enterprise, on the basis of specious arguments and unjustified analyses of the facts.

It has been erroneously alleged that the Executive order enlarging Dinosaur National Monument itself contemplated permission for dams in the monument. This is obviously an erroneous statement contrary to fact: The Executive order excepted only the Brown's Park site, on

which filing had already been made, which could not be ignored without condemnation. This site is far in the north end of the monument and would not have done material damage to the canyons lower downstream if it had been found advantageous for development. With this one exception, not now contemplated for use, the order explicitly puts the monument under protection of the Federal Power Commission Act which, as already shown, prohibits any dams in the national monuments. The view that the Executive order did not imply authorization of any other dams in the monument was confirmed by the Secretary of the Interior a year ago in conversation with a number of the objectors to the Echo Park Dam.

A precedent is a fact, not a theory.

Authorization of the Echo Park Dam by Congress in violation of the policy so wisely established in 1916 and heretofore enforced will be a precedent, whatever may hopefully be said to the contrary. You know and I know that there are similar projects proposed for the invasion of Glacier National Park, Yellowstone National Park, the Grand Canyon National Monument and Park, Mammoth Cave, et cetera, and the arguments for these others are very similar to those for the Echo Park Dam. We beseech you to stand firm on the established policy and eliminate the Echo Park Dam from this legislation, lest you start the despoiling and destruction of the few natural wonders and wilderness areas that have been earmarked for preservation.

Our growing population and constantly increasing leisure time point the need for more such areas; manifestly none of the few that have been preserved can be spared. The insistence of the Bureau of Reclamation upon the necessity for this dam, in the face of facts to the contrary and the manifest nationwide opposition, is obvious evidence of the Bureau's recognition of it as an entering wedge.

The Dinosaur National Monument is a unique and awe-inspiring natural wonder.

Those competent to judge are of the opinion that the canyons of the Green and Yampa Rivers, which it is now proposed to flood to the top of their vertical walls, are one of nature's most impressive wonders and afford unique recreational opportunities not found elsewhere, that is, relatively safe boating on torrential streams with intermittent quiet pools and camp sites in wild and natural surroundings. An appreciation of the value of such surroundings from an article by Paul Brooks in the June 1954 Atlantic Monthly may be quoted:

> As our packs became lighter * * * our load of gratitude grew heavier to those who have fought, and are still fighting, to preserve the area from despoilation; who recognize other values than the market values of fur, wood, iron ore, and electric power * * *. The successful battle to preserve a remnant of our wilderness is the surest evidence that we are becoming civilized.

I will not labor the subject further. There are still too many who know the price of everything but the value of nothing.

Under Secretary Tudor's statement to your committee last year that to him it was a question of "a choice between altering this scenery without destroying it, or the irreparable loss of enough water to supply all the needs of a city the size of Denver" was an astonishing misconstruction of the facts. He might as well have said that by cutting off the tails of his full dress coat it would be changed but not destroyed. And as for the irreparable loss of water, this is hardly in accord with

the facts, as I shall show. Even if it were, it is insubstantial. I refer also to the testimony of Dr. Richard C. Bradley, research associate in physics at Cornell University, before the Senate committee 2 weeks ago.

There are alternative dam sites, so that the upper Colorado Basin can have its water and its Dinosaur National Monument too.

At the Secretary of the Interior's hearing on April 3, 1950, and again in my memorandum to him in August 1951, I showed that alternative dams had been reported on by the Bureau of Reclamation, which would give more storage capacity and more power at less construction cost than the Echo Park and Split Mountain Dams. At your committee's hearing last year I showed a system of dams that would give 2,360,000 acre-feet more storage and only 50,000 kilowatts less installed power than the three recommended by the Department of the Interior at that time, at a cost of $54,641,000 less (using the available cost estimates of the Bureau), and with an added evaporation loss more than compensated for by the greater amount of water that would be stored.

The legislation now before you contemplates a selection of dams for initial construction, but indicates the intention of Congress to proceed with the program in the future. Now I must eliminate the last part of that paragraph, sir, because I had expected to be able to present to you two tables that would simply show the facts as reported by the Bureau in regard to these different dams economically, and what they would produce, and the changes in those facts that have gone along. I only got a good start on those two tables, and I was unable to finish them before the hearing.

It is pertinent that the Bureau has not challenged these figures in the past, but has merely stated that no alternative sites are practicable, although those I used were all covered by its 1950 report. One of the Bureau's representatives has, indeed, in the early days of this hearing, acknowledged that the Dewey site was a practicable alternative for Echo Park except for the illusory evaporation loss, and Mr. Tudor did consider a higher Glen Canyon dam as a possible alternative, but for the evaporation loss which subsequent check on the calculation he found was only 25,000 acre-feet per annum.

On page 15 of the regional director's report of December 1950 he states that of the 134 possible dam sites studied, "100 * * * are located in the upper drainage basin." Certainly with this rich field of possibilities there are alternatives that would do the job. If the Echo Park site did not exist, certainly even the Bureau would not maintain that a way to store water for the upper basin users could not be found.

Obviously, it is the prerogative and duty of the Bureau of Reclamation to find the proper solution of the upper basin's problems, and it should be required to do so without the Echo Park Dam. With the limited and constantly changing data of the Bureau's reports only and lacking the facilities of a large engineer office, it is manifestly impracticable for me to solve the intricate problem on which the Bureau has already spent many years with all the resources Congress has provided for it. My contribution is necessarily limited to showing that from its own studies such alternatives, even favorable alternatives, do exist. But the Bureau only answers with specious arguments and often erroneous alleged facts. It just must have the Echo Park Dam and get a foothold in the national parks and monuments.

It is relevant that Mr. Tudor not only found the alleged facts a: evaporation from the high Glen Canyon Dam to be grossly in err but in his article in the Saturday Evening Post last November points out three other cases in which he found its figures grossly i accurate: (1) Estimates of cost and benefits to the United States the Anchorage hydroelectric power project; (2) the appraisal of tl Arizona power lines; and (3) the "indefensible write-off," as he cal it, in the Grand Coulee power rates. Manifestly, the Bureau's argu ments for the Echo Park Dam should be accepted only with due cau tion and after check by someone or agency not possessed of the urge to break into the national park system.

Chameleon-like Glen Canyon Dam, wheelhorse of the power program, is interesting.

As the only proposed dam that will generate power at a cost (4.7 mills per kilowatt-hour) which will give a substantial profit when sold at 6 mills, the Glen Canyon Dam is the one that, according to the Bureau's computation, will pay for the whole project. Its story is interesting and pertinent, and was related in sufficient detail by Mr. David Brower to the Senate Committee 2 weeks ago. I need only point out some of the highlights.

In the hearings in 1924 before the House Committee on Irrigation, 68th Congress, 1st session, Mr. F. E. Weymouth, Chief Engineer of the Reclamation Service, testified that—the word "the" should be changed to "a." In other words, the site he looked at was not exactly where the site recommended now happens to be—testified that a Glen Canyon site had foundation conditions that would not support more than 20 tons per square foot and would not be safe for a very high dam.

Nevertheless, in House Document 419 on the Colorado River a Glen Canyon dam 725 feet above the rock foundations was considered but, according to Mr. Jacobson, "that was a preliminary report that didn't mean anything." In the 1950 report a dam 70 feet was proposed, and foundation conditions were asserted to be "favorable for a high concrete dam." Again in January 1954 before the House Committee on Irrigation a 735-foot dam was objected to by the Bureau's representatives only on the basis of its flooding with back-water the Rainbow Bridge Monument and the increased evaporation. The Secretary of the Interior has promised adequate measures to protect Rainbow Bridge Monument, and the evaporation at first alleged to be 165,000 acre-feet annually for a 750-foot dam was corrected by Mr. Tudor to be only 25,000 acre-feet, a negligible amount in view of the inaccuracies and likely errors in assumptions made in the computation. Computations on the same basic data showed that for a 735-foot dam there would be practically no added evaporation.

More recently question has again been raised as to the adequacy of the bedrock to carry a high dam with a high head of water behind it. I believe a letter from the Secretary of the Interior on the subject is in the record. At the Senate committee hearing 2 weeks ago, the Bureau's representative confidently averred that the rock would sustain a 700-foot dam, but not a dam any higher.

This story of rather unusual changes of opinion and chameleon-like adjustment to circumstances should raise a doubt as to whether the Bureau really knows that the character of the bedrock is such as

to carry the sort of dam it has recommended. While I do not doubt that no dam will be built there unless thorough investigation shows it can safely be done, I submit that no authority should be given for the expenditure of $421,270,000, the latest estimate, until the practicability of the structure is determined, as the cost cannot be accurately estimated until the foundation treatment is decided upon. Moreover, the structure—a dam perhaps 200 feet high—to protect the Rainbow Bridge Monument should be at least tentatively designed and the cost added, which has not as yet been done.

If the Glen Canyon Dam is found impracticable, the whole program for the upper Colorado River Basin will have to be restudied, as it is the power profitmaking element as well as the chief water-storage reservoir for river regulation of the upper basin. If a 735-foot dam is found practicable, it will supplant the storage that might be afforded by the Echo Park Dam with no increase loss by evaporation, and will furnish the power at much less cost than it could be got from the Echo Park Dam. Even if only a 700-foot dam is practicable, it will make the Echo Park Dam unnecessary, because its capacity will be, according to the Bureau's estimates, 3 million acre-feet in excess of that actually required for river regulation and in exceptionally wet years excess water can be passed on to Lake Mead's over 9 million acre-foot capacity reserved for flood control—evidently, if the river is regulated, Mr. Chairman, above, the flood-control capacity of Lake Mead will not be required; so that there is a storage capacity already existing there of 9 million acre-feet which might be available to take care of any little supercharge to the Glen Canyon Dam in very wet years—taking due credit for the water furnished from the upper basin to the lower.

The excess evaporation argument has itself evaporated.

When I first proposed alternative dam sites for the Echo Park Dam, it was alleged that their use would result in the loss by evaporation of 350,000 acre-feet more water each year. On showing the error and wrong assumption on which this figure was based, it was acknowledged in Mr. Tudor's statement last year that the loss would be only about 100,000 acre-feet. Then in connection with the raising of the Glen Canyon Dam as an alternative, which Mr. Tudor himself suggested, it was alleged that the loss there would be 165,000 acre-feet—691,000 minus the amount that would be lost from the reservoir with a 700-foot dam or 526,000 acre-feet minus the loss saved by not having the Echo Park and Split Mountain Reservoirs or 95,000 acre-feet—that was given as 165,000, but if your arithmetic is good, you will see it is only 75,000. So Mr. Tudor corrected this to 75,000 acre-feet with improved arithmetic; and later, on checking the Bureau's figures, he made another correction to 25,000 acre-feet. It must be admitted that this series of corrections might shake an unprejudiced observer's confidence in the Bureau's figures when a case is to be made for the Echo Park Dam.

I hesitate to take your time to go over again the intricacies of evaporation estimates, the uncertainties of such estimates at best, and the dangers of faulty arithmetic when applied to so important a subject. I limit myself for the sake of brevity to pointing out (1) that, assuming the Bureau used the best available data, and I am sure they did, their whole computation was based on pan observations at six stations located at considerable distances from the dam sites; (2) that

the Bureau apparently used a coefficient of 105, rather than one ranging from 75 to 95 used by the Geological Survey; (3) that air temperatures, prevalence of wind and wind directions were pretty much assumed, whereas it is common knowledge that these change greatly with the lay of the land and water; (4) that water temperatures were also assumed, at best an educated guess; and finally (5) that a mistake of 1 mile in the assumed wind velocity, or of 1½° Fahrenheit in the average water temperature, may each give an error of 10 percent in the results, and the probable error in the computation of any one unit may be as high as 25 percent.

Evidently the Secretary of the Interior was quite right when, in his press release of August 6, 1950, he spoke of this subject as a "comparatively little known but important phase of water-resources development" and that "the Bureau of Reclamation must know exactly what losses are likely to occur before they take a dam past the investigation stage." Evidently, they do not really know in these cases and have been perhaps a bit hampered in their assumptions and figuring by the obsession to justify the Echo Park Dam. Since 1950 much progress has been made in regard to the problem by the experiments at Lake Hefner and the records and analyses at Lake Mead; but while these afford good basic data in regard to existing lakes, they do not afford much basic help in forecasting the evaporation on nonexisting lakes. Anyway, the Bureau still sticks to its pre-1950 evaporation computations.

As a source of cheap electric power Echo Park Reservoir will prove a flop.

It is recognized in the 1950 report of the Bureau of Reclamation that Echo Park Reservoir will play but a negligible part in river regulation and irrigation, the demands for irrigation water for central Utah having originally been the part of the Flaming Gorge Reservoir (p. 6 of the regional director's report), and it was included in the first phase of construction. From it the water needed in central Utah could flow by gravity. However, for better justification of the Echo Park Dam, the latest recommendations of the Bureau have eliminated the Flaming Gorge Dam and proposed the supplying of Utah's water needs from the Echo Park Reservoir by pumping at added expense. The only technical argument for this is—the only one that I have been able to find—that the waters of the Green River may become so charged with salts from waters used in irrigation to the north that a mixture of fresh water from the Yampa River may be needed to freshen them up for reuse in Utah. Under the upper-basin compact 5 million acre-feet per decade of Yampa River water have been reserved for Utah. However, should such an eventuality occur—for the present it is entirely speculative—the Yampa River water to this amount could be pumped from the Cross Mountain Dam, or gathered behind a relatively low dam downstream and outside the Dinosaur National Monument.

With its 6,460,000 acre-feet storage capacity, the Echo Park Reservoir would play a part in river regulation by carrying over water stored in years of heavy runoff, but together the Flaming Gorge and Cross Mountain Reservoirs with aggregate capacity of 9,140,000 acre-feet could contribute more to the regulation of the same rivers, and alternative dams on other tributaries could play an equal part in the

overall regulation and provide a better distribution of water for consumptive use. Besides, the Glen Canyon Dam affords the capacity needed for river regulation at Lee Ferry anyway.

It has been alleged that the Echo Park Dam is needed for its electric power potential, that without it the power needs of the area cannot be met and the costs of the whole program cannot be justified. This is just another specious argument. The Bureau computes the cost of producing power at 5.9 to 6.0 mills per kilowatt-hour, the Federal Power Commission at 6.0 to 6.19 mills. If sold at 6.0 mills it does not appear that it will produce much revenue to help the irrigation projects, and it seems likely that it too will have to be subsidized by the profits of Glen Canyon power. Moreover, and the people of the interested States should note this, power at 6 mills at the plant bus bars is not cheap power. By the time it gets to the consumers it will approximate the present market price of steam power. Your committee may profitably compare this 6-mill power plus the cost of handling and distribution by private companies plus the legitimate profits, all included in the ultimate cost to the consumers, plus the subsidy paid by us taxpayers at large, with the cost of power from Lake Mead, which I understand is produced for a little over 2 mills.

In his statement to your committee last year Mr. Tudor said:

> The power loss could be replaced by steam power at some increased cost.

In the 1950 report of the Bureau, page 73, it was said that—

> by 1980 estimated energy requirements would greatly exceed the output of all production facilities;

and again—

> fuel generating plants may be desirable to supplement hydroelectric plants of the Colorado River project, particularly when the project output is reduced through upstream depletion. Energy for construction of some of the storage project features may be obtained from fuel-electric plants.

So the Bureau and the Department have both recognized the probable resort to steam plants to some extent anyway.

I submit that the economic possibilities of steam power as the primary source, and relegation of hydropower to incidental occasions when it is economical, merits your committee's very serious and favorable consideration. Far from being more expensive, steam power could be produced in this area for less than the hydropower at every point except Glen Canyon, provided of course that it be from sizeable modern-type plants. A careful analysis by an entirely qualified engineer, presented at the recent Senate committee hearing by Mr. David Brower, shows that it would not cost more than 4.9 mills per kilowatt-hour. Such an installation would cost very much less than the cost of the hydropower facilities proposed by the Bureau, would be more dependable, and the profits would be available to amortize the cost of the overall program and to subsidize the irrigation projects much sooner. Mr. Brower's estimate of the savings in 44 years amounts to $147 million—a sum of substantial interest to the nation at large.

It is noteworthy that the excess storage capacity proposed by the Bureau over what is necessary for river regulation and for consumptive use is manifestly desired to give the higher head at each dam required solely for power production; hence higher dams and much more expensive dams. If the Bureau is going to have to build steam powerplants anyway, I submit it would be wise to consider starting

with adequate steam powerplants, reduce the dams to their proper storage function, and thus lower greatly the first cost and the cost of operation, provide employment for the mines and miners for years to come, and have a project that can meet future consumer needs by normal additions as required.

It would seem that the sensible and economic solution of the upper basin's problems would be construction of the Glen Canyon Dam only, of such other dams for storage of water only for the irrigation projects you decide upon as worthy, and 1, 2 or 3 steam powerplants successively as the market requires, to provide for and subsidize the irrigation projects, and finally save the Treasury many millions of dollars.

As a whole the proposed program is not economically justified.

It is not for me to present the analysis of the cost of the irrigation projects to the taxpayers. I came into this rather contentious subject to do my bit in preventing the destruction of a very valuable and unique part of the Nation's heritage by the construction of the Echo Park and Split Mountain dams in a national monument, and the consequent violation of the wise policy established by law to protect the all too small national park system. Consideration of the construction features of the program showed me conclusively that the said dams are unnecessary, that is, the Echo Park and Split Mountain dams, that the economic justification is faulty, that the arguments advanced for these two dams are more imaginative than sound, and that the illusory will-o'-the-wisp of hydroelectric power has led the Bureau to recommend an outrageously expensive and unnecessarily high cost program. The report of the two Government agencies most competent to judge (the Chief of Engineers and the Federal Power Commission), while careful to refrain from criticism of their sister agency, substantiate this view. As a citizen and taxpayer I have felt constrained to put before you as clearly as I could the facts as they are evident from the Bureau's own reports.

With the heartfelt desire to see provision made for the development and greater prosperity of the upper Colorado Basin States, I have ventured to suggest alternative solutions that would accomplish this without destruction of a great national monument or an invasion of the national park system, or an unjustified raid on the Treasury.

Mr. Brower will show you, I believe he should convince you, of the economic advantages of eliminating the hydroelectric power element, its relative unimportance to the upper basin States (keeping in mind the special advantages of meeting the power needs with steam generated power), and the depth of the illusion in proposing it in a region where it will be so expensive. May I add, that the problem is not one involving technical engineering, as to that I have had to accept the technical conclusions of the Bureau of Reclamation, not having the time or the assistance necessary to check the dam designs or make the field explorations as to foundation conditions, dam site cross sections, and storage capacities. It is essentially a problem in analysis of the facts as reported by the Bureau.

On the basis of this already too long statement, I venture to recommend to your favorable consideration:

(1) Elimination of the Echo Park Dam from any authorizing legislation your committee may recommend, as unnecessary, unjusti-

fied economically, and a violation of policy to which the Congress adheres.

(2) Reconsideration of the whole program on the basis of authorizing construction of the Glen Canyon dam to a height of 735 feet and design of such series of lower and less expensive dams as may be necessary for the storage of such water as the participating projects need and can use economically, a successive program of steam powerplants to meet market demands as they occur, after the power potential of Glen Canyon has been exhausted.

(3) If the Glen Canyon Dam should prove impracticable—the Bureau assured the Senate committee that a 700-foot dam was surely practicable, which is more than enough storage for river regulation to meet the required demand at Lee Ferry, then to provide for the necessary river regulation with such a height of dam at Glen Canyon as is practicable and safe, and for the remaining storage in reservoirs at points other than Echo Park and Split Mountain.

Let us have an upper Colorado Basin project by all means, but one that is sound and economically justified.

Thank you very much.

Mr. ASPINALL. Thank you very much, General Grant. If you will take a seat now in the audience until the other two witnesses have given their statement, we will have our questioning later on.

At this time the Chair calls to the witness stand the Honorable Leslie A. Miller, former Governor of Wyoming.

Governor Miller, we are glad to have you before our committee this morning. We recognize your past service to your State and the Nation, and we wish you to know you are welcome with us.

There is one question I have before you start your testimony. Are you appearing here for any group or organization or are you appearing in your own behalf?

Mr. MILLER. I am appearing in my own behalf.

Mr. ASPINALL. Thank you very much. You may proceed.

LESLIE A. MILLER, FORMER GOVERNOR OF WYOMING

Mr. MILLER. Mr. Chairman and gentlemen of the committee, I am Leslie A. Miller, a former Governor of Wyoming. I am also Chairman of the Task Group on Reclamation and Water Supply of the Hoover Commission. It is not in my official capacity with the Commission, however, that I appear here. I am before you solely in the role of an interested citizen, and as a taxpayer. I am addressing myself to two subjects.

My approach to the proposal for the Colorado River storage project has largely to do with the economic aspects. It is my sincere belief that if the project, in the form contemplated by the pending bill, should be authorized and thereafter constructed, there would eventuate the loss of hundreds of millions of dollars to the general economy of the Nation. In view of our enormous national debt, and considering the fact we are, and apparently will be for the forseeable future, in a period of deficit spending, the authorization of works of questionable feasibility and unwarranted costs should be a matter of utmost concern to every person in and out of Congress.

You have been, and will be, talked to at great length regarding the alleged necessity for putting to work immediately the waters of the

Colorado and its tributaries in the upper basin in order to protect the allocation of 7,500,000 acre-feet annually as provided by the Colorado River compact. To many this is sheer nonsense—the compact provides that this allocation is "in perpetuity." The pact has been in force now for more than 30 years and, to the best of my knowledge, no responsible person or agency has ever challenged the validity of that "in perpetuity" clause.

There will be discussion also regarding the requirement of the compact that the upper basin guarantee delivery of 75 million acre-feet at Lee Ferry in any given 10-year period. There is agreement by many who have closely studied the matter that the proposed Glen Canyon Dam, with a reservoir capacity of 26 million acre-feet, would protect this upper basin commitment for many, many years to come. This being the case, there would clearly be no necessity for immediately authorizing or constructing other dams which wholly or in major part would be predicated upon such protection.

Now, let us dwell for a moment upon what is proposed for irrigation in the upper Colorado Basin. In a recent article in Collier's weekly, Senator O'Mahoney of Wyoming says the aim is to provide irrigation water for some 770,000 acres of land, 470,000 acres of which are already in irrigated cultivation but which could use more water. What kind of land, where located, and what would be raised? The Bureau of Reclamation tells us, so let us consult some of their unit reports.

Start with my own State, Wyoming. It is proposed at the Seedskadee, for example, to provide water for 61,720 acres of land at a construction cost of $383 per acre. The Bureau says that 9,030 acres would be suitable chiefly for pasture and that, of the remaining 51,690 acres, only a small proportion is first-class land—most of it is third to fifth class. The report says:

> The irrigated land would be utilized primarily for the support of livestock enterprises, particularly dairying.

Shades of surplus butter, cheese, and powdered milk!

> Climatically adaptable crops, such as pasture, small grain, hay, and some garden crops would be produced.

The water user would be expected to pay $70 per acre of the construction cost, the balance would be subsidized.

Take Lyman, Wyo. Here we have an already existing farming area, 40,600 acres, for which it is asserted more water is needed—the present supply is 37 percent short of normal requirements. It is proposed to furnish a supplementary supply, at a cost of $260 per acre for construction, and the supply would still be 12 percent less than needed to meet the "ideal irrigation requirement." The water user would be expected to pay $55 per acre for the 25 percent of additional supply. The Bureau sets out:

> Only grasses for hay and pasture, alfalfa, and some small grains can be produced to any extent as the growth of most other crops is precluded by a short growing season and untimely summer frosts that characterize the high 6,500 to 7,000-foot elevations of the project lands.

Now, go over to Colorado; the La Plata, down on the New Mexico line, is one to look at—9,800 acres, construction cost $947 per acre. The water user would repay $127 per acre. The Bureau says:

> Agriculture would continue to center around the livestock industry with most of the irrigated area producing livestock feeds.

The Florida in southwestern Colorado is another—18,950 acres, two-thirds already irrigated, construction costs $366 per acre, water user to pay $90. The Bureau reports:

*** * * the irrigated lands would be utilized largely for the support of livestock enterprises as now practiced in the area. Climatically adaptable crops, such as small grains, hay, pasture, and some pinto beans, potatoes, apples, vegetables and berries would be produced.**

The Navaho project, New Mexico: 151,000 acres to be irrigated, mostly on the Indian reservation. Construction costs would be $1,540 per acre, and the Bureau states:

Most of the project acreage would be utilized for production of livestock feeds, with smaller acreages being utilized for fruit and garden crops.

The lands lie at elevations from 5,200 to 6,100 feet and have a frost-free season of around 150 days.

CentralUtah project (initial phase): This consists of a number of units too numerous and complicated to detail here. It would provide water for only 78,500 acres of new land and supplementary water for 132,000 acres now irrigated. Construction costs allocated to irrigation, $793 per acre, of which the water user would pay $74 per acre, or less than 10 percent. The Bureau's report does not specify what crops would be raised, but it does say that while preliminary land investigations indicate feasibility—

Detailed classification of most of the land areas in the project would be required during the definite planning state of the investigation to confirm the suitability of the lands.

The fact the Bureau finds the water user here could repay only $74 per acre compared with $90 per acre on the Florida in Colorado, at a higher elevation, would indicate considerable skepticism.

I have given the foregoing details regarding a few of the participating projects for the purpose of characterizing the average of the lands, and for pointing up the excessive costs of building the irrigation construction works. You gentlemen will realize that these are estimated costs only and you are familiar, I am sure, with the record of the Bureau for underestimating costs, sometimes by as much as 200 and 300 percent. I have here a detailed tabulation of all Bureau of Reclamation projects since 1902 to prove this and some other points, if you desire.

Mr. HOSMER. Mr. Chairman?

The CHAIRMAN. Mr. Hosmer.

Mr. HOSMER. Do you have that detailed report with you?

Mr. MILLER. Yes, sir.

Mr. HOSMER. Do you desire to put it in the record at this point or at the end of your testimony?

Mr. MILLER. It is quite a table. It will be in the report of the task force group on reclamation and water supply of the Hoover Commission. If you want to put it in the record here, I will do it. It is quite a thing. I will show you. This [indicating] is the first work of this kind to come out and it is about five pages. Do you want that in your record? You may have it if you wish.

Mr. HOSMER. I will withhold my unanimous consent request at this time and discuss it with the chairman off the record later.

Mr. MILLER. Now perhaps you would expect me to say something about the benefits which may flow from all this irrigation. With some

knowledge of the so-called cost-benefit buildup of the Bureau of Reclamation, it can be safely asserted they are most difficult to understand. On the grounds of just common ordinary good sense, and, in looking at realities, I reject their findings in this case as being of little or no validity. In order to know what we presumably are talking about, let us look at what the Bureau says about how they went at the subject in considering the Colorado River storage project:

For the benefit-cost comparisons for the units, benefits were evaluated on the basis of a long-term projected price level of 215 (1910–14=100) and a parity ratio of 100. (In comparison the January 1953 average price level received by farmers is approximately 267 and with a parity ratio of 95 on the same base period.) Overall irrigation benefits were considered to be the value of increased goods and services associated with the increased production resulting from the additional irrigation. These benefits are dependent on some nonproject costs as well as on costs for establishing, maintaining, and operating the project. The overall benefits were reduced by the amount of the nonproject costs and the remaining benefits compared with project costs in the benefit-cost comparisons. Direct, indirect, and public benefits were evaluated. Direct benefits represent the increase in farm income in excess of farm production costs and the value of alternative employment opportunities. Indirect benefits include the increased profits to the nonfarm enterprises resulting from the increased agricultural production and from increased goods and services supplied for farm operation and for the farm family living. Public benefits include the value of increasing opportunities for establishment of family-sized farms.

In order to be comparable, both benefits and costs of each unit were computed as average annual equivalent values over a period of 100 years with compound interest at 2.5 percent annually. In computing the average annual equivalents, benefits were adjusted for an appropriate development period. The average annual equivalent costs include the net project investment, including interest during construction, less the present worth of the terminal salvage value, amortized with interest at 2.5 percent over 100 years; operation, maintenance, and replacement costs * * *

It may well be that you gentlemen can translate this into easily understandable language, but I confess my inability. However, there is one way to approach the question which we all can comprehend—I will put it on the basis of a project which in the course of our Hoover Commission work was examined a few months ago, the Frenchman-Cambridge, in southern Nebraska.

Here is an irrigation project embracing some 68,500 acres, partially constructed. The estimated cost at the time of authorization in 1944 was $26,900,000. As of June 30, 1952, that estimate had grown to $74 million, $908 per acre allocated to irrigation. All of the land is privately owned and the farms were established long before the Bureau came into the picture.

Our inquiries on the ground brought out that a fully developed and improved irrigated farm in this area is worth about $250 per acre in the market. That price would, of course, be paid upon the basis of what the place would earn over a period of years on the investment. So it seemed to us that this is what we could properly term the direct benefit. The Bureau has a formula for measuring the indirect benefits and by this they find the average of such benefits to be about 60 percent of the direct.

In this case, just to be on the liberal side, let us say the indirect benefits would equal the direct—we would then have an irrigated farm with an overall value to the general economy of $500 per acre. But the cost of constructing the irrigation works is $908 per acre. Gentlemen, I can get no other understanding in such a situation than that the difference between the construction cost and the sum of the benefits,

$408 per acre, or $65,280 per 160-acre farm, is wholly lost to the economy of this country, be it paid by the taxpayers of the Nation or by the purchasers of Missouri Basin public power.

We can apply a similar line of reasoning to the upper Colorado River Basin. It is proposed in the measure you have before you to supply supplementary water for a very considerable acreage of already established farms. Therefore, there are going values easily ascertainable. I have quoted above the findings of the Bureau of Reclamation that the greater part of the lands will be chiefly farmed for the production of forage crops for the livestock industry. Such land in that general area will not command a sales price in excess of $150 per acre. If we optimistically add to that another $150 in indirect benefits and thus arrive at a possible value of $300 per acre in the overall economy, we can place against that the estimated irrigation construction costs averaging for the projects in the bill approximately $1,000 per acre, and again we cannot avoid a conclusion that their construction will involve a loss to the economy of the Nation of $112,000 per 160-acre farm, or $539 million on Senator O'Mahoney's figure of 770,000 acres—this loss without consideration of interest.

The objective of any farming enterprise admittedly is to produce food, directly or indirectly. We have, in this Nation today, as all of you are acutely aware, great stores of surplus foods. Some figures published a few days ago indicate that, by the end of 1955, we will have $8 billion of taxpayer money tied up in these surpluses, and it was stated the Treasury is required to pay out around $700,000 daily just for storage fees.

We are unable to see any end to the farm subsidy and surplus situation. In 1953 and 1954, severe drought conditions prevailed in great areas, particularly the Southwest. Yet, in both of these years, the Nation produced farm crops of near record proportions, and the surpluses continued to grow.

We have a record number of beef cattle and have also great numbers of hogs. The wool industry is in such a state that just a few days ago a committee of sheepmen was in Washington endeavoring to talk the Army into buying up some 70 million pounds of low-grade wool stored in warehouses and for which there are no buyers. The Army said it already has woolen stocks on hand to last 7 to 10 years.

Doubtless much will be heard here as to the supposed necessity for providing more irrigated land for food production for a growing population, and the year 1975 is pointed at in grim terms. Of recent years, however, investigations have been made of these problems, and it is the concensus, borne out by Department of Agriculture studies, that when 1975 rolls around we can amply feed that growing population on the present farm acreage through proper application of newly developed techniques and fertilizers and the use of more efficient machinery. Our per acre output is growing year by year.

At the outset some attention was given to the questionability of adding to farm production in the country by means of ultra-high-priced irrigation financed by the Federal Government through the Bureau of Reclamation. It is consistent here to point out that much more irrigation has been provided in the past, and is being provided today, by private enterprise than by the Government. Of all the 25 million acres of irrigated lands in the 17 Western States in 1950, considerably less than one-fourth had been watered by the Bureau.

And in its contribution less than 2,500,000 acres was in new land—about 3 million acres were lands already in irrigated farming, established by private enterprise but in the 10-year period 1941–50, less than 25 percent of which was provided by the Federal Government.

How is irrigation brought into being without great Federal Government subsidy? Well, take the case of Montana. On 173 small projects—this was in 1952—the Montana State Water Conservation Board has been responsible for furnishing, under financing it has assisted with, full water supplies to 133,294 acres of new land and supplemental water to 252,920 acres of land already in irrigated cultivation. The Board has accomplished this at a cost of $16,820,584, or $43 per acre. Congressman Dawson can tell you, I am sure, of what some of his people have done for themselves in the Sevier Basin in Utah. You might ask him.

Besides the assistance programs in many States, we are today witnessing a great resurgence of irrigation development by private enterprise. For example, take the sprinkler irrigation systems we see mushrooming about the country. It is a relatively new development but here are some data you will surely find of much interest.

Using a combination of Federal and State agricultural, Census Bureau and industry figures it is learned that today there are approximately 3,100,000 acres of land being sprinkler irrigated, by far the greater part of which development has taken place since 1949.

An example—one dealer in such equipment in your State of Colorado, Mr. Chairman, told the speaker a few days ago that, in 1954, his concern sold sprinkler equipment to irrigate 12,300 acres of land in the area served by Greeley. Most of it was sold to irrigate units of 160 acres and the investment was approximately $50 per acre, including well and pump. For smaller acreages the figure would be considerably higher as practically the same equipment would be required for 60 or for 80 acres.

Your close consideration of this is suggested by reason of the fact all this has come about without Government subsidies.

I should interject there, that since I came to Washington that week I learned that nearly 25,000 acres of land in the State of Utah have been put under irrigation with sprinkler equipment, and I have the data here in my briefcase. Moreover, sprinkler irrigation is usually more efficient in use of water—it makes for less erosion, thus conserving soil, gives better results from fertilizers and materially lessens loss of water from percolation in lighter soils. It largely avoids the high cost of land leveling, and it does not involve the kind of back-breaking shovel and hoe labor that goes with flood irrigation.

This is not to say that sprinkler irrigation has fully come of age—there are problems of water supply, of course, and whereas in some areas, it is evident that ground water has been injudiciously overmined, care must be exercised in avoiding multiple drilling of wells without adequate prior investigations. Certain it is, however, that sufficient information is in hand to warrant the assertion that this method of irrigation can be vastly expanded and that, as increased food supplies may be needed, it will meet the demands—and on the record it can and will do so without such huge subsidies as are contemplated by the proposal under discussion.

It is a known fact, of course, that, in the general area of the upper basin States, there are vast stores of minerals of various kinds. It

has been asserted with much validity that here exists one of the greatest concentrations of energy fuel resources, coal, oil, oil shale, gas, and uranium, in the world. There are many, and I am one of the group, who believe the ultimate destiny of the region is involved in the development of those and other minerals. Haste in tying down the water to irrigation of marginal agricultural land could seriously impede industrial development which would depend upon the use of large amounts of water. Let us assume a hypothetical case.

A concern utilizing water to a great extent in processing, let us say oil shale; the proper location for the mill may be at the lower end of one of the streams in the area. The water of the stream has been fully appropriated under the priority-of-use laws of the State and thus tied to the land above the site of the mill. To enable the mill the unimpeded use of the water, the owners thereof would be required to buy the water rights, the owners of which naturally would insist the land go with the water, as without water, the land would be almost, if not wholly worthless. The mill company thus would be faced with the necessity of buying perhaps thousands of acres of land for which it would have no use and which would not constitute assets on its accounts to offset the costs.

Certainly such an altogether consistent situation can be visualized, and what greater deterrent could there be to the location of an industry in the area under discussion than such a consideration?

It is of interest to consider at this point the difference between industry and irrigation farming—and I am talking about flood irrigation here—in the matter of capital requirements to provide a family with a living. A study at hand brings out that an average investment of $13,300 in an industrial manufacturing plant will provide 1 man with a job. Another study stemming from an experiment farm on one of the Missouri Basin irrigation units in Nebraska indicates that a capital investment by the Government and the farmer of $99,200 is required for 160 acres in that area to provide the farm family with a net income of $3,600 per annum. In the upper Colorado area the required farm investment would average much more.

Thus, if Federal subsidy is required for the development of the Colorado River Basin, it would appear to be much wiser to consider all types of resource development and not put all of our money on marginal agriculture. Let's spread our bets over the board a little bit.

Having talked about the participating projects, we should give some attention to dams and the cost thereof. Why some proponents apparently feel that Echo Park Dam is something sacred, something that must be built at any cost and with all disregard of what millions of people in the country feel about it, is a matter of great mystery to me. After all it is not the only dam that can be built and certainly if it be true that Glen Canyon will give the required storage protection under the compact terms for years of a foreseeable future, why all the pressure to build the highest cost dam when there is a choice? We do not have to invade a national sanctuary, we do not have to spend more than is necessary to achieve the results sought.

Echo Park is designed to store 6,460,000 acre-feet of water. The cost of construction is estimated to be $176 million. That, gentlemen, is $27 per acre-foot.

A few miles away is the Cross Mountain site. The reservoir capacity there would be 5,200,000 acre-feet. With a cost of $51 million, that would be $9.80 per acre-foot.

Now look at Glen Canyon. Capacity 26 million acre-feet, cost $421 million or $16.20 per acre-foot.

So you may note that of the major reservoirs Echo Park storage is by far the most costly. The same is true of power. The Bureau states that power costs at Glen Canyon will be 4.7 mills; at Cross Mountain, 5 mills; and at Echo Park, 6 mills. Why not raise Cross Mountain Dam a few feet and thus increase the cheaper power potential?

On another note, the average per kilowatt capital costs of 12 hydroelectric projects licensed by the Federal Power Commission since 1940 with capacities of 50,000 kilowatts and over is $319.70. The same cost at Glen Canyon dam is estimated (1954) at $463.72, and at Echo Park Dam at $641.92, which is more than twice that of the average of the projects licensed by the Federal Power Commission.

Understandingly, you are going to ask me for alternative suggestions to H. R. 270, if any I have. A few weeks ago former Senator, now Governor, Ed C. Johnson of Colorado said that in certain circumstances he would recommend congressional authorization at this time be restricted to Glen Canyon Dam with a provision that surplus earnings on power sales therefrom be distributed to the 4 States of the upper basin upon the basis of the distribution of waters of the Colorado River as agreed upon by the States under the Colorado River compact. These moneys could then be utilized by the States to develop, on a matching basis or otherwise, local water projects. A study of the history of irrigation convincing me that it is more feasible and economic to have developments locally controlled, it seems to me Governor Johnson's proposal is logical and I would approve it.

Under this kind of a setup the States could go into a number of small projects, as Montana has done, and thus would spread the benefits more widely. Suppose some farmers in eastern Colorado would want to form a district and go into sprinkler irrigation. They might need some aid in financing the costs of well drilling, pumps, and pipe. The State agency could give consideration to loaning funds to the district and all the work would be done locally, most of it by the farmers themselves.

We can expect to have repeated here the argument that because we are expending great sums abroad, we should spend great sums also on projects of the kind here proposed. That always leaves me quite cold.

Our expenditures overseas, fostered by the present administration and its predecessor, have two main purposes: (1) To bolster the military strength of our allies as a contribution to our own defense, and, (2) to improve the economic well-being of other nations in the interest of raising standards of living and thus building international trade.

If members of Congress believe these expenditures to be wasteful, they have a duty to vote down the appropriations. It is no defense of questionable expenditures here to say, "Well, we are wasting money with our right hand—let us waste some more with our left."

Actually there is no consistent relationship whatever between those programs and what we are considering here and no reference to the former should be of any weight.

It can be anticipated that we will also hear the point asserted that we have every right to spend money on irrigation because it partially pays its way, whereas most expenditures on flood control and navigation are nonreimbursable. The answer here is that in the solid opinion of many, and I am one of them, who have studied this general problem in detail, the beneficiaries of all water-development projects should be required to pay consistent shares of the costs. If the Congress will agree to this and enact the necessary policy legislation, it is certain indeed that there will be much, much less demand for so-called pork-barrel authorization and appropriations in the future. In the interest of the taxpaying public, I sincerely hope this will take place.

Probably, too, there will be some who will say, "Oh, but this is only an authorization—we are not asking for appropriations now." True, but as all of you are quite well aware, almost every authorization measure carries a moral, and ofttimes a legal, responsibility to appropriate the money thereafter. With authorizations there would immediately spring to the front the local communities with demands for prompt financing of their pet projects, and political pressures are, many Members of Congress would rally around regardless of all consideration of economics.

Somewhat apropos, I desire to say a word about the present pressures being engendered in the Upper Colorado Basin States. The Upper Colorado River Commission appropriated some $39,000, everything it could lay its hands upon, to propagandize the bill before you and then fostered the creation of an organization which took the name "Aqualantes." This group, largely encouraged by business people who feel they would stand to profit from expenditures for construction in their neighborhoods, is extremely active, going up and down the streets exchanging lapel buttons for $1 bills and exhorting one and all, day by day, to petition the Congress to pass this bill. Believe it or not, they are even proselyting the schoolchildren in the schools.

But nowhere do they say a word about the costs of the project. They very glibly say the Government will get back its money but they don't say much about how, how long it will take, or the interest it will pay out and not get back at all. In all the printed articles to be seen in the newspapers and the magazines we fail to see anything about what the taxpayers of the Nation will be called upon to pay in interest for one thing, never a word about how it will be required that $1,000 per acre will have to be expended in construction costs to take water to land that will not command a price to exceed $150 per acre in the market when fully improved and in production.

With regard to all this pressure, politically potent as quite evidently it is, I wish to state a philosophy if you please.

We have in this Nation a representative form of legislative government. Men are elected to the Congress to represent States and districts and under our system fundamentally they are expected to reflect the views and the wishes of their constituents. All of them, presumably, desire to be looked upon as statesmen.

While we have these electoral States and districts, nevertheless they are all parts of one great national union, and broadly what is good for

the Nation is good for the parts thereof, and conversely, what is not good financially or otherwise to the Nation eventually will reflect adversely on the parts.

It is inevitable that in the career of almost every Senator and Representative, he will be called upon at some point to make a choice between the welfare of the Nation and the immediate demands of his constituents. His willingness and courage, at such a point, to make a decision in behalf of the greatest good for the greatest number, not only in the country as a whole, but for the people of his State or district and their children over the long pull, serves to mark the measure of his statesmanship.

Perhaps we are at such a crossroad today. As stated earlier, the Nation is burdened with a gargantuan national debt. We are and will be for the foreseeable future in a period of deficit spending. In such circumstances, it seems clear to this speaker that the Member of Congress who, by his vote in matters not actually timely or really necessary, acts to still further increase the national debt and to indefinitely extend the requirement for deficit spending, divests himself of all claim to statesmanship.

A few days ago, just before I came down here, I heard a statement was made that the Aqualantes had recruited 3,000 members in a certain area out there. Well, my reaction to that was that probably 2,990 of that 3,000 did not know a thing in the world about the project, the economic aspects of it. If you will bear with me, Mr. Chairman, I will give you an example.

Not long ago, following one of my trips down here, when I went home, I had heard the statement had been made here in Washington that the people of Wyoming were behind this upper Colorado storage project 100 percent. So I thought I would test that out.

I, at lunch one day, gathered with about 15 or 18 of the leading businessmen in my community, men who can be considered above the average intelligence, I think, and certainly closer readers of the newspapers than the average. So I asked this group what they knew about the Colorado storage project and, as I thought would be the case, they unanimously said they knew nothing about it; they had read 1 or 2 references to Echo Park Dam, but that is all they knew about it.

So I say that some of the propaganda that is being engendered is based upon local enthusiasts for what they call free public expenditures, and not upon the facts of the situation.

Inasmuch as you have announced, Mr. Chairman, that there will be cross-examination, that will complete my statement.

Mr. ASPINALL. Thank you very much, Governor Miller.

Mr. HOSMER. Mr. Chairman?

Mr. ASPINALL. The Chair recognizes the gentleman from California.

Mr. HOSMER. I would ask unanimous consent, Mr. Chairman, that at the conclusion of Governor Miller's prepared statement a portion of the paper which he has produced this morning be entered into the record.

I make this request with the full understanding and the statement that the request, if granted, would have no implication that the Hoover Commission Task Force on Water Resources and Power is taking any part in this discussion one way or the other, and that the idea in mind

is merely to put this information in the record, as such, without any implication whatsoever.

The portions to which I am referring are the columns headed "Projects," "Date of authorization," "Estimated total cost at time of authorization" and "Estimated total cost June 30, 1952."

Mr. ASPINALL. Would the gentleman include in his request also that the rest of the compilation be made a part of the file?

Mr. HOSMER. Yes, I do.

Mr. SISK. Reserving the right to object, Mr. Chairman, who prepared the chart?

Mr. HOSMER. The chart was prepared by the Commission on Organization of the Executive Branch of the Government, Task Force on Water Resources and Power.

Mr. SISK. Is that part of the Hoover Commission?

Mr. HOSMER. Yes.

Mr. SISK. It is my understanding, Mr. Chairman, the Hoover Commission has not taken a stand on this case.

Mr. HOSMER. That is exactly the point I am making. This is nothing more than a tabulation of the things that I mentioned, namely, project names, date of authorization, cost estimate at the time of authorization, and estimated total cost estimate at the end of June 1952. In other words, it is a compilation of existing data and material.

Mr. SISK. I will not object.

Mr. DAWSON. Mr. Chairman, I object to the inclusion of this as a part of the record. I have no objection to including it as part of the file as we have done in other instances in this hearing with documents of this kind. This report is a most lengthy and extensive report, and I think by taking out one portion of it, if the gentleman wants to have it put in the record, is unfair, and the only way we can get it in is to make it a part of the file as we have done in other instances.

I further contend that even though the gentleman says that no reference shall be made to the Hoover Commission, nevertheless, this will be referred to as the Hoover report and implications will be made that this has something to do with the findings of the Hoover Commission, which is entirely not the case.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. Yes.

Mr. HOSMER. I understand, as you do, that the figues that are contained and compiled here are, of course, very dismal with respect to the Bureau of Reclamation's ability to estimate cost of projects.

Mr. DAWSON. I will say to the gentleman, if they are dismal, they are dismal for California as well as they are for the rest of the Nation, because as I understand, it covers all reclamation projects.

Mr. HOSMER. I am not arguing that point at all. It contains all reclamation projects from 1903.

Mr. DAWSON. Mr. Chairman, I renew my objection to making it a part of the record and have no objection to making it a part of the file.

Mr. HOSMER. I object to making it a part of the file.

Mr. ASPINALL. Since there has been objection, it will not be admitted as a part of the record or a part of the file at this time.

The next witness is David Brower, representing the Sierra Club of California. Will you take the witness chair, Mr. Brower?

STATEMENT OF DAVID BROWER, REPRESENTING THE SIERRA CLUB OF CALIFORNIA

Mr. BROWER. Mr. Chairman, my name is David Brower. On behalf of the Sierra Club, I wish to thank this committee for this opportunity to appear.

Mr. ASPINALL. Mr. Brower, you have been before the committee before and we welcome you again this morning. You may proceed.

Mr. BROWER. Mr. Chairman, there are now being distributed to the members of the committee some 41 pages, all of which, I hasten to add, are not part of the statement I intend to read at this point.

Mr. ASPINALL. What you intend to read at this time is incorporated with the statement; is that correct?

Mr. BROWER. Yes, sir.

Mr. ASPINALL. You may proceed, and then we will make the request later.

Mr. BROWER. I should like, first, to summarize the beginning pages of my statement, which speak briefly of the Sierra Club, its history, the kind of people who are in it, their primary interest and fields, and the things that they have in common.

It goes then into the subject of Dinosaur National Monument, the kind of park values we have there, and how a good many of our people have enjoyed those values in the course of the past 3 years—300 last summer, in the course of which 912 people went down the river; 200 the summer before that, and presumably another 300 this coming summer for the 5 trips we have again scheduled down through the canyons of the Green and Yampa Rivers.

We then go into the subject of what kind of use we can look forward to if Dinosaur is retained in its present condition, with modest national park type of improvements, and what is likely to happen were Echo Park Dam to be built.

As examples, I cite what has happened at Lake Mead, where very real values have materialized from the building of Hoover Dam, but where there are troubles developing because of the lake's unhappy facility for fluctuating up and down.

We then discuss Hetch Hetchy, which has been mentioned to this committee many times before, I am sure, where back in the early part of the century advocates of a dam that would supply San Francisco with water were arguing that San Francisco had to have it, had to have the power, that there were no good alternatives, that the scenery would be enhanced, greater accessibility would result, and then charged nature lovers with obstructing progress. We cite that chiefly because those arguments have proved to be invalid. There were alternatives which still exist and can still be used. But because the wrong choice was made back in about 1911 or 1912 we have lost a very valuable element of what has since become the national park system.

I cite the threat to Yellowstone National Park in 1921 when proponents were urging a project to raise Yellowstone Lake 6 feet, arguing that it would help the park, increasing the size and beauty of Yellowstone Falls. Defenders of the park system prevailed, and former Secretary of the Interior John Barton Payne pointed out "the water does not stay in the park. Use it outside."

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It was before this committee that he summed up the case of park protection with the remark, "There's a heap more in this world than three meals a day."

Then I should like to pick up my statement on the top of page 5, the second paragraph.

In Hetch Hetchy there was no National Park Service and the national park system lost.

In Yellowstone, the Department of the Interior stood behind the Park Service and the parks gained protection.

In Dinosaur the issues are in essence the same. But the National Park Service cannot speak. Protection of the park system is thus up to the people, who own it, and their Congress. Eternal vigilance is the price of liberty—and of national parks.

All along, the Sierra Club's chief concern has been national park and national wilderness preservation. The principle of park preservation should be able to stand alone. But we have been persuaded by practical men that one way to prevent park invasion is to offer alternatives to that invasion. This has led us to study more thoroughly than we wished the details of the upper Colorado storage project, to make our own observations about it, to check them with experts, to dig out facts that were missing in the basic 1950 report on the project by the Bureau of Reclamation, to discover important errors, and to see the Bureau correct some of them.

From this study we came up with this tentative conclusion, which we can amplify in such detail and with such documentation as you may wish: That conclusion—even if the present plan did not invade the park system, which it does, and even if the total plan had been proved necessary (we do not find that it has), still it is not a sound project.

When I was pointing out various probable flaws in its soundness before the Hoover Commission task force in San Francisco last May, Governor Lee, of Utah, said to me:

> Don't you think you are on sounder ground in your argument on that basis [unsoundness] than you are that it is going to injure some park. * * * I think your soundest argument is against the cost, and certainly isn't because it is part of the national park system.

I quote him directly.

I disagreed, because we believe that if we defended only those parks which could not be soundly exploited, our national park system would have died before Abraham Lincoln started it. That does not mean, however, that we feel we should shun considerations of engineering or economic or agricultural soundness.

I have gone into these questions with no engineering background except what an editor can acquire when his father and his brother are engineers—and when he knows a few very good engineers to go to for assistance. This is similar to the procedure an attorney would follow in the same situation. The following deals with questions and answers arising from discussions with competent authorities in the various fields concerned. I hope they will help you in defining a sound project.

We have two constructive suggestions to offer. First, we urge that destruction of park values be avoided and that the national park and wilderness system be improved.

Our findings agree with those of the best qualified experts, who have devoted their careers or their philanthropic efforts to park preser-

vation. Our findings are that dams in Dinosaur would forever destroy all that is of national park meaning in the place. We know that Dinosaur, for all its relative obscurity today, is one of the finest parts of the national park system. We know that an invasion here will gravely threaten the entire system. For although you can ask yourselves here, "To dam or not to dam?" it is beyond anyone's power, gentlemen, to say what will or will not be a precedent. Only time can decree that. What goes before is precedent, and cannot be undone.

If a half-century-old reclamation withdrawal at Browns Park should now be used to destroy the park quality of the heart of Dinosaur, then Kings Canyon National Park is on the way out along the same road. The destructive pattern would have been set—Kings Canyon and six others.

The Federal agency that would normally be here to protect the parks from a damaging precedent cannot appear without jeopardy. The charts, the photographs, the documents, the tables and diagrams, the staff, the pleas—all these things that an efficient agency of the administration could have assembled to help save the parks—this service has been denied to you, and I fear that the agency would suffer were you to order it to appear.

A mere handful of men, most of them laymen, are trying to fill that wide gap. They come to represent organizations concerned with the public interest in conservation, organizations that exist on modest dues paid by devoted members. It is an enormous responsibility.

The Sierra Club's second constructive suggestion concerns a proposal for a new look at the Colorado storage project. The proposal covers many fields of study, and as I have pointed out earlier, we have been most fortunate to have been able to rely on expert opinion, both from within and from outside our own membership, for our information in these various fields.

In outlining the proposal of a revised project, I must necessarily speak in round numbers, for our basic data, those compiled by the Bureau of Reclamation, have not yet been subjected to the dispassionate check which has been urged by many advisers to the administration and by independent agencies. Round numbers will, however, provide you with the general order of magnitude of what is involved.

I have felt that this different look at the upper basin's water needs and how better to fulfill them can best be presented in charts and tables, which I would like you to refer to while I explain them. I would emphasize that the basic data are the Bureau's. As everyone knows, it is one thing to gather data, and another thing to interpret them. This different interpretation is suggested but not followed up, in various parts of the basic 1950 Bureau report. It is what inevitably comes to light if you go through all the data so expertly and painstakingly compiled with a different end in view: Not how much power, but how much water. It is the logical question to ask, for unlike most of the rest of the country, the Colorado Basin is essentially a land of little rain. Major Powell discovered this when he first traveled down the river and named Echo Park, in 1869. It is still true. This is an arid land. Power can come from any other sources and means may easily be devised for power users to help water users if that must be the decision. But water cannot come from other sources, and water, as all you gentlemen know, either is or will be critical in this region.

The charts and the tables, then, are addressed to the choice the Colorado Basin States must take. It is not a choice between water and parks. We can have both. It is a choice between water, which we have heard time and again there is desperate need for—a choice between water and costly hydroelectric power which wastes water and risks a vast public debt which has not been justified and, I believe, cannot under any now foreseeable circumstances be justified.

Chart 1, though not too expertly prepared, is the key chart, and the subsequent charts and tables help amplify it.

Here I will just talk through these charts.

Figure 1 shows how to get a full share of water for the upper basin with power coming from more abundant, cheaper sources (the chart referred to appears on p. 770).

The important purpose of this chart is to show at a glance when, according to the Bureau figures, the upper basin will need storage and in what quantity it will be needed from step to step.

Starting at zero in the year 1850 the water use curve is made to rise uniformly to today's use, 2 million acre-feet. It then rises steeply to accord with the Bureau's projection of full use in 75 years. The curve then levels off for 1,000 or 2,000 years, far off the page.

Since 4,350,000 acre-feet, 58 percent of the basin's total allocation, is available without storage, according to the Bureau, another 2.3 million acre-feet can still be depleted. Not until 1987 will it be necessary to start bringing in the 23 million acre-feet of storage the Bureau says will be necessary to even up the flow of the river. This 23 million acre-feet would be built in steps. The individual dams, as needed are suggested by initials—"F. G." for Flaming Gorge, "C. M." for Cross Mountain, Dewey, and Bluff, as a possible first four steps. After the year 2030, 7 million acre-feet of new storage will be needed each century to offset storage capacity lost to sediment.

Elimination of the power features does several things, which will be discussed along with the charts and tables.

The thing to stress so far as the storage project is concerned is that no part of it need be built as needed until 1987, and then only a step at a time should be built.

This approach will save about 500,000 acre-feet of water per year which the Bureau's plan would evaporate in order to produce power. But power is not the issue, water is.

It is entirely possible that storage will not be needed this rapidly for two reasons: Increase in depletion is probably too rapid in the curve, and a possible function of Lake Mead is overlooked. That possible function of Lake Mead is in the copy of the statement I made before the Senate subcommittee earlier this year, which I would like to submit for the committe files, and each of you has a copy before you.

Mr. ASPINALL. Unless there is objection, the statement made before the Senate committee will be accepted as a part of the files.

Mr. HOSMER. A point of information, Mr. Chairman.

Mr. ASPINALL. Certainly.

Mr. HOSMER. What in that statement before the Senate committee were you just referring to?

Mr. BROWER. It relates to Lake Mead.

Mr. HOSMER. Is that information in your statement to this committee, your prepared statement?

Mr. BROWER. No. I can go on into that, though. I have it written out here.

Mr. HOSMER. I would ask then, the portion of his testimony before the Senate committee which pertains to Lake Mead be included in the record of these hearings rather than the file, since it is apparently additional pertinent data.

Mr. BROWER. Let me just summarize rather quickly because I have the notes in front of me.

Mr. HOSMER. Then I will withdraw my request.

Mr. ASPINALL. Hearing no objection, it will be made a part of the file.

Mr. BROWER. House Document 364 on page 155 says this about Lake Mead:

> Of the lake's total capacity of 32 million acre-feet, the top 9,500,000 acre-feet is reserved for flood control. Operations of the Colorado River storage project, including the large reservoir at Glen Canyon, will materially reduce the flood inflows into Lake Mead, justifying a smaller flood space in Lake Mead and in turn permitting increasing power production at Hoover Dam through higher head operation.

The committee might well ask two questions of the Bureau:

1. The smaller flood pocket permits a higher power head, but what will be used for water to fill it?

All the figures I have seen indicate that if Lake Mead is not full when Glen Canyon Dam starts releasing 7½ million acre-feet per year, Lake Mead may never fill again as long as the downstream population continues to use what the 1922 compact and the Mexican treaty awarded it.

2. If controlling flood flows and sediment upstream creates a proportionate increase in space at Lake Mead, can this space be used for exchange? Water intended to be stored at Echo Park and Glen Canyon is destined for beneficial downstream use. So is the water in Lake Mead. The difference is that a given acre-foot of water at Glen Canyon has not yet had the experience of passing the arbitrary division point at Lee Ferry.

Some aspects of the compact require an interpretation by the Supreme Court. But the accident of Lee Ferry is something else. If a technicality concerning this place name means that the largest man-made reservoir must go partly unused, surely Congress has the indirect power, if not the direct power, to require such modification as is necessary to prevent the waste of Hoover Dam's full function.

I hope you will ask the Bureau this further question: Without any suggestion of changing the allocation between upper and lower divisions, but considering primarily the full operation of the theory of exchange, in what way would the Colorado River storage project be planned if the Bureau were directed to assure full use of the facilities now existing at Lake Mead?

I should myself be extremely interested in the formal answer. I have already heard the informal one.

In any event, the step-by-step approach makes sense. The need can be sized up as we go along. It makes as much sense as it does for a man to shop around and buy one automobile at a time rather than buy all at once the 10 or 20 cars he will use in a lifetime.

Now buying those 10 or 20 cars all at once, and on credit, also costs a lot more, as figure 2 shows. (The chart referred to appears on

p. 771.) Actually, it only begins to show the difference between the two approaches. Here, graphically, we see the Bureau plan, which is to spend $2.5—I have found a mistake in that already—$2.5 billion in 20 to 30 years to accord with an educated guess. And to the right is shown the means of providing the water to meet exact needs in another way, as illustrated in figure 1. With a half-mill per kilowatt tax started now, this would be a pay-as-you-go project. The cost figures are derived from House Document 346 and will be explained in tables 3 and 4.

Now figure 3 touches upon reservoir operations and shows how the generation of hydroelectric power, according to the Bureau's plan, actually brings about a heavy consumptive use of water. (The chart referred to appears on p. 772.) From the Bureau's area-capacity curve for Glen Canyon you can derive the reservoir area and capacity according to its fluctuation in depth. For example, at the 370-foot dead storage level the capacity is 6 million acre-feet and the area is about 50,000 acres. That is as low as it can go, theoretically.

If you study this for a while, you will perceive how power depletes water: First, because dead storage boosts power head and therefore increases reservoir area and evaporation. The resulting added loss at Glen Canyon is 125,000 acre-feet per year. Second, because in operating a storage reservoir for power the Bureau adds still 18,000 more acres to the evaporating surface, losing another 85,000 acre-feet. Thus the water lost to power here would total 210,000 acre-feet per year out of Glen Canyon's total evaporation of 526,000 acre-feet.

Figure 4 gives a visual answer to the question, How important is this Colorado project hydropower—how important in an arid region abounding with other sources of energy? (The chart referred to appears on p. 773.)

The bottom of the curve assumes a gradual increase in installed power up until now—about 1½ million kilowatts. The curve then rises to accord with the Bureau's projection of 150,000 kilowatts per year. The curve shoots up rapidly past a representation of the entire capacity of the Colorado storage project, which would be outgrown in 11 years. Echo Park Dam's part would be passed in 16 months. Note that the upper basin coal reserve of 400 billion tons will produce power for 7,000 years at the rate consumed 100 years from now. Note, too, in the box, that this is by no means cheap hydropower. For a thorough discussion of power costs, may I refer you to pages 15 to 23 of my statement to the Senate, and make the request now that become a part of the file?

Mr. ASPINALL. It has already been made a part of the file.

Mr. BROWER. I beg your pardon.

Mr. HOSMER. A point of information, Mr. Chairman. Is that, Mr. Brower, the portion of your statement that starts "Is Dinosaur National Monument needed for power"?

Mr. BROWER. Yes.

Mr. HOSMER. And it goes over to page 23?

Mr. BROWER. It gets into atomic power.

Mr. HOSMER. Down to where it says "Summary"?

Mr. BROWER. Yes.

Mr. HOSMER. Is that information that you are not presenting before this committee this morning?

Mr. BROWER. That is information, I think, which would be of great interest to this committee.

Mr. HOSMER. I ask unanimous consent, Mr. Chairman, that portion of Mr. Brower's statement before the Senate committee be made a part of the record.

Mr. ASPINALL. Permit the Chair to see how extensive it is and what it refers to.

I think the request of the gentleman is in order. Without objection, it is so ordered.

Hearing no objection, it is so ordered.

(The statement referred to follows:)

IS DINOSAUR NATIONAL MONUMENT NEEDED FOR POWER?

The Bureau proposes to charge nearly 90 percent of the cost of Echo Park and Split Mountain Dams to power production but has given the public no clear analysis of alternatives. The following few pages show that—

1. Tax free low interest rate steam-electric plants could sell power for appreciably less than the proposed tax free low interest rate hydroelectric plants.
2. Private utility companies could sell steam-electric power at only the small extra cost necessary to pay the taxes otherwise paid by the electorate-at-large instead of by subsidized power users.
3. Steam plants would avoid a large increase in the national debt.
4. Steam plants take far less time to build, are not involved in the controversy as to whether the dams could provide power in dry years. Furthermore, they could help the unemployed upper basin coal miners.
5. Estimates on steam-plant costs are more reliable than dam-cost estimates and the water power may actually cost more than estimated.
6. Power production cannot on any sound basis justify flooding the canyon floors and destroying scenic, geological, and related values of national importance.

The Bureau of Reclamation has not released any clear comparison between their Colorado River upper basin proposal and the best alternative proposal which would avoid building Split Mountain and Echo Park Dams in the canyons of Dinosaur National Mounument. It is insufficient to state that these dams are the most economic when alternatives are admitted to be feasible. The public is entitled to be sure that optimum alternatives have been seriously studied and to know what price differential the Department of the Interior has decided is too great to pay for retaining this important recreational region in its natural state.

In the absence of any such clear Government presentation, the public is impelled to make it own appraisal as best it can. The price differential must be judged in terms of water storage, water distribution, water evaporation, and power generation. Most of the cost of these two dams is being charged to power generation. The purpose of this memorandum is to discuss some aspects of the subject of power generation as related to this proposal. The water problems are being presented elsewhere.

BUREAU'S PROPOSAL

The Bureau of Reclamation proposes to install 300,000 kilowatts of total power-generating capacity at Split Mountain and Echo Park Dams. They estimate an annual firm output capacity of 1,660 million kilowatt-hours which they propose to sell at 6 mills per kilowatt-hour at load centers. Any excess over the firm capacity would be sold at 3 mills per kilowatt-hour. The portion of the total $282 million project cost which the Bureau proposes to amortise with power income is $248 million, which makes this expensive water power. (See Bureau of Reclamation supplemental report, October 1953.) They indicate the actual cost of this power by their own method of calculation will be 6.2 mills per kilowatt-hour.

In comparing the above costs to alternative Government hydroelectric power projects it is difficult to predict the charges the Bureau would assess against power production. This is due to varying assumptions regarding such items as the extent of subsidy of irrigation costs by power revenue, the subsidy in use of Government funds without interest for non-power-generating portions of the project, and the lack of any Government reimbursement for Government land used or for assumed benefits to flood control and recreation. Rather than attempt such

a comparison, therefore, the writer will instead present the comparative cost of generating an equal amount of power with several suitable steam powerplants located at appropriate load centers.

STEAM PLANT ALTERNATIVE

The cost of power from steam powerplants varies with many factors. However, it is possible to predict the cost of such power, even without detailed location information, more accurately than the Bureau can predict its dam costs, as indicated by past records on the accuracy of steam powerplant cost estimates as compared to dam cost estimates. A recent survey of modern steam-plant costs by competent professional engineers yields the typical information given below for plants in the 50,000 to 300,000 kilowatt capacity size range and with the same peak power to average power output ratio assumed by the Bureau for the combined Split Mountain and Echo Park powerplants. In order not to be unfair in this comparison it has not been assumed that these moderate-sized plants would equal the best recently built plants with less than $125 cost per kilowatt of capacity and a 37 percent thermal efficiency for coal-fired plants. It has instead been assumed that more average modern plants would be built costing $150 per kilowatt of capacity and having a 30 percent thermal efficiency.

	Private utility plants	Federal steam plants
Plant investment for 3 to 6 plants, 285,000 kilowatts [1] at $150	$42,750,000	$42,750,000
Operating and investment costs per kilowatt hour:	*Per year at 6 percent*	*At 2½ percent*
Fixed costs:		
Interest on investment	2,565,000	1,069,000
Income and property taxes	2,565,000	----------
Depreciation at 3 percent based on 20-year amortization with a sinking fund	1,283,000	1,283,000
	6,413,000	2,352,000
	Mills per kilowatt-hour	*Mills per kilowatt-hour*
At the assumed average annual output of 1,660 million kilowatt-hours this fixed cost is (This is an average of 66 percent of full load. Any sale of power above 66 percent would decrease this charge per kilowatt-hours.)	3.9	1.4
Operating (production) costs:		
Labor and supplies	.8	.8
Fuel costs. It is possible that part of the fuel could be very cheap natural gas, but we will assume coal at $4.75 per ton or 24 cents per million B. t. u. (Federal Power Commission reports show power plant fuel costs in the upper basin of 12 to 27 cents per million B. t. u.).	2.7	2.7
Total cost of power at steam plant	7.4	4.9

[1] Drop in installed power if High Glen Canyon Dam used instead of Echo Park and Split Mountain Dams, per Under Secretary Tudor, Jan. 10, 1954.

Some small transmission line cost may have to be added to this to provide equivalent distribution to that included in the Bureau's proposal, but since we have assumed several plants located at load centers most of the cost of distribution for the power would be taken care of by plant location, so for purposes of rough comparison it can be ignored. If a single large plant were built the transmission line cost could be as much as $10 million, but in this case the plant could be located near cheap gas fuel, or at a coal mine, providing cheaper coal, and a single plant would cost less than several smaller ones. The total power cost might therefore actually be reduced. The private utility power would be reduced to about 6.9 mills per kilowatt hour and the Federal steam power to 3.8 mills per kilowatt hour if fuel were used costing 12 cents per million B. t. u. and $10 million were spent on transmission lines amortized in 50 years, with all other costs remaining constant.

EFFECT ON TAXPAYERS AND POWER USERS

It appears that Federal hydropower from Echo and Split Mountain Dams would cost both the taxpayers and the power users substantially more than Federal steam power. Private utility steam power would cost the power users

a little more than the proposed hydropower, but would cost the taxpayers a great deal less.

The 1.4 mill difference between a 7.4 mill private utility price and a 6.0 mill kilowatt-hour Federal hydroplant price would cost the power users an extra $2,320,000 per year, which is hardly enough to cause the users financial distress and is less than private steam plants would pay in income and property taxes. In order to save the upper basin power users this small extra power bill the United States taxpayers as a whole are being asked to provide the following subsidies:

1. Pay $2,565,000 per year of additional income and property taxes otherwise paid by the steam-plant utility companies.
2. Sacrifice one of the most scenic canyon parks in the world to become just another reservoir.
3. Increase the national debt unnecessarily by $282 million minus the cost of the same water storage at other sites.
4. Run the risk of an enormous investment which FPC data indicates may not have enough water to run the turbines.
5. Wait for a 6 year, or longer, construction job when steam plants can be built in less than half the time, and as needed, instead of being based on uncertain long-range predictions.
6. Run the risk that the dams may cost far more than estimated. It was stated in the recent upper basin hearings in the House that the Bureau's past project costs have averaged twice their original estimates. If the cost went up only 30 percent the Bureau's power price would have to go to about 8 mills, or the public would have to increase the subsidy another $80 million.
7. The Bureau's proposed 6.0 mill price is 0.2 mills below their admitted cost, or about $330,000 per year loss. They plan to offset this with cheaper Glen Canyon Dam power but it is still an admitted loss for the Split Mountain increment of power generation.
8. Potential relief for unemployed upper basin coal miners is ignored.

FUTURE ENERGY SOURCES

It may be argued that a few decades in the future the coal, oil shale, and gas fuel supplies of the region may begin to be scarce. However, a look at the technical progress of the last two decades, combined with knowledge of the present stage of development of nuclear (atomic) power leads the writer to the conclusion that it is not safe to predict that there will be, in this century, a strong economic incentive to provide this relatively small and expensive increment of hydroelectric power. When it is vital it would be wise not to have the dam sites already partially filled with silt.

CONCLUSION

The Department of the Interior has indicated that it would not recommend on the basis of power needs alone what it curiously calls an "alteration" of the canyon floor with 500 feet of water. The above analysis corroborates this conclusion and indicates that power production should not even be used as a significant partially supporting argument for flooding the heart of the national monument. In a decade or two the recreational use of these canyon floors will probably increase such that a proposal to flood them would be like proposing today to flood Yosemite Valley for a subsidized and uncertain power saving of 1.4 mills per kilowatt-hour to the users of a rather small increment of power expansion.

The preceding analysis entitled "Is Dinosaur National Monument Needed for Power" was prepared by Alex Hildebrand, licensed professional engineer, who since 1950 has been manager of the development division of a prime research and development contractor of the AEC. This company has studied proposals involving large amounts of power. For fifteen years prior to that he was engineer for a large oil company progressing to position of assistant chief engineer of a large refinery. His extensive experience included in two refineries each of which generated most or all of its own power.

The Sierra Club neither advocates nor opposes Federal subsidization of steam plants. We submit, that the following provides the proper basis of comparison of benefits:

(1) Echo Park, Split Mountain hydro, per kilowatt-hour at market (Bureau of Reclamation) ____ mills	6.2
(2) Equivalent, steam-generated ____ do	4.9
(3) Saving, with steam alternative, per kilowatt-hour ____ do	1.3
(4) Echo Park-Split Mountain annual generation billion kilowatt-hours	1.66
(5) Annual savings in operating and investment costs, steam over hydro	$2,158,000
(6) For 44 years, rounded	95,000,000
(7) Interest subsidy saved taxpayers by earlier retirement of irrigation allocation to participating projects, at 2½ percent	52,000,000
(8) Total saving, 44 years	147,000,000

There would also accumulate, in the 44-year period, a sinking fund of $94,000,000, the residue of which, after deduction for plant rehabilitation, could be available for irrigation payout. Moreover, a possible additional saving in fuel cost would nearly double the profit.

There is abundant coal in the upper basin. Just 10 percent of these reserves would produce power at this rate for 48,000 years, in the course of which an Echo Park Reservoir would have filled with silt 75 times.

And in addition to all this saving, we'd have also saved an important national park.

ATOMIC POWER

The prospects for nuclear power are little short of astounding, and seem to become more so every day. The Washington Post for February 28 carried a significant editorial and a significant news item. The editorial is entitled, "Nuclear Power in Britain" and says in part:

"The British Government's announcement that it is launching a 10-year plan for building electric power stations to be run by nuclear energy is aptly described by Geoffrey Lloyd, Minister of Fuel and Power, as 'historic.' If the program is successful it may mean more to the country than any other industrial development of this generation.

"* * * The program, which calls for the building of 12 nuclear power stations, will cost in the neighborhood of $840 million. The amount of electricity produced will be equal to that from 5 to 6 million tons of coal a year—hardly enough to keep up with the normal increase in requirements for electricity but at least enough to take some of the pressure for increased production off the coal industry. From 1965 onward the Government believes that all new power stations may depend upon nuclear energy; if all goes well the total nuclear power station capacity by 1975 will be 10 to 15 million kilowatts—equivalent to the amount produced by 40 million tons of coal.

"Nuclear power thus is as important to the future growth of some highly industrialized nations as to some underdeveloped ones * * *."

The Post's editorial comment upon Britain's plan is followed by Darrell Garwood's story, in the same issue of the paper, about an interview concerning progress in the same field in the United States. Because so much of this material is highly classified, it is difficult for all of us to know as much about it as we'd like to guide our thinking about the future of our country's energy requirements. What the Post story reveals is of tremendous importance to plans for upper basin water and mineral development; it reads in part:

"W. Kenneth Davis, newly appointed director of the Atomic Energy Commission Reactor Division, said yesterday that before 1960 United States private industry could complete the most advanced type of power station—the kind that will produce more atomic fuel than it burns.

"A British white paper issued last week allows no possibility for this type of atomic generator until about 1970. The first 5 years of British construction will be allocated to a kind of reactor which United States atom builders have already decided to bypass.

"Davis' statement was the first indication the AEC considers the time ripe to start full-scale construction of the so-called breeder, a chain reactor that will more than replace its own fuel while turning out huge quantities of heat for the generation of steam and electricity.

"A small-scale pilot model of the breeder, first atomic device of any kind to produce electricity experimentally, has been operating successfully since 1951 at Arco, Idaho, and a medium-scale model is scheduled for completion in 1958.

"Davis said it is not necessary to wait for completion of the latter before going ahead with plans for a full-scale plant—that the project could start now and be completed in 4 or 5 years.

"Detroit Edison Co., 1 of more than 50 large firms studying atomic construction, has indicated a willingness to build the first commercial breeder.

"Consolidated Edison has announced plans to build in New York the first privately financed, full-scale converter—a type that produces some new atomic fuel, but not more than it consumes.

"The British, in outlining plans for 12 large atomic power stations to cost $840 million, said the first 4 stations to be completed in 1960 and 1961 will be gas-cooled, and 4 more, to be completed in 1963 and 1964, might be liquid-cooled. * * *"

Mr. BROWER. Referring still further to figure 4, if this project is not paid for by hydroelectric power revenue, how can it be paid for?

First, it does not seem realistic to think it can be paid for by hydro revenue. The project is too much and too late—too costly to compete in the new power era we are in.

Mr. ASPINALL. Let me ask you this question. Are you reading from that Senate statement now?

Mr. BROWER. No, these are my notes to myself on my charts.

Mr. ASPINALL. All right.

Mr. BROWER. It cannot fairly compete with upper basin steam power right now.

Second, should power users subsidize agriculture here?

It does not seem so. It hangs a high-cost-power millstone on the upper basin, spoiling its destiny as America's combination of a Switzerland and a redoubt. It seems clear that the basin's future lies in its space and its mineral storehouse; the basin handicaps its future tremendously if it makes power users carry farmers through the process of growing things which can be far more economically produced elsewhere.

That is an opinion. Perhaps power users absolutely must subsidize agriculture. If so, there is a much cheaper way—a tax, for example, of half a mill per kilowatt-hour on the power being generated in the upper basin, by whatever means. The immediate income would be about $4 million per year. Considering the return, this should not add greatly to the tax burden now being carried by power users, which probably ranges from 2 to 4 mills. The tax revenue would increase about $4 million per decade. Even if it did not, there would be more than enough at $4 million per year to build the project outlined in figure 1 in table 1 in ample time to meet storage requirements.

It should also be possible for your economic advisers to arrive at a formula whereby Federal and local governments could share in subsidizing the farmer by an amount equal to the increase in value of his land when water is put on it. In return, he might pay the interest and rehabilitation costs. If more help is needed, step up the tax a mill or two per kilowatt-hour and thus either speed or extend the development. When further high cost food production becomes a necessity, further subsidy may then be required; but that is a decision for the future.

Table 1 gives an example of a step-by-step schedule of reservoir construction in some detail, showing the results of the thesis that in an arid land water must not be wasted to produce hydroelectric power.

(The table referred to can be found on p. 774.) We could start with Flaming Gorge, although Cross Mountain would be more favorable in several respects. We would not advocate any special order, except that Glen Canyon come late owing to its huge evaporation loss and its beauty, and that Echo Park Dam be at the end of the line—which, as you will see, is a long way off.

Flaming Gorge would presumably be needed by 1987 (referring to the table and back to this chart where we read off the dates). Its capacity of 4 million acre-feet would be adequate until at least 1994. The annual evaporation loss would be 56,000 acre-feet, and the annual siltation loss 7,000 acre-feet. Then Cross Mountain in 1994, and Dewey in 2003. Bluff would end a phase; its storage, added to that of the other three would allow full depletion of 7½ million acre-feet in the upper basin.

The next group would replace capacity loss to sediment, Curecanti, Coconino, Desolation, Dark Canyon, miscellaneous dams on the tributaries listed in the footnote, and finally, far in the future at about the time Lake Mead silts up, high Glen Canyon Dam, complete with surcharge, could replace Lake Mead and last until the fourth millenium.

Let me stress, referring to footnote 2, that there will be an enormous saving in evaporation losses if each reservoir is built no sooner than needed for conservation storage and is operated for storage and not for power. This saving would make an additional 250,000 acre-feet annually available to the State of Colorado as compared to the Bureau's plan. There would be proportionate gains for the other upper basin States.

Incidentally, figures exist for evaporation at Desolation, but the 2 sets of figures the Bureau gave you last year are 110,000 acre-feet apart concerning this alternate site.

Now concerning footnote 3, it has been demonstrated at Lake Mead that sediment capacity of reservoirs is about 25 percent greater than water capacity, and that sediment life can be extended greatly by passing small particles downstream in suspension.

Watershed improvement could accomplish wonders. If we can learn how to keep only half the sediment now being transported by the Colorado River out of the river and up on the land where it belongs, Echo Park Dam will not be needed for 2,300 years.

Table 2 shows a comparison of costs between restoration and reclamation of lands, and I think it sets the stage for evaluation of the next two tables. (The table referred to can be found on p. 774.)

I think it clearly demonstrates that the Bureau of Reclamation in close cooperation with the Department of Agriculture can plan projects which we can afford outside the arid part of the West. This may be heresy from a westerner, but I cannot escape it.

Mr. ASPINALL. The Chair will ask that you be able to conclude your statement in 10 minutes, Mr. Brower.

Mr. BROWER. Note that the restoration of lands in various stages of productivity, in New England, Illinois, Missouri and Iowa, ranges from $18 to $101 an acre; that, clearing without stumping, in Massachusetts, the Southeast, the Delta States and the Pacific Northwest ranges from $17 to $39 per acre. Note, too, that most of the price tags have dust on them. They are pretty old, but they still have relative value.

You will note that the table ends up with an estimate for the central Arizona project which goes up to $620 per acre, with a footnote raising it to $2,200.

The bottom of the table shows the source—Prof. Paul B. Sears, president of the American Academy for the Advancement of Science.

Table 3 gives an analysis of costs entailed in the Colorado River storage project and participating projects assuming the Bureau estimates are adequate. (Table referred to appears on p. 775.)

I would make a note that there are two corrections that I need to make in that table: That the interest under part 1, subparagraph 5, should read 531.7 million instead of 364.9 million, and that the total cost of the project would then be $2,470,400,000.

Table 4 shows most of the potential total cost of the entire project. (Table referred to appears on p. 776.) Here again those corrections must be carried forward to this one. Under part 1, the total would be 2.5 billion; part 2, subparagraph B, the interest would be 1.7 billion. The total rounded out would be 2.3 billion and the grand total under part 2 will be 4.8.

In Part 5, the third line, the 1.8 billion should read 2.3, for a total of part 5 of 7.4 billion, and a grand total of 12.2 billion.

You will note that we cite the Bureau's 50-year average, including the Missouri Basin project, and that the factor is pretty high, about 3.6. I realize there have been extenuating circumstances; nevertheless, that is what actually happened, and we have to face it because we would have to pay it.

Mr. HOSMER. Mr. Chairman, may I ask that the witness submit a corrected copy of tables 3 and 4 so that the record may be correct?

Mr. BROWER. I will be happy to do that.

Mr. ASPINALL. The Chair will make that request at the proper time.

Mr. BROWER. Figure 5 is no more than a sheet of graph paper, but I have some notes about it, and that paper has 2,268 squares on it. I should like to relate to the squares to energy.

Someone has predicted that our total energy requirements will double every decade. A more conservative projection, similar to the Bureau's in its 1950 report, adds the equivalent of present consumption every decade. Thus, 1950's total energy, expressed as 6 trillion kilowatt-hours would become 12 trillion in 1960, 18 in 1970, and so on. I can cite the sources of my figures but they do not matter. If they are 10 times too high or 10 times too low, the conclusion remains the same.

In 1978 we will use the equivalent of 22.7 trillion kilowatt-hours of energy—10 billion for each of the squares on the graph paper. Echo Park's power would fill a 10th of 1 square. It would solve nothing; we would need 500 times that much for each succeeding year. By 2030, the Bureau's predicted year full water use, Echo Park would fill three-hundredths of a square—enough to dot an "i" if you use a soft pencil.

We ought to contemplate for a moment how much an impaired Echo Park would take from the national park system, and how little it would add to our energy resource. We ought also to think about what the energy represented by all these squares combined will mean in human terms—more people, more transportation, faster means of travel, more access, more leisure.

More leisure, let us hope, for trips to our beautiful places, to our parks that will meet a demand increased tenfold—provided you not only decide to guard zealously what we have, but also resolve to set aside, while parklands yet remain, far more than we have.

As a final summary, the interest of the conservation groups is to preserve Dinosaur and the national park system. They have sought alternatives to the proposed Echo Park Dam.

2. Reviewing one of these, a high Glen Canyon Dam, we found the figures for the fundamental issue, evaporation loss, causing the Reclamation Bureau to reject it were in error at least 140,000 acre-feet.

3. With this issue gone, the Bureau said the higher dam could not be built for geological reasons. Secretary McKay's explanation of these seems to cast doubt on the Glen Canyon site itself. Without Glen Canyon Dam, the Bureau's entire project is not feasible.

4. However, the Bureau's figures indicate that neither Glen Canyon nor Echo Park holdover storage is needed for water-use projects now being considered. These dams are primarily for power and may not be needed for six or more centuries. Without them the upper basin States would get more water: a new step-by-step project, designed for water, would lose far less by evaporation.

5. If we were somehow wrong about this and all the Bureau's storage were necessary, high Glen would be the most economical place for it and spares Dinosaur.

6. If high Glen can't be built for geological reasons, there is doubt about the Glen Canyon site itself which must be resolved before authorization lest there be more cost-estimate trouble like that in the Missouri Basin, where the $840 million estimate has nearly quadrupled owing to inadequate investigations and engineering.

7. Power lost by substituting high Glen can come more cheaply from coal now, and may soon come still more cheaply from uranium, probably decades before the big dams could be amortized in this arid region.

8. Echo Park's power installation would fill upper basin power-expansion needs for only 16 months. Then, with the park gone for good, other sources would be needed, and should be sought first, not last.

9. Conservationists are sincerely interested in a sound project which respects dedicated lands in Dinosaur. If they are wrong, the dam sites will still be there. If the dammers are wrong and win, nothing can restore the park.

I would like to add, as a postscript that the California Wildlife Federation, consisting of 600 member groups with 80,000 as members in the State of California, has asked me to state to this committee that they are opposed to Echo Park Dam.

Thank you, Mr. Chairman, for your patience.

Mr. ASPINALL. Thank you for the statement.

Unless there is objection, the statement of Mr. Brower as placed before the committee, together with the charts, together with the tables, with the understanding that the tables shall be corrected in accordance with Mr. Brower's testimony, shall be made a part of the record.

Hearing no objection, it is so ordered.

(The statement referred to follows:)

STATEMENT IN SUPPORT OF DINOSAUR NATIONAL MONUMENT

By David R. Brower, executive director of the Sierra Club, before the Subcommittee on Irrigation of the Committee on Interior and Insular Affairs, House of Representatives, March 17, 1955

I represent the Sierra Club, a national conservation organization of 9,000 members, of which I am executive director, and in which I have been active for 20 years. I also speak on behalf of the Federation of Western Outdoor Clubs, a regional organization of 31 separate clubs in California, Oregon, Washington, and Utah whose membership totals 22,000 and includes the Sierra Club. For further details on these organizations and their views as previously expressed I would refer you to testimony beginning on pages 789, 797, 824 of the published hearings on the upper Colorado project held before this subcommittee a year ago last January. I shall not repeat here my earlier testimony.

For 62 years the Sierra Club has been striving to play well the role envisioned for it by John Muir, one of the Nation's greatest conservationists, who was the club's president for its first 22 years. The club's successes—and there have been many—have been due to the devotion and the labors, selflessly volunteered, of many thousands of individuals through these six decades. You would recognize the names of many of them. Like most conservation organizations, this one has many experts and professional men in almost any field you can name, some of whom have received the highest honors their peers can bestow. Membership has included presidents of great universities, of a railroad, of a mining concern, of several scientific societies of the National Reclamation Association; top men in electronics, engineering, hydrology, geology, economics, law, and finance; Members of the Congress and of a State legislature; a justice of a State supreme court; four directors of the National Park Service, the previous Republican Secretary of the Interior; great teachers and great writers: All-American football players, outstanding mountaineers and skiers. And a host of people whose names may never get in the papers at all.

What do they have in common? A certain kind of humility in the presence of the natural beauty in the outdoor world. They have joined together to enjoy for themselves some of the finest scenery in the country, and to try to make sure, for the sake of their sons and yours, that man should not endeavor to scratch his name over the entire face of the land, but that man should instead leave some of the land unmarred, unaltered, and unimpaired, that we might always know with what skill and artistry God made the earth, unaided by man.

The board of directors of the Sierra Club, drawing upon the wide scope of knowledge within the membership, and after careful study has taken this stand, and no member of the club has protested it: The Sierra Club has no objection to a sound upper Colorado River storage project that does not impair the national park and wilderness system.

Our national parks, monuments, and wilderness are a priceless asset. They are the fruition of 90 years of prodigious effort on the part of men of great vision. I need not sing the praises of our enviable national park system before Congress because it was Congress which established the National Park Service in 1916 and which has steadily improved and protected the system ever since.

I am well assured of your appreciation of the national park system. Yet I am not sure that those people who are in the best position to know have presented to you the importance of Dinosaur National Monument to that system.

Words won't do it. Pictures won't do it very well. One of our printers commented, "We've seen a lot of pictures of Dinosaur, and I thought that you had probably shown all there was to see." This man had also seen two-color motion pictures of boat trips down the canyons. "But I just wasn't prepared for what I saw," he told me. "It just keeps unfolding and unfolding, always different. I rode with a different boatman every day, and each one told me, 'Today's the best of all.' It's the most gorgeous place I've ever seen."

The printer and his wife were on the first Sierra Club trip last year—the first of five, which traveled across the monument from east to west—86 miles of floating from Lily Park through Split Mountain Gorge.

My secretary went on that trip, too. For more than a year she had been seeing letters, pictures, clippings, and articles about Dinosaur, as well as the two movies. She has seen very few parks and I'm not sure she had ever camped out before. She wanted to try the river trip and off she went. "But I'm going to walk around those rapids," she told me. She is one of those blonds who tan beautifully, and she came back a week ago Monday from the 6-day trip, beauti-

fully tanned. Ask her about that trip, and all you get is a rapturous sigh. It was the best trip she had ever had, anywhere. And did she walk around the rapids? Not one. She helped the boatmen row through some of them.

When there wasn't enough splash from rapids, the 10-boat flotilla with some 70 people aboard, got into water fights to keep things lively. You can splash quite a lot of water on someone if you use an oar or a baling can right. Helping in the battle, with their dignity pleasantly relaxed, were one of the Nation's foremost physicists and an Assistant United States Attorney General. The physicist had his 4-year-old daughter along. She helped too. And so did the leader of the trip—who is a great-grandfather.

Two of my boys and I hope we can take the river trip again ourselves. As it is, we'll wait until next year. Once isn't enough by any means. Six days only serve to tantalize you, to show you 20 new places you'd like to camp in and explore. I'm using the word "you" in a general sense; it probably covers everyone in this room who has any liking at all for the outdoors and who doesn't mind sleeping out in the open.

It doesn't break you, either. Last year the nearly 300 people from all parts of the country who took the Sierra Club's nonprofit trip paid $65 for 6 days on the river, including boats, boatmen, leadership, food, and a small crew to do most of the cooking and pot walloping.

Is it hazardous? Without proper precautions you can get into trouble and not just on a river. Even in a bathtub. I'd say the greatest hazard is driving to Vernal, Utah, the jumping-off point. One man from Vernal, who I am quite sure had not been down the river, alternates between saying a corpse could make the trip and you may be a corpse if you try. Having been through once I know I would hesitate to go through the monument in a boat of my own until I had learned more about river running, but I wouldn't hesitate to go on an organized trip with skilled boatment along. Likewise, I'd hesitate to take a horse into national-park back country until I knew more about horses. Once you yourself step into one of Bus Hatch's rubber boats and let one of his boatmen take you down the Yampa or the Green, you'll not be worried again over alarmist claims about the river hazards in Dinosaur.

Yes; I am sure that once you have gone through you will well understand why hundreds of people who have been through consider entirely wrong the claim that a dam would enhance this place. It would do to Dinosaur what a dam would do to Yosemite Valley—destroy the best of the Valley itself, and do untold damage to the effect of Yosemite National Park as a whole as well as to the national-park idea. As the National Park Service itself has said, the effects of the dam would be deplorable.

It seems to us well worth extremely great effort to find a way to preserve and enjoy Dinosaur just as it is, unaltered and unimpaired. We have only begun to see how much it can mean to the nation as a primeval national park, one of the finest units in all the system, unexcelled by any canyon park.

The Sierra Club, with its own limited means of bringing the Dinosaur River trips to public attention, has encouraged a good 500 people to see Dinosaur for themselves on club-organized trips. It will be 32 years before all our membership goes through at this rate, and by then there will be a new generation on deck. It's worth bearing in mind that 300 people who take a 6-day river trip are getting as many man-hours of enjoyment as about 40,000 people who take the short dusty ride from Highway 40 to the hot little museum and quarry to look at the Dinosaur bones.

Isn't it worth exploring how much this unique and enjoyable canyon travel can expand without damaging the place? What would the potential be, for example, if other groups arranged trips like the Sierra Club's? What would happen, too, if the chamber of commerce in Vernal, the natural gateway to the wild beauty of the Dinosaur canyons, were to start encouraging transcontinental travelers to pause for a good trip to or down the canyons?

The man-days of use per year might eventually number several hundred thousand and the natural qualities of Dinosaur National Monument would be continuously sought out for their unique beauty by national park travelers

Let me emphasize that this is a theoretical potential use of Dinosaur's recreation possibilities as a natural national park. It may never get that high; I myself feel that there are other values to national parks than those measured by counting the crowds who pass by. The headcount puts the emphasis on quantity, and is too likely to overlook the qualitative experience national parks can and should provide. It is not getting to the bottom of the issue to say that one

area is good because 2 million people pass by each year and another area is useless because only 20,000 people see it. I think that it is the re-creative, inspirational values that we must consider here, and that have been considered well by those who have set up and protected the national park system.

If, however, the Echo Park Reservoir replaces the wild canyon rivers, Dinosaur could not be expected to be the mecca for reservoir recreation predicted by those who would flood its canyons. Its national park qualities would have vanished. It would be one more reservoir in an upper basin project calling for 700 miles of new reservoirs to add to the Nation's existing hundreds of miles of reservoirs. In summer it would be a hot and glaring lake with no attractive woods growing at its fluctuating waterline. Vast areas of denuded landscape would be exposed year after year. The reservoir might fill once or twice in 40 years, and all its active storage might be drawn down as often. The intermittently drowned and desiccated vegetation would be no attraction. The rapid encroachment of silt, exposed in varying amounts according to drawdown, would repel travel in the upper reaches and in the embayments. If history of other reservoirs is a fair criterion, there would be a momentary improvement of fishing, then a steady decline. Its summer upland temperatures would be hot, its glare unrelieved; its winter climate would be too severe. It is not in the climatic zone that can bring large numbers of travelers past Lake Mead the year around.

Not in our time, of course, but in due time, and depending upon whose sedimentation scale we rely upon, this reservoir, and all the beauty it inundated, would completely silt up. The top 200 feet on Steamboat Rock would be the tombstone for a park that need not have died. These estimates have solid basis in three examples which we ought to heed.

Lake Mead.—Prior to construction of Hoover Dam and formation of Lake Mead, this region was not a public attraction. The scenery is spectacular and tremendous in expanse but no single natural feature or group of natural features was given national attention.

Total travel to Lake Mead national recreation area for 1952 was 2,220,940 persons. Approximately 300 people a year took the all-day scenic boat trip; approximately 4,500 people a year took the 1-hour boat trip on the lake; approximately 500 people a year, 3-hour scenic boat trip.

The fluctuation hampers recreation use of the lake to a very marked degree and adds tremendously to the cost of maintaining boat docks, boat launching facilities, sanitation along the shore, swimming facilities, and many other public use facilities, including safety and navigation aids.

Siltation has made it necessary to abandon all lakeshore facilities at Pierce Ferry, once a popular harbor. Lake Mead is now drawn down 130 feet.

Obviously, reservoir recreation provides for a real, if different need. There is great opportunity for it now, and the opportunity will increase. It need not, and should not, increase at the expense of parks.

Hetch Hetchy.—In Yosemite National Park we learned a costly lesson, and once is too often. Back in 1911 there was no National Park Service to protect an irreplaceable scenic valley. And proponents of Hetch Hetchy dam were claiming: San Francisco will wither without this water; we must have this cheap power; there are no good alternatives; the scenery will be enhanced; greater accessibility will result; nature lovers are obstructing progress; California's land must be used for California's benefit.

In 1954 we know better, too late. Not one of these claims proved valid. Yet we are now hearing parallel claims for Echo Park. We are still not faced with a choice between water and scenery; sound planning will conserve both.

We know that our superb and enviable national park system is not an accident. Men of vision have been building it for 90 years. Ninety years from now the need for parks will be greater. And posterity deserves the best, not the dregs, of the things that make America beautiful. They and we can have them if we keep our vision clear.

A threat like that to Hetch Hetchy and Dinosaur was staved off in 1921 in Yellowstone National Park. Dam proponents were then urging a project to raise Yellowstone Lake 6 feet. It would help the park, they said, increasing the size and beauty of Yellowstone Falls. Arguments that it would create a dangerous precedent they tried to dismiss as visionary and sentimental.

Defenders of the new national park system, however, prevailed. They revealed the project's incompetency to accomplish the results claimed for it. For-

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mer Secretary of the Interior John Barton Payne pointed out: "The water does not stay in the park. Use it outside."

It was for this committee that he summed up the case of park protection with the remark, "There's a heap more in this world than three meals a day."

The threat to Yellowstone resulted in passage of the Jones-Esch bill rescuing national parks and monuments from the application of the Water Power Act—a protection broadened by a 1935 amendment and cited in the proclamation enlarging Dinosaur National Monument to its present magnificent scope.

In Hetch Hetchy there was no national park service and the national park system lost.

In Yellowstone, the Department of the Interior stood behind the park service and the parks gained protection.

In Dinosaur the issues are in essence the same. But the national park service cannot speak. Protection of the park system is thus up to the people, who own it, and their Congress. Eternal vigilance is the price of liberty—and of national parks.

All along, the Sierra Club's chief concern has been national-park and national-wilderness preservation. The principle of park preservation should be able to stand alone. But we have been persuaded by practical men that one way to prevent park invasion is to offer alternatives to that invasion. This has led us to study more thoroughly than we wished the details of the upper Colorado storage project, to make our own observations about it, to check them with experts to dig out facts that were missing in the basic 1950 report on the project by the Bureau of Reclamation, to discover important errors, and to see the Bureau correct some of them.

From this study we came up with this tentative conclusion, which we can amplify in such detail and with such documentation as you may wish. That conclusion: Even if the present plan did not invade the park system, which it does, and even if the total plan had been proved necessary (we do not find that it has), still it is not a sound project.

When I was pointing out various probable flaws in its soundness before the Hoover Commission task force in San Francisco last May, Governor Lee, of Utah, said to me: "Don't you think you are on sounder ground in your argument on that basis (unsoundness) than you are that it is going to injure some park * * *. I think your soundest argument is against the cost, and certainly isn't because it is part of the national park system." (I quote him directly.)

I disagreed, because we believe that if we defended only those parks which could not be soundly exploited, our national park system would have died before Abraham Lincoln started it. That does not mean, however, that we feel we should shun considerations of engineering or economic or agricultural soundness.

I have gone into these questions with no engineering background except what an editor can acquire when his father and his brother are engineers, and when he knows a few very good engineers to go to for assistance. This is similar to the procedure an attorney would follow in the same situation. The following deals with questions and answers arising from discussions with competent authorities in the various fields concerned. I hope they will help you in defining a sound project.

TWO CONSTRUCTIVE SUGGESTIONS

We have two constructive suggestions to offer. First, we urge that destruction of park values be avoided and that the national park and wilderness system be improved.

Our findings agreed with those of the best qualified experts, who have devoted their careers or their philanthropic efforts to park preservation. Our findings are that dams in Dinosaur would forever destroy all that is of national-park meaning in the place. We know that Dinosaur, for all its relative obscurity today, is one of the finest parts of the national park system. We know that an invasion here will gravely threaten the entire system. For although you can ask yourselves here, "To dam or not to dam?" it is beyond anyone's power, gentlemen, to say what will or will not be a precedent. Only time can decree that. What goes before is precedent, and cannot be undone.

If a half-century-old reclamation withdrawal at Brown's Park should now be used to destroy the park quality of the heart of Dinosaur, then Kings Canyon National Park is on the way out along the same road. The destructive pattern would have been set.

The Federal agency that would normally be here to protect the parks from a damaging precedent cannot appear without jeopardy. The charts, the photo-

graphs, the documents, the tables and diagrams, the staff, the pleas—all these things that an efficient agency of the administration could have assembled to help save the parks—this service has been denied to you, and I fear that the agency would suffer were you to order it to appear.

A mere handful of men, most of them laymen, are trying to fill that wide gap. They come to represent organizations concerned with the public interest in conservation, organizations that exist on modest dues paid by devoted members. It is an enormous responsibility.

The Sierra Club's second constructive suggestion concerns a proposal for a new look at the Colorado storage project. The proposal covers many fields of study, and as I have pointed out earlier, we have been most fortunate to have been able to rely on expert opinion, both from within and from outside our own membership, for our information in these various fields.

In outlining the proposal of a revised project, I must necessarily speak in round numbers, for our basic data, those compiled by the Bureau of Reclamation, have not yet been subjected to the dispassionate check which has been urged by many advisors to the administration and by independent agencies. Round numbers will, however, provide you with the general order of magnitude of what is involved.

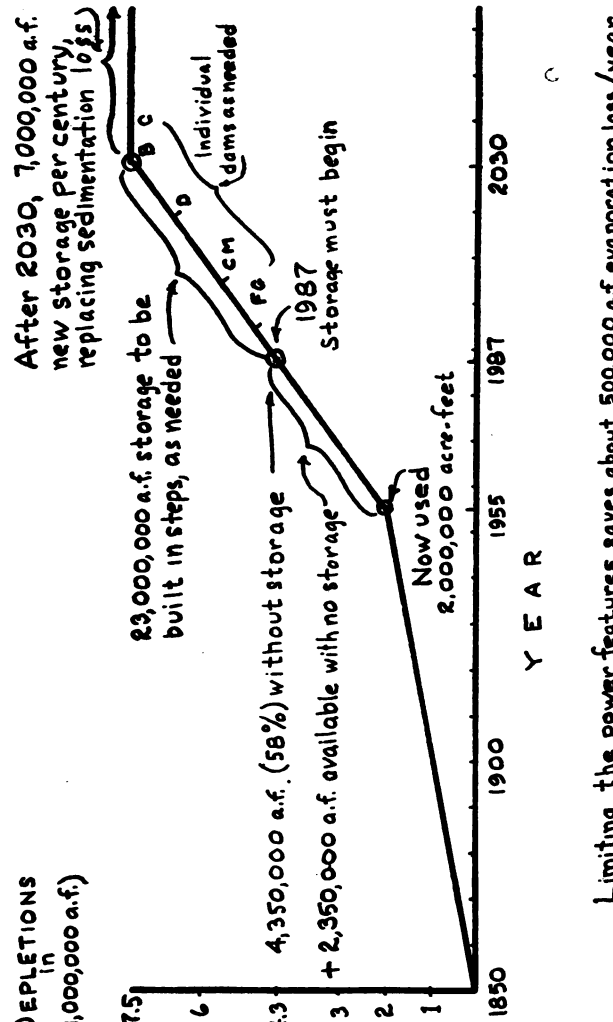
PROPOSAL FOR A NEW LOOK

I have felt that this different look at the upper basin's water needs and how better to fulfill them can best be presented in charts and tables, which I would like you to refer to while I explain them. I would emphasize that the basic data are the Bureau's. As everyone knows, it is one thing to gather data, and another thing to interpret them. This different interpretation is suggested, but not followed up, in various parts of the basic 1950 Bureau report. It is what inevitably comes to light if you go through all the data so expertly and painstakingly compiled with a different end in view: not how much power, but how much water. It is the logical question to ask, for unlike most of the rest of the country, the Colorado basin is essentially a land of little rain. Major Powell discovered this when he first traveled down the river and named Echo Park, in 1869. It is still true. This is an arid land. Power can come from any other sources and means may easily be devised for power users to help water users if that must be the decision. But water cannot come from other sources, and water, as all you gentlemen know, either is or will be critical in this region.

The charts and tables, then, are addessed to the choice the Colorado Basin States must make. It is not a choice between water and parks. We can have both. It is a choice between water, which we have heard time and again there is desperate need for—a choice between water and costly hydroelectric power which wastes water and risks a vast public debt which has not been justified and, I believe, cannot under any now foreseeable circumstances be justified.

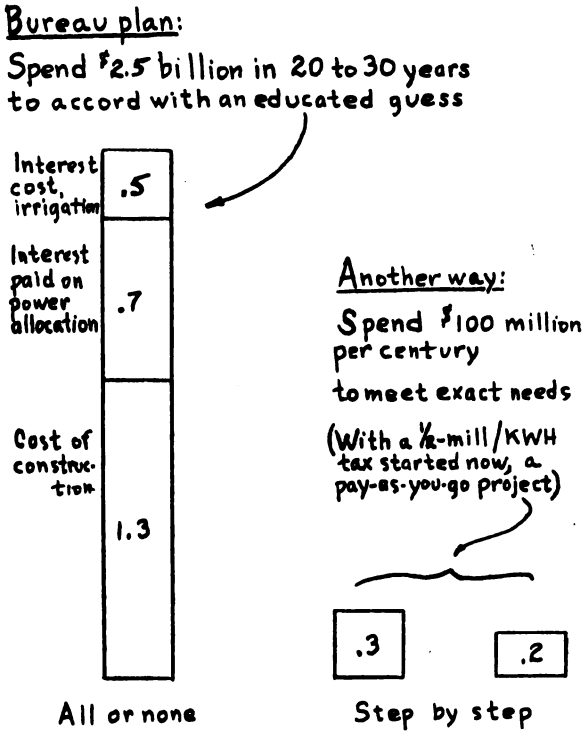
Chart 1, though not too expertly prepared, is the key chart, and the subsequent charts and tables help amplify it.

FIGURE 1



Limiting the power features saves about 500,000 a.f. evaporation loss/year

Comparison of Risk FIGURE 2



Cost figures derived from H.D. 364 (1954, pp. 49 [facing], 51)

Reservoir Operations—AREA-CAPACITY CURVE, GLEN CANYON

FIGURE 3

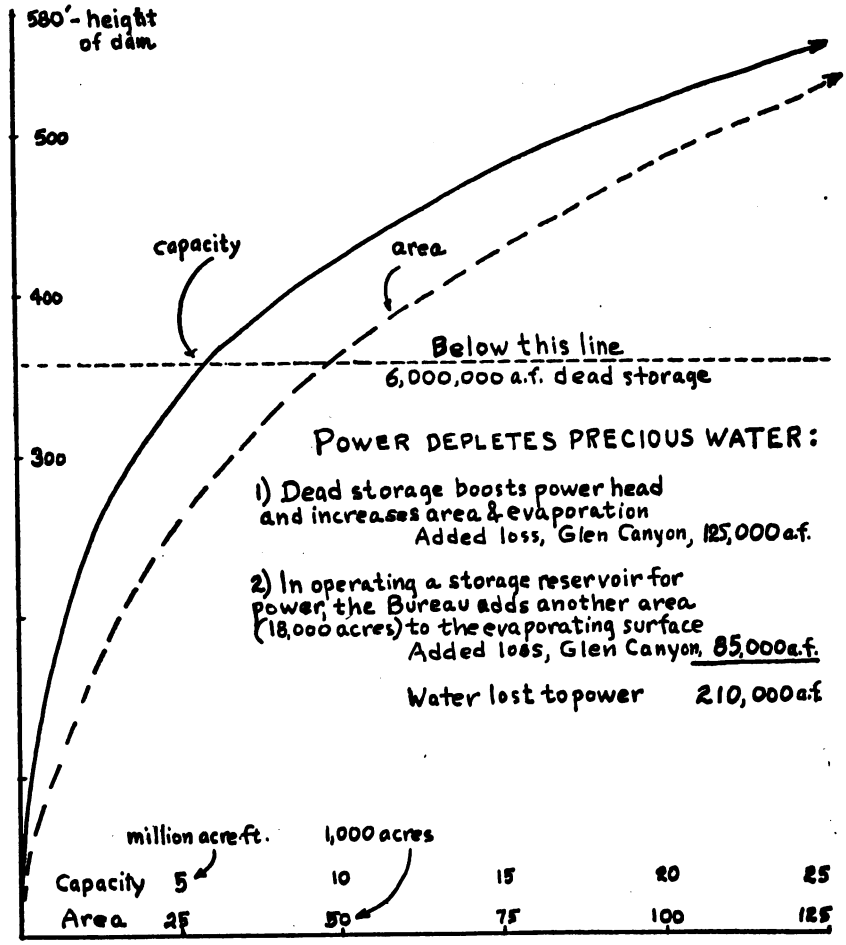


FIGURE 4

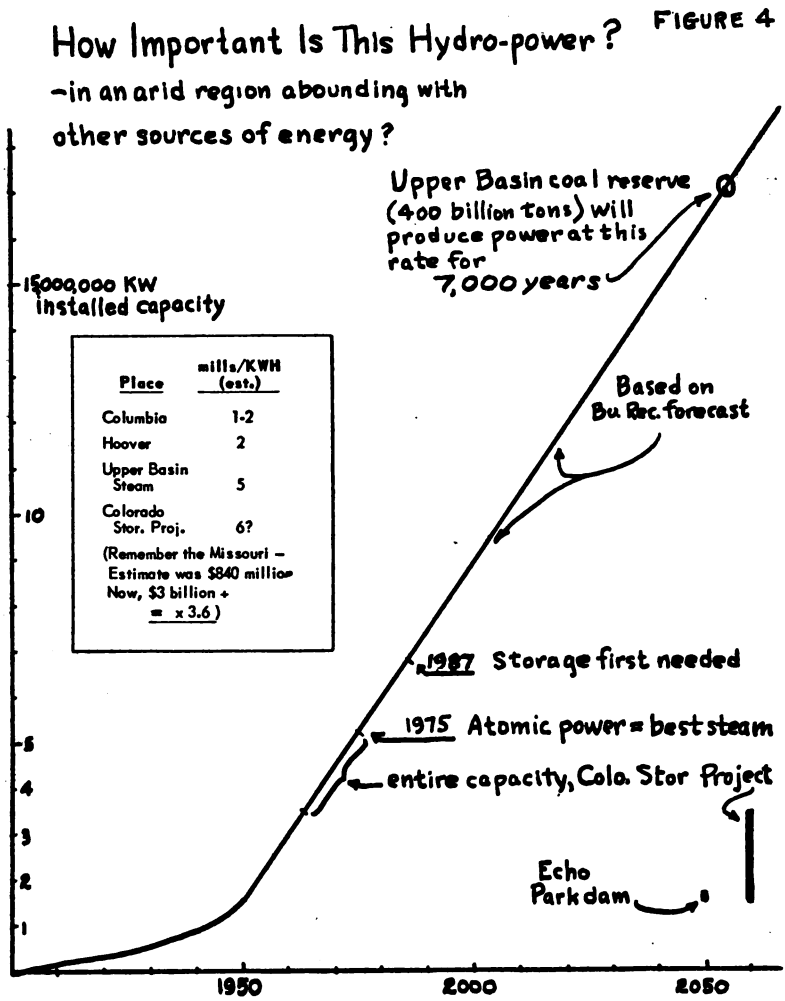


TABLE 1.—*Example of a step-by-step schedule of reservoir construction*

[Assuming that in an arid land water cannot be wasted to produce hydro-electric power]

Dam	Year needed	Capacity	Adequate until	Annual evaporation loss [1]	Annual silt loss [2]
Flaming Gorge	1987	4,000,000	1994	56,000	7,000
Cross Mountain	1994	5,200,000	2003	70,000	1,500
Dewey	2003	8,000,000	2018	253,000	12,500
Bluff	2018	7,000,000	2030	170,000	30,000
Curecanti	2030	2,500,000	2066	32,000	300
DeBeque, Coconino	2066	4,500,000	2150		
Desolation, Dark Canyon	2150	14,000,000	2350		
Miscellaneous on tributaries [3]	2350	14,000,000	2550		
Glen (high), after Lake Mead silts up	2550	34,000,000	[4] 3100	600,000	77,000

[1] There will be enormous savings in evaporation losses if each reservoir (*a*) is built no sooner than needed for conservation storage; (*b*) is operated for storage and not for power. This would make an additional 250,000 acre-feet annually available to Colorado (proportionate gains for other Upper Basin States), compared to the present Bureau plan.

[2] Sediment capacity of reservoirs is about 25 percent greater than water capacity. Sediment-life can be extended by passing small particles downstream in suspension, and by watershed improvement.

[3] Assumes further development of sites on the Blue, Gunnison, White, Dolores, Duchesne, Price, San Rafael, Dirty Devil, Escalante, Little Snake, San Juan, and Little Colorado Rivers.

[4] If we can learn how to keep half the sediment now transported by the Colorado River out of the river and on the land where it belongs, Echo Park dam will not be needed for 2,300 years.

TABLE 2.—*Comparison of costs, restoration and reclamation*

Purpose of project	Area	Average cost per acre	Year of estimate
Restoration of lands in various stages of productivity.	Average United States	$30.00	1949
	New England	19.00	1948
		24.50– 101.00	1950
	Illinois	14.50– 22.63	1947
		24.00	1949
		35.00	1949
	Missouri	36.30	1948
	Iowa	18.00	1949
Clearing without stumping	Massachusetts	15.00– 30.00	1947
	Southeast	25.00	1946
	Delta States	17.00	1930–40
	Pacific Northwest	18.00– 39.00	1944
Complete clearing (after deduction of salable timber).	General	50.00– 75.00	1946
	Massachusetts	95.00– 160.00	1947
	North and South Carolina	36.00– 50.00	1947
	Delta States	30.00– 100.00	1945–48
	Pacific Northwest	57.00– 200.00	1944
Drainage	General (new areas)	15.00– 40.00	1946
	Rhode Island (including clearing)	30.00– 125.00	1948
	South Carolina	40.00	1948
	Delta States	8.00– 25.00	1945–48
Irrigation [1]	Columbia Basin	233.00	1950
	Central Valley	300.00– 690.00	1950
	Missouri Basin:		
	Supplemental	145.00	1950
	New land	440.00	1950
	Rio Grande: Fort Sumner project	380.00	1950
	Colorado:		
	Grand Valley project	141.00	
	Central Arizona project	[2] 620.00	1948

[1] Report of the President's Water Resources Policy Commission, 1951, Ten Rivers in America's Future. Includes only costs allocated to irrigation.

[2] $2,200 if new acreage actually benefited is considered.

Source: Comparative Costs of Restoration and Reclamation of Land, by Paul B. Sears, president of American Academy of the Advancement of Science, in The Annals of the American Academy of Political and Social Science, May 1952.

TABLE 3.—*Costs, Colorado River storage project and participating projects*

[Assuming Bureau estimates adequate; page references to H. Doc. 364, 1954]

I. Storage and power project costs:	
(1) 9 dams, irrigation allocation (p. 51)	$166,800,000
(2) 9 dams, power costs assigned including interest during construction (p. 51)	1,045,900,000
(3) Central Utah power feature:	
(*a*) Total (col. 6, facing p. 49)	586,200,000
(*b*) Less Glen (col. 7, p. 51)	376,600,000
(*c*) Less Echo (col. 7, p. 51)	141,800,000
(*d*) Total deduction	518,400,000
(*e*) Difference	67,800,000
(4) Interest on power costs assigned:	
(*a*) Ratio investment: interest (col. 16, 17, facing p. 49) is 586.2:359.2=c. 10:6.	
(*b*) Total power costs (2)+(3,e), 1113.7.	
(*c*) Interest, 10:6 ratio on this amount	668,200,000
(5) Interest on deferred repayment of irrigation allocation (1) for 44 years and during 16-year deferred repayment periods, at 2.5 percent compounded (at end of which period there will remain an unpaid balance of $531,730,000)	531,700,000
Total cost	$2,480,400,000
II. Water made available by storage project—cost per acre-foot:	
(1) Available to upper basin when full use is made	7,500,000
Available with no storage (58 percent of above	−4,350,000
Less lost by storage project evaporation	−850,000
Not gained by storage project, acre-feet	2,300,000
(2) Storage cost per acre-foot to power users and United States taxpayers (2.5 billion divided by 2.3 million)	1,080
(NOTE.—No such allocation is charged against municipal use in central Utah project, a subsidy of $48,800,000.)	
III. Storage-project costs per new acre or equivalent:	
Assuming average of 1.6 acre-feet per acre	1,725
IV. Central Utah project costs per acre, based on allocated costs shown:	
Adjusting the acreage getting supplemental water to the 1.6 acre-foot/acre average, the depletion figure translates into 87,000 acres for which the irrigation allocation is $127,500,000, exclusive of approximately $11,000,000 in nonreimbursables and ultimate-phase cost	1,460
V. Total central Utah project cost per acre to power users and taxpayers:	
(1) Storage project allocation (I)	1,725
(2) Allocable to irrigation (IV)	1,460
(3) Interest on (2), derived as in I,5)	4,630
Total	7,815
Irrigator's ability to repay	175
Total	7,640

TABLE 4.—*Potential total cost of project*

(*1*) Storage project costs, from table 3	$2,480,400,000
(*2*) Cost of putting 1,000,000 acre-feet of water on the land, from tables 1 and 2 of February 28 statement of E. O. Larson, including 15 participating projects:	
(*a*) Irrigation allocation	530,627,200
(*b*) Interest, compounded as in table 3	1,690,750,000
(*c*) Municipal water	72,275,000
(*d*) Municipal water interest cost (10:6)	43,200,000
Total, rounded	2,336,850,000
Total involved in present bills	4,800,000,000
(*3*) Water depleted when projects now authorized or under construction are complete, in acre feet	2,500,000
Water that will be depleted by the expenditure of $4 billion, above:	
Beneficially used	1,000,000
Evaporated	850,000
Total	1,850,000
Total	4,350,000
(*4*) Remaining for upper basin depletion	3,150,000
(*5*) Projected cost, assuming the same expenditure per remaining acre-foot as made in (*2*), 3.15 million acre-feet times 2.3 billion, rounded	7,300,000,000
Potential total cost, initial and ultimate phases, rounded	[1] 12,100,000,000

[1] Does not include unpaid balance accrued in interest cost for irrigation allocations on which the interest cost is not charged but will be paid by United States:

(*a*) On storage project (table 3, I, 5)	$531,700,000
(*b*) On 15 participating projects (above [2b])	1,690,750,000
(*c*) On ultimate phase (line above×3.15)	5,335,862,000
Total	7,600,000,000

This assumes that the Bureau of Reclamation will keep within its estimate; it also assumes that the ultimate-phase participating projects are as economical per acre-foot as the initial projects. The Bureau's 50-year average, excluding the Missouri Basin project, is to exceed its estimates by slightly more than 100 percent. On the Missouri project the original estimate has now been multiplied by a factor of 360 percent.

SUMMARY

1. The interest of the conservation groups is to preserve Dinosaur and the national park system. They have sought alternatives to the proposed Echo Park Dam.

2. Reviewing one of these, a high Glen Canyon Dam, we found the figures for the fundamental issue (evaporation loss) causing the Reclamation Bureau to reject it were in error (at least 140,000 acre-feet).

3. With this issue gone, the Bureau said the higher dam could not be built for geological reasons. Secretary McKay's explanation of these seems to cast doubt on the Glen Canyon site itself. Without Glen Canyon Dam, the Bureau's entire project is not feasible.

4. However, the Bureau's figures indicate that neither Glen Canyon nor Echo Park holdover storage is needed for water-use projects now being considered. These dams are primarily for power and may not be needed for 4 or 5 centuries. Without them the upper basin States would get more water: a new step-by-step project, designed for water, would lose far less by evaporation.

5. If we were somehow wrong about this and all the Bureau's storage were necessary, high Glen would be the most economical place for it and spares Dinosaur.

6. If high Glen can't be built for geological reasons, there is doubt about the Glen Canyon site itself which must be resolved before authorization lest there be more cost-estimate trouble like that in the Missouri Basin, where the $840 million estimate has nearly quadrupled owing to inadequate investigations and engineering.

7. Power lost by substituting high Glen can come more cheaply from coal now, and may soon come still more cheaply from uranium, probably decades before the big dams could be amortized in this arid region.

8. Echo Park's power installation would fill upper basin power-expansion needs for only 16 months. Then, with the park gone for good, other sources would be needed—and should be sought first, not last.

9. Conservationists are sincerely interested in a sound project which respects dedicated lands in Dinosaur. If they are wrong, the dam sites will still be there. If the dammers are wrong and win, nothing can restore the park.

Mr. ASPINALL. It is believed that we will be able to meet at 2:30 this afternoon, and with that understanding, the Chair will now recess the committee until 2:30 p. m. with the understanding that this afternoon we shall conclude our cross-examination of the three witnesses that have been before the committee this morning.

Is there any objection to that procedure?

Hearing none, it is so ordered. The committee stands in recess.

(Whereupon, at 11:55 a. m., the subcommittee recessed to reconvene at 2:30 p. m., of the same day.)

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will be in order for the further consideration of the legislation before the committee.

The Chair wishes to call to the attention of members of the committee that there are now available statements by Mr. Ely, Mr. Matthew, Mr. Morris, Mr. Simpson, Mr. Howard, and Mr. Hughes, stating the position of certain California and southern California interests on this legislation. These gentlemen will be before the committee tomorrow morning, and copies of their statements can be secured this afternoon or this evening if desired by members of the committee.

There are also available statements by representatives of the communities of Price and Helper, Utah, appearing in opposition to the participating project known as the Gooseberry project. The Chair hopes that members who have interest in their statement will get a copy of it, study it this evening, and be able to permit it to be introduced as a part of the record in tomorrow morning's session, at the beginning of the session, without taking too much time. These gentlemen do not appear in opposition to any part of the project except the Gooseberry, and then only at this time because of certain testimony that has been placed in the record by a witness appearing in favor of the legislation.

At this time the Chair would remind the members of the committee that we had an agreement that we would finish with the cross-examination of the three witnesses who appeared before the committee this morning at this afternoon's session, and we will try to divide the time accordingly. We will appreciate it if we can adjourn the committee this afternoon sometime between 4 and 4:30.

The Chair recognizes the gentleman from Utah, Mr. Dawson, and the witnesses will take their position before the witness table—General Grant, Governor Miller, and Mr. Brower.

QUESTION PERIOD OF U. S. GRANT III, LESLIE A. MILLER, AND DAVID BROWER

Mr. DAWSON. General Grant, I believe you were the first witness, and I want to join with my colleague from Colorado and tell you, while we may differ in some of the views we have on the preservation of our monuments, we do respect your opinions and we are mighty pleased to have you here.

I might, first of all, ask you if you have been out to see our Dinosaur area since we were here last year?

General GRANT. No, sir; I have not been able to, except to fly over it, which is not a satisfactory view.

Mr. DAWSON. I am rather amazed at that because, if I recall, the last time you were here you made a similar statement as to what you made this time, extolling the beauties of our country and telling what was out there, and I was in hopes you might have gone out to see it for yourself.

General GRANT. I hoped so to do, Mr. Dawson, but it could not be managed last year.

Mr. DAWSON. I am appreciative of the statement you made that you are sincerely interested in the development of the upper Colorado, and I assume you mean just that, do you not?

General GRANT. I am not at all against the development of the upper Colorado Basin, and I believe a sound and economic project can be worked out. I am against the Echo Park Dam, and I do not think it is necessary.

Mr. DAWSON. Are you here primarily to protect Echo Park or Dinosaur National Monument area, or are you here opposing this project because of its economic phases?

General GRANT. As a representative of the American Planning and Civic Association, sir, we are opposed to the Echo Park Dam, and that is the extent of our interest. But, having gotten into the subject and finding that the economic justification of the Echo Park Dam does not seem to be established properly, and finding that there are other arguments and questions arising, and that maybe the program is not well thought out as a whole, I thought this was only the duty of a good citizen to bring that to the attention of the committee, too.

Mr. DAWSON. A year ago I do not think you had any objection to the rest of the project if Echo Park Dam were taken out of it. Am I correct in that?

General GRANT. That is correct, as representing the American Planning and Civic Association.

Mr. DAWSON. And since that time, I take it, you are following the same argument that Mr. Brower and others from California have now raised against this project?

General GRANT. Since that time, sir, as I have gone into it more and more, I have become convinced that the whole project should be restudied. As I say, I think there is a possibility of a sound and economically justifiable project along the lines that I suggested in my statement today. That is my personal view and is not for the American Planning and Civic Association.

Mr. DAWSON. Will you repeat again what you consider to be sound and economic justification?

General GRANT. I think that the development of hydroelectric power where it is as expensive as it is at the Echo Park Dam, or any other one of these dams, except perhaps the Cross Mountain and, of course, the Glen Canyon, is bad and contrary to the interests of the country.

Mr. DAWSON. Then how do you account for the fact that the people in the lower basin are very desirous of securing this power at 6 mills, which is the rate at which it would be sold at the load centers?

General GRANT. You mean the power companies?

Mr. DAWSON. Yes.

General GRANT. I think they probably are interested in getting it at that price, sir. They will be saved a great deal of trouble. I do not think that is the price they are going to sell it to the consumer for, is it, sir?

Mr. DAWSON. That was not my point. My point was, why would the representatives from the lower basin States be insisting that they be permitted to share in this power pool and purchase power at that rate?

General GRANT. I do not know anything about the psychology of the lower basin States.

Mr. DAWSON. General Grant, another part of your statement that rather concerns me is your interpretation of the proclamation of the President in which the Brown's Park site was reserved, and also the proclamation was subject to the Power Act, power withdrawals.

Mr. ASPINALL. Would the gentleman from Utah yield for a question at that point?

Mr. DAWSON. Yes, I yield.

Mr. ASPINALL. General Grant, if after more study it could be logically shown that your interpretation of the reservation was wrong and that there has been no established policy up to the present time to stay out of such a monument as Dinosaur National Monument, and in particular for power development, would that change your position upon going into the Dinosaur National Park with this power development program?

General GRANT. Not at all, sir.

Mr. DAWSON. In other words, General, we will assume we were going to build the dam at Brown's Park site. You would then still be opposed to such a dam?

General GRANT. No, sir, not that, because I think that was reserved in the first place and not essential to the monument and will not affect materially the scenery that we are concerned about.

Mr. DAWSON. Of course, you are talking about precedent, are you not, that you do not want to see any precedent set? Would not that set a precedent if we construct it at Brown's Park site?

General GRANT. No, sir, because in the definition of the monument there had been claims filed on that site, and that was excepted from the monument. So it would not be an invasion of the monument.

Mr. DAWSON. I cannot follow your reasoning. It would still be an invasion, would it not, and it would be a precedent? In other words, they are building a dam for the first time within a national monument. Is not that the precedent you are objecting to?

General GRANT. That is the precedent we object to, yes, but I do not think that that would be a breach of the policy because that site was expected in the Executive order setting up the monument.

Mr. DAWSON. That brings me to my next question, and that is an interpretation of the phrase in the proclamation which refers to making this subject to the Federal Power Act. In the proclamation it states:

Except that this reservation shall not affect the operation of the Federal Power Act of June 10, 1920, as amended.

Then it goes on also to make it subject to the withdrawal for the Brown's Park Reservoir site.

I have read your interpretation of that statement, which I think is rather strained reasoning, and with the permission of the committee at this time, I would like to have inserted in the records at this point the analysis which was made by the counsel for this committee last year on pages 719 through 747 of the record.

I make that request for this reason. I hate to prolong the discussion here on this matter, but if there is objection, then I would like permission for the committee counsel to interrogate the witness on this particular subject.

Mr. SAYLOR. I object. In other words, you have had throughout the time that the proponents of this bill were here to present their version. They are entitled to their opinion. Now what you are attempting to do as far as this witness is concerned is to put him at the mercy of our counsel, who is a lawyer, and ask him as a lawyer, to ask an engineer questions. This is not a law case. If you want to try it in that manner, then we will go back and abide by the rules of evidence, and a lot of what has been put in by your side up to this point will be excluded.

Mr. ASPINALL. The Chair notes the objection to the insertion of the material, and objection having been made, it will not be accepted at this time. However, the Chair does suggest to the gentleman from Pennsylvania, if we have time, perhaps the Chair would ask counsel to make the interrogation, and I think it would be perfectly in order.

Mr. SAYLOR. I object to that. I may be overruled, but I will object to it.

Mr. ASPINALL. Proceed, Mr. Dawson.

Mr. DAWSON. I will not pursue that matter further, but I do suggest to the committee members that they study pages 719 through 747 of last year's record for themselves, in which a very concise and studious study was made of this whole problem and which, in my opinion, very amply answers the contention of the witness.

That is all for the general.

Now, Governor Miller, I believe you were the next witness, were you not?

Mr. MILLER. Yes, sir.

Mr. DAWSON. I was very much interested, Governor, in your statement as to your philosophy on reclamation matters. When were you Governor of Wyoming?

Mr. MILLER. 1933 to 1939.

Mr. DAWSON. When?

Mr. MILLER. 1933 to 1939.

Mr. DAWSON. And did you have reclamation projects being undertaken in your State during that period of time?

Mr. MILLER. We had one chief project which was undertaken at that time, the Kendrick project, as it is now known.

Mr. DAWSON. Did that have your support?

Mr. MILLER. I will say tentatively, Mr. Dawson. Frankly, I endeavored to stay out of that situation for this reason: I had knowledge that that was a project which was not sought and which was not approved by the Bureau of Reclamation. There were local interests—I am not in a position to reveal the urge behind the project—but it never did have any complete approval and support, and I refrained from saying much about it at that time. Senator Kendrick——

Mr. DAWSON. Can you tell me whether you opposed it or not?

Mr. MILLER. I did not oppose it openly; no, sir.

Mr. DAWSON. Was there any difference in the Kendrick project in the way of financing than the one we are talking about here?

Mr. MILLER. No difference in method?

Mr. DAWSON. Yes.

Mr. MILLER. No.

Mr. DAWSON. Why is it now you are coming forward on this project then and challenging the whole reclamation program, and you did not raise a hand when you had your own project up?

Mr. MILLER. Mr. Congressman, I have been exposed to a good deal of history since that time. I went into the governorship without any knowledge of these matters, at all. I have had occasion to be concerned with them to a very considerable extent since. While I think it is a misstatement to say that I am opposed to the whole reclamation program, I am fundamentally opposed to some of the subsidizing that has been done in carrying out that program.

Mr. DAWSON. Let me just read one of your statements, and I think we can develop this a little further.

Mr. MILLER. All right.

Mr. DAWSON. On pages 8 and 9 of your statement you make this statement:

> It can be anticipated we will also hear the point asserted that we have every right to spend money on irrigation because it partially pays its way, whereas most expenditures on flood control and navigation are nonreimbursable. The answer here is that in the solid opinion of many, and I am one of them, who have studied this general problem in detail, the beneficiaries of all water-development projects should be required to pay consistent shares of the costs. If the Congress will agree to this and enact the necessary policy legislation, it is certain indeed that there will be much, much less demand for so-called pork-barrel authorizations and appropriations in the future. In the interest of the taxpaying public, I sincerely hope this will take place.

Mr. MILLER. Yes.

Mr. DAWSON. I assume from that statement that you are opposed generally to flood-control projects in which none of the money is reimbursable and the property owners pay nothing. Is that right?

Mr. MILLER. I am opposed to that system; yes, sir.

Mr. DAWSON. That would include such projects as the Missouri River flood-control project and, we might say, the Johnstown, Pa., area, or any other section?

Mr. SAYLOR. If the gentleman will yield, since that is my area, he had better get his facts straight, because that is one project for which the people offered to pay.

Mr. ASPINALL. The gentleman from Pennsylvania will wait to see whether or not the gentleman wishes to yield. Does the gentleman from Utah yield?

Mr. DAWSON. I will be happy to yield to the gentleman if he wants to make that statement for the record.

Mr. ASPINALL. The gentleman's statement will stay as it is in the record, then. Otherwise, it would be taken out.

Proceed, Mr. Dawson.

Mr. DAWSON. So I assume that what you mean, Governor, is that the taxpayers of Utah, for instance, should not be required to pay any of the costs for flood-control projects in Pennsylvania.

Mr. MILLER. They should not, you say?

Mr. DAWSON. Yes.

Mr. MILLER. They should be required to pay their proportion of the burden that is assumed by the Federal Government in the income taxes they pay.

Mr. DAWSON. The point you are making is that the Federal Government should not pay for it, that the people who get the benefits should pay for it.

Mr. MILLER. Not quite, Mr. Dawson. My position is that the beneficiaries of all flood control, navigation projects, whatever the water development, shall assume their burden as beneficiaries. There are some aspects of those projects which are national in scope which are not definable as direct benefits to the beneficiaries. The Federal Government, of course, is required to assume those national aspects. We all, as taxpayers, then pay our share of those national aspects.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. Yes.

Mr. HOSMER. I understand within that rule you are only opposed to those flood-control projects which are of a pork-barrel nature and not in the interest of the taxpayers of the United States; is that right?

Mr. MILLER. I hardly would state it that way, Mr. Hosmer.

Mr. HOSMER. You are not for pork-barrel measures, are you?

Mr. MILLER. No, I am not.

Mr. HOSMER. You are not?

Mr. MILLER. I am not for pork-barrel projects, no.

Mr. HOSMER. You are against them?

Mr. MILLER. I am against them.

Mr. HOSMER. I will yield back the balance of my time.

Mr. DAWSON. It is all gone. [Laughter.]

Then, I assume on that same theory, you would have been opposed to the Hoover Dam?

Mr. MILLER. Oh, no, the Hoover Dam is paid for on schedule.

Mr. DAWSON. Paid for by whom? Where did the money come from to build Hoover Dam?

Mr. MILLER. The power users.

Mr. DAWSON. Where?

Mr. MILLER. From the users of their power, purchases of power.

Mr. DAWSON. My question is, Where did the money come from to construct Hoover Dam?

Mr. MILLER. From the Federal Treasury.

Mr. DAWSON. Where will the money come from to construct Glen Canyon Dam?

Mr. MILLER. From the Federal Treasury.

Mr. DAWSON. Who will pay it back?

Mr. MILLER. The people who buy power, the users.

Mr. DAWSON. That is right, and who will pay Hoover power back?

Mr. MILLER. The buyers of the power.

Mr. DAWSON. In other words, there is no difference, is there?

Mr. MILLER. No, not in the two projects.

Mr. DAWSON. Were you opposed to the Hoover project?

Mr. MILLER. No, it was a sound project.

Mr. DAWSON. Let us come back to this question raised a minute ago about the irrigators paying. Did the irrigators pay one penny of the cost toward constructing Hoover Dam?

Mr. MILLER. As I recall the figures, there was $25 million, as I remember it, assigned to irrigation from Hoover Dam and the details as to to repayment of that by the irrigation districts down below are not right at my fingers. I could dig them out for you, probably, but what part has been paid I could not answer.

Mr. DAWSON. You say you have made quite a study of all these irrigation projects in the United States, and I think you presented a chart of some of the details here. Do you want to bank on that statement you just made, that irrigators are paying any of the cost of the Hoover Dam?

Mr. MILLER. I would not make it unqualifiedly without referring to detailed statistics.

Mr. DAWSON. I could be mistaken, but I think I am right in the fact that there was not one penny paid by the irrigators in the lower basin toward the construction of Hoover Dam.

Mr. MILLER. Was not that payment deferred for quite some time?

Mr. DAWSON. No, it was not even assigned.

What you probably have in mind, Governor, there was $25 million worth of flood control in there which was deferred, nonreimbursable, but not one penny paid by the irrigators.

Mr. MILLER. As I say, it has been so long since I have looked at those figures I would have to refresh my memory whether there is any irrigation allocation.

Mr. DAWSON. Then, if Hoover Dam was being constructed today and that were the case, that the irrigators were not paying any of the costs, you would be against Hoover Dam, would you not?

Mr. MILLER. Not necessarily. I would be against that part that was not reimbursable.

Mr. ASPINALL. Will the gentleman yield so that we can go to the others and come back if we have time left?

Mr. DAWSON. You mean to leave the governor at this point?

Mr. ASPINALL. Let me call on some other member of the committee.

Mr. DAWSON. Can I go on to Mr. Brower?

Mr. ASPINALL. Would the gentleman be satisfied to come back when we get through with the others?

Mr. DAWSON. Yes.

Mr. ASPINALL. The gentleman from California, Mr. Engle.

Mr. ENGLE. I would like to ask Governor Miller a couple of questions.

Governor, will you refer to page 4 of your statement?

Mr. MILLER. Yes, sir.

Mr. ENGLE. If I interpret your statement correctly, you are saying that there must me some standard by which we set a limit eventually to the amount of subsidy to be given in these projects for irrigating lands. Now, in the Central Valley of California, for instance, the subsidy to the irrigators in the Central Valley project will

run, according to the most recent estimates, about 30 percent. In other words, the irrigators themselves will pay approximately 70 percent of the capital costs.

Mr. MILLER. Where is that, Mr. Engle?

Mr. ENGLE. The Central Valley project of California. The remaining 30 percent is picked up by power in the nature of a subsidy from the power revenues of Shasta and Keswick to irrigation features of the project.

Now, are you prepared to say at this time how far the power subsidies should be used to put water on land? Of course, in the upper basin project, we understand that the amount the irrigators will actually pay on the capital investment is somewhat less.

From time to time, I have raised the question in this committee in the years past as to just where we should stop; that is, where we should say that beyond that point we do not have what you might call an economic proposal.

Do you have any idea in your mind now as to what percentage of the costs of irrigation features should be paid by the irrigators before a project can be considered as unworthy to be built?

Mr. MILLER. Mr. Engle, I will say, in answer to that question, that I do not think that the irrigators should directly assume all of the burden of irrigation that can be attributable to the development in this respect: We have, as I tried to outline here, certain indirect benefits which the farmer himself does not assume. That can be assumed by conservancy district or by a water district or by a compact commission, or what have you.

My own theory is this: That, as I tried to outline here, the subsidies should not go beyond the figure to be established as the sum of the direct and indirect benefits of that scheme of irrigation. If, as I say here, a going farm is worth $500 to the overall economy, then it should not be subsidized beyond that. I say this is an uneconomic project in our general scheme of things, if you go beyond such a figure as that.

Mr. ENGLE. I observed your statement to that effect.

Now the indirect benefits are assessed on the basis that the national economy profits to that extent by the general improvement due to the delivery of water to irrigated lands in the development of irrigated lands and the homes thereon. Your statement says that, as a rule of thumb, they have taken as indirect benefits about 60 percent of direct, but for the purposes of your illustration you use what I have always regarded as a more general system used by the Department, and that is that the indirect benefits roughly equal the direct.

Now, if that assumption is correct, you would start immediately with 50 percent, would you not; that is, that you could subsidize irrigating of lands up to 50 percent from some other source than the direct payments by the farmers; is that right?

Mr. MILLER. That is right.

Mr. ENGLE. As to how far you go beyond that, you say that the upper limits should be the value of the land itself; that is, that the total of the two should not be greater than twice the total value of the land. But that brings me to ask you whether or not you mean by that the value of the land before or after the water has been placed on it, because it has been our observation that when water is placed on land, then the land becomes more valuable. As a matter of fact, urban developments grow up around irrigated area.

Let me give you an illustration. In Arizona, for instance, they have the Salt River Valley project, which is one of the best. There is not really very much difference between the adjacent area and some other areas in Arizona, but the area around the Salt River Valley project has grown up into a lush area, inviting the presence there of tourists, and their whole economy has grown by leaps and bounds, whereas other communities similar in geography and in climate in the State of Arizona, and in years past more or less of the same size, have not similarly gone ahead.

So I ask you, do you put the upper limit on the basis of what the land is worth before you put the water on it or afterward?

Mr. MILLER. Afterward, Mr. Engle.

My picture here is that the direct benefits should be the value of the land fully improved and in production, and the value that can be established in the market. After that, then, these indirect benefits that you speak about, the building of the community. We double it, let us say, in the Central Valley in California. If land out there is worth $500 an acre, fully improved and in production, then, as I say, the indirect benefits being equal to that, you have a value in the economy of a thousand dollars for that land.

Mr. ENGLE. Of course, that is where you need the crystal ball because by the very nature of the case it is very difficult to anticipate what the future will produce in the way of land values, is it not?

Mr. MILLER. Mr. Engle, I think not at the present time. It was in the early development of irrigation in that country out there, but now we have irrigation all over the West in all kinds of situations. You can ascertain these values in any State out there in that part of the country that you want to use for this kind of a study. The values are established. You have them in California, you have them in Utah. So there is not any need to go into any complicated figures as to establishing direct or indirect values; they are established, they are easily ascertainable.

Mr. ENGLE. Of course, Governor, I am inclined to agree with you that somewhere or other we should try to draw the line as to where the contribution to irrigation should cease. For instance, if you should say it would be 85 percent and that is permissible, then would you say it should be 90 or 95 percent and so on, until you get down to the point where you would be arguing, if you carry the case to its logical conclusion, that the subsidy out of power or from other sources would be 100 percent, and all irrigators would be required to repay would be their maintenance and operation?

Now, I have never really applied myself to the question of whether or not there is sufficient national interest in developing irrigated farms as to warrant the Government, either through itself or through power, building a capital structure and giving it to the irrigators, provided that they can pay the maintenance and operation.

I would assume, however, Governor, that you would certainly agree that was beyond the ken of appropriate action in authorizing these projects.

Mr. MILLER. I would so agree.

Mr. ENGLE. On the other hand, let us look at it the other way. In cases of flood control, we do give a capital investment completely to an area, and after the works are completed we turn them over to the respective State or locality for maintenance and operation on an

assumption that the cash investment made by the Federal Government in the works to protect that land is worth what they cost to the national economy, if the local areas are willing to assume the maintenance and operation of those works, thereafter; do we not?

Mr. MILLER. That has been past practice. I do not agree with it.

Mr. ENGLE. You do not agree with it?

Mr. MILLER. No, I do not.

Mr. ENGLE. But you do admit that is the past policy?

Mr. MILLER. That is right.

Mr. ENGLE. And in your opinion that past policy has been wrong?

Mr. MILLER. Yes, sir.

Mr. ENGLE. The great trouble is, of course, that we have not gotten around to solving all these problems and laying down the specific rules. I am not so sure that I know the answer to them. I am interested in your analysis of the situation here.

Now you do say one other thing, and that is with reference to the utilization and the development of the resources of this great upper Colorado Basin area. As I understand your view, you take the position that the moneys which could be received from the Federal Government and the revenues that could be secured from power development could be more beneficially used in the upper basin if applied to the development of resources other than the land resources, perhaps the timber and the mineral resources, of that area. Is that what you have in mind?

Mr. MILLER. I will qualify that by saying that it is not my position that we should do that. What I am trying to say here is, now that we do have these resources—I say, "If Federal subsidy is required for the development of the Colorado River Basin, it would appear to be much wiser to consider all types of resource development and not put all of our money on marginal agriculture."

Now, I do not say that I advocate that. What I am saying is that my position is that we should not go beyond undue bounds in that matter of subsidy, but if it be the policy of the Congress that they do go beyond those bounds, then it is questionable to me if we should put all our eggs in one basket; because, if we are going to apply the subsidies, then perhaps we could take a look at the possible mineral development of that part of the country and help out with it.

I do not say in principle I advocate that, but I say if you are going to retain unlimited Federal subsidies, then perhaps we ought to look around the field a little bit.

Mr. ENGLE. In my opinion it would not be necessary to undertake Federal subsidies, but to adopt a viewpoint of the development of the upper basin which would dedicate the basic aid from the Federal Government in noninterest bearing funds and in power revenues to the development of other resources.

Last year when this project was before this committee, I suggested to some of my friends from the upper basin that it might be more intelligent to try to use their basic water resource for the purpose of subsidizing and aiding the mineral and timber potential of the area rather than trying to develop the land resources. But, of course, being from California, that is a matter which I cannot very appropriately argue. As a citizen of Wyoming, you can appropriately argue it because you come from that area.

As a Californian, I take the position it is none of our business particularly how they use their water or water resources as long as in using it they do not take something that belongs to us.

But I want to take this occasion again to point up the proposition that I have always felt that the upper basin would be wise to take a look at the development of the other basin resources in the upper basin, timber and minerals specifically, as distinguished from the utilization of the great subsidies which are involved in this kind of program for the sole purpose of improving and developing the land resources of that area.

I think wise statesmanship in the upper basin might dictate a little broader and more flexible utilization of their water resources.

Now I have not pressed that opinion because it is not my business to do it. If it were my State, though, that was undertaking something like that, I think I would have a good deal to say about it.

Then, finally, the two would come together because, whenever you build an industrial empire—and the natural resources of this upper basin are capable of building a great industrial empire predicated upon the mineral and timber resources of that country—then you get to the point very quickly where water is worth what it cost, and the industries and people there are able to buy and to pay for the water, whatever it costs, even if it cost $70 or $80 an acre-foot to get it in to take care of the people who have to have it to maintain industrial development and maintain municipalities, and the base of this development of this water is spread between industry and the development of minerals and timber, and the development of these farming land areas.

Mr. MILLER. I think that is a very good statement, Mr. Engle.

Mr. ENGLE. That is all.

Mr. ASPINALL. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. No questions.

Mr. ASPINALL. The gentleman from Florida, Mr. Haley.

Mr. HALEY. Mr. Chairman, I merely want to make an observation. I am very happy to see before this committee my good friend the ex-governor of Wyoming. He made a great governor. He is continuing his activities, I am happy to say, in some field of government, and read his statement here with a good deal of emphasis. I think he has been one of the fine statesmen and is a fine American citizen, and I am glad to see you here today presenting your views.

Mr. MILLER. Thank you.

Mr. ASPINALL. The Chair recognizes the gentleman from Colorado, Mr. Chenoweth.

Mr. CHENOWETH. Governor Miller, just one question. I am sorry I was not here when you presented your statement, I was not able to be in the committee meeting at the time you made your full statement.

Are you opposed to the Colorado River project as a whole or just one feature of it?

Mr. MILLER. I am opposed chiefly to the high cost of the participating projects. I am not opposed to Glen Canyon Dam. I am opposed to Echo Park Dam on the grounds of high cost, and I believe it is unnecessary to the project as a whole, and I agree with my friends

here who objected to its on the principle of an invasion of a national monument.

Mr. CHENOWETH. In other words, you favor the building of the Glen Canyon Dam?

Mr. MILLER. Yes, sir.

Mr. CHENOWETH. I think that is all, Mr. Chairman. Thank you.

Mr. ENGLE. Will the gentleman yield?

Mr. CHENOWETH. Yes.

Mr. ENGLE. That raises a very interesting question. You say that you favor the construction of Glen Canyon. Would you favor the construction of participating water consumptive projects along with that, provided that, as a rule of the thumb, the total capital investment, in the participating projects did not exceed approximately twice the amount of the market value of the lands after being under irrigation?

Mr. MILLER. I would not object to the participating projects if, we will say, as I tried to outline here, the sum of the direct and indirect benefits amounted to $300 an acre. If you had some of those projects that could be held to that figure, I would not object to them at all. But when you have an average cost of construction for irrigation works of a thousand dollars to take water to land that will not be worth more than $300 in the overall picture of our economy, I object to that.

Mr. ENGLE. Let us assume that the land would be worth $300 an acre and that the investment in that particular participating project did not exceed $600 an acre. You would then, on your formula, not object to that sort of participating project, would you?

Mr. MILLER. If, as I say, there were no subsidy over and beyond that $600; yes, sir.

Mr. ENGLE. Very good. Thank you.

Mr. ASPINALL. The Chair recognizes the gentleman from Montana, Mr. Metcalf.

Mr. METCALF. Governor Miller, I was very pleased when you commented in your statement about the activities of the Montana Water Conservation Board.

Mr. MILLER. Yes, sir.

Mr. METCALF. In the State of Montana we have been proud of the development of small projects under that program, and they have brought a good deal of land into cultivation and under irrigation which probably would never have been brought into cultivation had it not been for that program.

However, do you think that Montana would be able to have built such a project as Hungry Horse Dam under that water conservation program?

Mr. MILLER. I doubt it.

Mr. METCALF. Do you think that Colorado would be able to build such a dam as Glen Canyon?

Mr. MILLER. I think not.

Mr. METCALF. Or Arizona would be able to finance a dam like Glen Canyon under the small water resources projects like that?

Mr. MILLER. When we are discussing these things about Montana, we are not discussing power, we are discussing small irrigation projects.

Mr. METCALF. That is right. But there is an area in which these small projects can be developed by State and local activity, and then there are these large projects where there are irrigation, reclamation,

power, flood control, multiple-purpose projects, that have to be done by someone with greater resources than the State of Wyoming or the State of Montana, do you not believe?

Mr. MILLER. Yes.

Mr. DAWSON. Will the gentleman yield to me at that point?

Mr. METCALF. Yes.

Mr. DAWSON. Governor, I think in your statement you referred to the State of Utah and the fact that we had some small water projects there. One of them you referred to was the sprinkling system we are adopting. Do you think we can operate those sprinkling systems without any water?

Mr. MILLER. No, surely not.

Mr. METCALF. So while in Montana we are proud of our local water conservation projects and our local development of our water resources. I do not feel that we could finance such a needed and necessary integrated project as the upper Colorado project or transfer to Montana some project on the Columbia or the Missouri River that would tie in and make a greater beneficial use of even our State projects. Do you not think there is room for both?

Mr. MILLER. Mr. Metcalf, I tried to outline my position here in my discussion of the Glen Canyon Dam proposal. I think there are very great opportunities for the expansion of your Montana idea in Colorado, in Utah, and Wyoming, if you please, whereby we can bring very considerable acreages under irrigation in the aggregate.

No, I do not have any doubt at all but in some of these so-called participating projects in the bill which we have under discussion here, that you can go out and you can pick out some parts of them that will be pretty good, self-sustaining. They can be brought into being under some such program as you have in Montana and developed at very considerably less cost than the average that is proposed here. I mean that irrigation has reached that point where we ought to consider more of that.

You see, I developed some figures here to indicate that in the period 1941 to 1950 some 7 million acres of irrigated land were added in this country, and less than a fourth of that was the responsibility of the Bureau of Reclamation. So you see private enterprise irrigation has gone forward and is going forward now.

My proposition is: Why go into all of these high subsidy requirements when the country does not need it? But if private enterprise is let alone, just like your citizens in Montana, irrigation does not stop. It grows every year and will continue to grow.

My fault to find is this great subsidy that is required to bring the upper Colorado into the field. I believe it is destructive of some phases of our economy. When we pay more for a thing than it is worth, we lose some of our wealth, do we not?

Mr. METCALF. I am not sure that we pay more than it is worth. But I did not want this to pass and my colleagues on this committee and in Congress to get the idea that all we need for the development of our water resources in Montana is the continuation of that small irrigation project program, because we need to integrate that program with such things as the construction of Libby and Paradise Dams and other dams up and down the Missouri and Columbia Rivers that are multiple-purpose dams and bigger than we can finance through the facilities we have within the State.

Mr. ASPINALL. Will the gentleman from Montana yield at that place?

Mr. METCALF. I yield to the gentleman from Colorado.

Mr. ASPINALL. Governor Miller, how much development would you have had in Wyoming if it had not been for some of these large projects which benefit your State so much? And I can name them if you wish me to, but I do not think there is any necessity. You know their names better than I do.

Mr. MILLER. Mr. Chairman, in Wyoming there is a great deal more acreage that was brought in under irrigation cultivation by private enterprise than by the Bureau of Reclamation. The same is true in Colorado.

Mr. ASPINALL. You would not expect me to deny that, would you? I have lived out there as long as you have, and I know that.

I am asking you the area that would have been brought into cultivation without the Federal subsidy you have up there in Wyoming at the present time.

Mr. MILLER. There are only about 2 of those, well, maybe 3. There is the North Platte which was extended. It was not established by the Bureau of Reclamation; it was already in existence when the Bureau came in with the Pathfinder Dam and added land to it. But it was much more under cultivation there when the Bureau came in. The same is true up in the Big Horn Basin now. There was no Federal irrigation until Shoshone was brought in, way in the extreme northern part of that.

Riverton is the biggest single project, and you know some of the troubles at Riverton. Maybe some of the committee members would say that perhaps the Bureau of Reclamation should not have gone in on that one.

Mr. ASPINALL. Would you make that statement, Governor?

Mr. MILLER. I say they should not have gone in without further and more adequate soil investigation.

Mr. ASPINALL. Would you make the statement that it should not have been entered into at all?

Mr. MILLER. Not altogether; no.

Mr. ASPINALL. No; I do not think you would, and that is just the point I was making.

I will yield back.

Mr. METCALF. I have but one more comment, Governor. You mentioned that the Colorado legislature has appropriated $39,000.

Mr. MILLER. The Upper Colorado River Commission.

Mr. METCALF. Yes, I am sorry. The Upper Colorado River Commission has appropriated $39,000 for the promotion of this upper Colorado program. Would you say $39,000 was an excessive amount for the State of Colorado to appropriate for the promotion of this sort of a project and program?

Mr. MILLER. No; I would not say that was an excessive amount. I was just trying to point out how they were going at things to bring pressure to bear down here without telling the story.

Mr. METCALF. $39,000 worth of pressure to bring to bear down here?

Mr. MILLER. They have got quite a lot out of it.

Mr. METCALF. That is all.

Mr. ASPINALL. The Chair recognizes—the Chair will yield a certain amount of his personal time to the gentleman from Wyoming, Mr. Thomson.

Mr. DAWSON. Will the gentleman yield to me for a question?

Mr. THOMSON. Yes.

Mr. DAWSON. Governor, along the same lines as the questioning of the gentleman from Montana, I think you also made the statement in one of your off-the-cuff remarks after the conclusion of your written statement, that you felt the 3,000 people in Wyoming who had purchased these Aqualante badges and dug up $1 were duped, and that 2,999 of them were mistaken. Is that correct?

Mr. MILLER. I would not say they were mistaken; they just do not know what the project comprises.

Mr. DAWSON. I did not hear you.

Mr. MILLER. I say, I would not say that they were dupes. I say they do not know what the project comprises.

Mr. DAWSON. Then, in other words, we have had the two Senators from Wyoming over here testifying yesterday, and we have had Congressmen, and we have had everyone who appeared so far from Wyoming in favor of this project. You would say, then, that the 2,999 are all out of step but you. Is that about it?

Mr. MILLER. No; I would not say that. I would just say they are misinformed as to the details of the project.

I will say this further, Mr. Dawson, that I think I know the people of Wyoming pretty well. I have a good deal of confidence in them, I have a good deal of faith in them, that when they know all of the phases of any given proposition they are pretty generally right. But in this business here they have not been told about the cost of the project.

Mr. DAWSON. We will let your statement stand you just made, that the 2,999 are misinformed, and you are the one who is informed.

Mr. MILLER. I do not say misinformed, I say they are not informed. There is a difference.

Mr. DAWSON. All right.

Mr. HOSMER. Will the gentleman yield to me?

Mr. THOMSON. Yes.

(Discussion off the record.)

Mr. THOMSON. Governor, I am very happy you could be down here. I think you do know the people of Wyoming. I think the people of Wyoming respect you, and I know I do. However, in connection with this, as far as their being informed, the fact is that you have traveled to a substantial extent over the State informing them about this project, have you not, in your life?

Mr. MILLER. Not about this project, no.

Mr. THOMSON. Did you not speak to the Casper Junior Chamber of Commerce about it?

Mr. MILLER. Yes.

Mr. THOMSON. That is about half-way across the State from where you and I live.

Mr. MILLER. That is the one instance.

Mr. THOMSON. Just in the way of economic spending of money wisely, that only engendered about one letter, and I think he is in favor of the project. Now we only had about four letters in our office opposing the project from Wyoming, and only one of which has evidenced information.

Also, in connection with that, the Wyoming Legislature considered this just recently, did they not?

Mr. MILLER. They have several times.

Mr. THOMSON. And at the last session of the legislature just concluded, committee hearings were conducted on this, were they not?

Mr. MILLER. I could not say. I do not know about that.

Mr. THOMSON. But you did leave on the desk of each one of the legislators a copy of a statement setting forth your ideas on the project. did you not, or cause that to be left?

Mr. MILLER. I did. And if you do not mind, Mr. Chairman, I will say that was for the reason that I requested an opportunity to appear before the committee and I was not given that opportunity.

Mr. THOMSON. I believe the Wyoming Legislature adopted their resolution or joint memorial to the Congress in support of these projects without a dissenting vote, did they not?

Mr. MILLER. It may be. I did not look at the record. I was down here.

Mr. THOMSON. There was substantial support for it in Wyoming, and bordering on unanimous support, if we take the conclusion of the Wyoming legislators after looking it over.

Mr. MILLER. I think probably all members of the committee are familiar with the ease of getting memorials of that type through the legislature.

Mr. THOMSON. In connection with your speaking to businessmen in the place where you live—that is in Cheyenne, Wyo.?

Mr. MILLER. Yes, sir.

Mr. THOMSON. And that is far removed from the western half of the State that would be benefited directly by this project?

Mr. MILLER. That is right.

Mr. THOMSON. You would not, because of being from Cheyenne or any other region, want to withhold benefits from them, though, just because somebody far removed was not informed, would you?

Mr. MILLER. Oh, no.

Mr. THOMSON. You are familiar with the fact that in the area involved the businessmen have almost unanimously taken action through their clubs endorsing it, a great number of them, Rock Springs, Green River, and that area in there?

Mr. MILLER. I have not followed that. I would not know.

Mr. THOMSON. In connection with the time when you were elected Governor in 1934—is that not correct?

Mr. MILLER. I went in the first of 1933.

Mr. THOMSON. And at the very time you were in the Governor's chair there you recognized that during the drought of 1934 we had to purchase through the Federal Government about a fourth of our cattle or over 284,000 head, and that we purchased through the Federal Government 584,000 head of sheep, about 20 percent of them, and a good part of those were just slaughtered on the land. Do you recall that?

Mr. MILLER. Yes.

Mr. THOMSON. And that was quite a blow to the economy in Wyoming, was it not?

Mr. MILLER. In common with the country as a whole.

Mr. THOMSON. Yes, in the country as a whole.

Mr. MILLER. Yes.

Mr. THOMSON. So there was a substantial economic loss there?

Mr. MILLER. Yes.

Mr. THOMSON. The livestock and farming industry, you recognize, still is one of the principal industries in Wyoming at the present time?

Mr. MILLER. Surely.

Mr. THOMSON. I notice you say the country does not need the products of this, but the fact is that we have had shortages of hay and had to ship it from long distances, the very products that would be raised off of these lands. Is that not correct? In the last year even.

Mr. MILLER. In certain areas.

Mr. THOMSON. Generally over most of Wyoming we have had shortages, have we not?

Mr. MILLER. I do not think over most of Wyoming, no. In some parts, the southern part and the eastern part. I would not say over most of it. Not the Big Horn Basin and the Riverton project.

Mr. THOMSON. Not on the reclamation projects where they had water, but I mean on the dry land areas they have had a general shortage of hay crops.

Mr. MILLER. In the dry land areas, yes.

Mr. THOMSON. As a matter of fact, hay is selling out there for about $30 a ton, is it not?

Mr. MILLER. I would not know about that.

Mr. THOMSON. Alfalfa hay. I think that is substantially correct.

In connection with the formula of yours, I take it you just disregard the Bureau's benefit-cost theory on the basis that it is difficult to comprehend and go over to the proposition of the cost of irrigated land in the area versus the cost of putting water on it. Is that correct? That is the essence of your theory, is it not, that we should not pay more than what you can go out and buy it for on the open market?

Mr. MILLER. That is right, plus the indirect benefits.

Mr. THOMSON. Plus the indirect benefits. Taking the Powell project, for example, one we are both familiar with, when you go in there and pay $150 or up for irrigated lands, that is behind the obligation to buy the water to put on that land, is it not? You still have to pay for the water in addition to that?

Mr. MILLER. I think so, yes.

Mr. THOMSON. What I am getting at is that water is not a capital investment as we conceive it out there, but it is the cost of operation, and you still have to pay that. If you buy the land in the Powell area of Riverton or any place else, they still pay for the water.

Mr. MILLER. That is right.

Mr. THOMSON. If an acre of land out there will produce 7 tons of alfalfa hay in 1 year at $30 a ton, that would be $210 raised off that 1 acre of land in 1 year, which approaches being twice the cost of the land itself. But out of that has to come the cost of the water, gas and oil for the tractor or anything else. I cannot follow any relationship to this theory of the cost of the land against the cost of putting the water on there.

Mr. MILLER. If a man buys that, say, for $150 an acre, and he assumes that indebtedness, the man he paid that $150 to felt that that was the worth of the land, that that was the price upon which a return on the investment could be made by the next man who came along.

Mr. THOMSON. But that is the worth of the land, is it not, after he has paid for the cost of the water?

Mr. MILLER. Surely.

Mr. THOMSON. It is worth that much in excess of the cost of the water to him.

Mr. MILLER. He pays for the water as he goes along.

Mr. THOMSON. Yes. So I cannot see—what you are doing, as I view it—and I think this committee should understand it—is to take an operating expense, the cost of the water to the man, and try to relate that to what the land is worth after he paid the cost of the water.

Mr. MILLER. We do not.

Mr. DAWSON. Will the gentleman yield?

Mr. THOMSON. Yes.

Mr. ASPINALL. Let's keep this time straight. I have the time. The gentleman will proceed.

Mr. THOMSON. Excuse me. I am sorry.

With regard to this Kendrick project, I am quite certain it is true that you were not appearing before committees of Congress or out stumping the State to get that Kendrick project across, but if my recollection serves me correctly, there was a little disagreement between yourself and the water commissioner who opposed that about that time, was there not?

Mr. MILLER. I am afraid I do not remember that.

Mr. THOMSON. You were in favor—I should not put it that way. It would be argumentative and I do not want to do that. But were you aware on the Kendrick project, which was built during the time that you were Governor, that the Federal investment to put water on that land per acre was $753, and that the water users paid $40 of that, and that the part paid from power out of the Missouri Valley system was $713 per acre?

Mr. MILLER. I did not know that until 2 years ago. If you want me to explain that I will.

Mr. THOMSON. The time is——

Mr. MILLER. This Kendrick project was first based upon the probable irrigation of 35,000 acres of land, and afterward a soil analysis showed that less than half of that was feasible for irrigation. It raised the cost of water construction for irrigation up to $782 an acre. That was not in the picture in the 1930's at all. That came in much later, in fact, 12 or 14 years later.

Recently it developed the construction costs per acre up there are $782, of which, as you say, the water user will only pay $40. The balance is to be subsidized from the sale of power.

Mr. THOMSON. It is the people in our area and the area as a whole in the upper basin States that will pay for that power, is it not, except for what may be sold from Glen Canyon to southern California?

Mr. MILLER. Presumably.

Mr. THOMSON. And there has been no objection on the part of the power consumers or the private utilities or other people who intend to get that and want to get it, to paying it. Such is the testimony before the committee. So it is not a subsidy from the Federal Government, but ourselves subsidizing another segment of ourselves that you complain about. Is that right?

Mr. MILLER. If you want to put it in that way, what I am saying is, whether the purchasers of power or the taxpayers, or whoever pays

for a thing more than it is worth, he is worth that much less in his scheme of assets after he has got the transaction concluded.

Mr. THOMSON. In connection with this use of our water to develop our natural resources, are you familiar with the fact that the State of Wyoming through its natural resources board has caused a study to be made, and that in order to develop that it is going to take about 58,000 acre-feet of water per year, as they study it out, and from their viewpoint we need these projects to develop that water as well as water for irrigation purposes; that it is all part of one scheme?

Mr. MILLER. I do not follow you—58,000 acre-feet for what?

Mr. THOMSON. For municipal and industrial uses.

Mr. MILLER. I am not familiar with that study.

Mr. THOMSON. But you think it is worth while to develop the water to develop the natural resources there in the State?

Mr. MILLER. Out in that country we almost have to develop water to develop natural resources.

Mr. THOMSON. We cannot use our timber resources around Green River to have a paper pulp mill that some of us have been working on until we get some water for it. Is that not a fact?

Mr. MILLER. That is right.

Mr. THOMSON. And the same way with oil shale.

Mr. MILLER. That is right.

Mr. THOMSON. We cannot develop it and many of our other resources without water.

Mr. MILLER. My point was, Mr. Thomson, we ought to save some of that money for such use and not tie it all down to agriculture, which will not pay for itself.

Mr. THOMSON. And my point is that the proper people in the State of Wyoming have studied it out and it is included in these projects which we are trying to get through at the present time.

I believe that is all. Thank you very much, Mr. Chairman.

Mr. ASPINALL. The chairman's time has about expired. [Laughter.] The Chair recognizes the gentleman from Arizona.

Mr. UDALL. I have an observation or two and a couple of questions of General Grant and Mr. Brower who are appearing for the Sierra Club and other conservation people.

Being a person who is very much interested in conservation, I am particularly interested in your presentations here. I probably have in my district in Arizona more national parks and monuments, both as to number and area, than any other congressional district in the entire country. Therefore, since I also hold the view that space and these natural wonders are perhaps the glory of our State and one of its best assets, I do feel keenly about conservation of them, and I probably will be coming to you people from time to time for help in developing and protecting them.

Yet, at the same time, instances arise where reclamation and conservation collide, and that is what it seems to me has happened where the Echo Park proposition is concerned.

I wanted to make this as a general observation, completely gratuitous as far as you gentlemen are concerned: In your presentations that are made here, where you present the conservation issue, I am perfectly willing to hear that presentation, to consider that issue on its merits. Where you present, as you have done here, very forcibly alternative solutions, I think we also should listen to you very respectfully.

Mr. ASPINALL. Will the gentleman yield right at that place?

Mr. UDALL. I yield.

Mr. ASPINALL. I would like to ask Mr. Brower a question about one alternative that he has suggested, and that is the tax of half a mill or so on the power that is presently produced in the area out there. Do you know of any procedure by which that sort of a program could be carried into execution, Mr. Brower?

Mr. BROWER. I should imagine, Mr. Chairman, that that could be——

Mr. ASPINALL. I do not ask you to imagine now. I want to know whether or not you have thought this thing through and knew what you were suggesting.

Mr. BROWER. I will say I have assumed that since there is a tax being paid now, it was somehow contrived how to charge that tax and, therefore, it could be increased.

Mr. ASPINALL. Do you mean to say there is a tax being charged on hydroelectric energy in the area which is involved in this upper Colorado River program?

Mr. BROWER. There is a tax being paid by the power users in the rate they pay for their power, which is represented as an increment in the price per kilowatt-hour, if it is privately produced power.

Mr. ASPINALL. Levied by whom?

Mr. BROWER. It would be levied by the taxing authorities at the various levels of government.

Mr. ASPINALL. Do you know of any agency by which you could make that uniform throughout this interstate area?

Mr. BROWER. I do not know of such an agency, but I imagine it could be done.

Mr. ASPINALL. That is all.

Mr. UDALL. To get to my point. The big thing that has dismayed me—I do not direct this to either of you because I have had correspondence, as others have, from conservation people and received from them what I considered literature or data which are essentially antireclamation. I think the conservationists are weakening their position and weakening their arguments where they take up cudgels and use antireclamation arguments in an attempt to win the day for their own particular cause.

I think we all will listen respectfully on any issue where a clean-cut conservation issue is presented, and I hope we hear from you on it. I do want to make that observation.

I think those in the conservation field—again I do not say you have done it—who get outside the conservation field and simply become propagandists, as some of them have, for the antireclamation people, are doing a disservice to conservation. In the situation some of us find ourselves in in the West when this collision occurs between conservation and reclamation, naturally, since reclamation is a bread-and-butter issue, and since that tends to be a paramount thing with us, we come out on the side of reclamation.

We want you to understand the position that we find ourselves in, to understand our situation, too.

I did want to ask one question.

Someone at the Senate hearings, I believe Mr. Packard, under questioning by Senator O'Mahoney or Senator Anderson, was asked if he

knew of any other proposed dam which Echo Park would set a bad precedent for where the water would be backed up into a national park or national monument, and he said, "Yes" and he mentioned Bridge Canyon Dam, which is the unit down below.

I wonder if you or your organization have made a study of Bridge Canyon Dam and know whether you oppose that dam or will oppose it in the future on the same grounds.

Mr. BROWER. To whom do you address the question?

Mr. UDALL. Either of you.

Mr. BROWER. Do you want to speak to it?

General GRANT. I do not think that question has come up before our organization, but I am sure, on the basis of the general principle, if it invades a national monument and the national parks, as I understand it would, that we would oppose it. Yes, sir.

Mr. UDALL. I take it you have not made the type of study so that you could answer categorically on it.

General GRANT. There has been nothing definite put before us and our Board of Directors has not acted except on the general principle.

Mr. UDALL. Because that is the key unit, of course, in the Central Arizona project, and we were rather thunderstruck with that, because hearings were held exhaustively in the 81st and 82d Congress on that project and no one ever appeared to raise that issue. We were not aware it was in the picture because, of course, the dam itself will be well outside the national park or the national monument.

Mr. BROWER. May I put in an observation?

Mr. UDALL. Yes.

Mr. BROWER. That the Advisory Committee to the Secretary of the Interior on Conservation has gone into that subject in some detail and has recommended against a Bridge Canyon Dam which would be so high as to back up water into Grand Canyon National Park.

Mr. UDALL. In other words, if the dam could be constructed in such fashion, it might be all right as far as you people go?

Mr. BROWER. Yes.

Mr. UDALL. That is something I know both of us will be interested in and might have a collision of our own on some day.

That is all I have.

Mr. ASPINALL. Because of the fact it was necessary for the gentleman from Pennsylvania, Mr. Saylor, to be in the Rules Committee this morning, the Chair has intentionally left him until last. He recognizes Mr. Saylor at this time.

Mr. SAYLOR. I would like to take this opportunity to congratulate General Grant and Mr. Brower and Governor Miller on the statements they have made presenting their views.

First, General Grant, I would like to ask you whether or not the Bureau of Reclamation has ever presented to you any survey of the 134 dam sites which they testified during the last session of Congress were available in the upper basin.

General GRANT. No, sir, I do not think that they were all listed, by any means, in the original Colorado River volume. I don't remember that many.

Mr. SAYLOR. In view of the fact, sir, that you have presented certain alternate proposals, will any or all of those proposals provide as much storage as Echo Park?

General GRANT. Yes, sir; they will provide more storage. One combination would provide something like 50,000 kilowatts less power, but, as Mr. Tudor said in his testimony, you can supply that from a steam plant. In the 1950 report the Bureau indicated that they would probably have to have some supplementary steam plant anyway. So I did not feel that that 50,000 kilowatt hours of power was very important, and the cost was $54 million less.

Mr. SAYLOR. I concur in that, General, and I think that is the opinion of the Bureau, because they have eliminated any power projects in the provisions of the bill which are before us in the San Juan-Chama, which would have produced a little more power than you are losing in your combination of that Echo Park. So that by the very nature of the agreement which they have arrived at as far as San Juan-Chama is concerned, certainly the loss of 50,000 kilowatts should not be an important factor.

Are you familiar, General Grant, with the fact that the Bureau of Reclamation last year was compelled to admit to members of this committee that their evaporation figures were in error?

General Grant. I believe so, yes.

Mr. SAYLOR. And you are also familiar with, or I think you were in the room when several of the proponents of this legislation testified that there is no known definite method of measuring evaporation even upon existing reservoirs. Do you concur in that?

General GRANT. I think I heard that the other morning when I was here; yes, sir.

Mr. SAYLOR. In other words, if there is no accurate way of measuring evaporation upon existing reservoirs, it becomes increasingly difficult then to measure evaporation losses upon nonexistent reservoirs; is that correct?

General GRANT. Quite so.

Mr. SAYLOR. Do you feel that the alternate sites which you have proposed compensate in every way for the elimination of the Echo Park Dam and Split Mountain Dam?

General GRANT. I feel they would, yes, sir.

Mr. SAYLOR. Governor Miller, I would like to commend you very highly upon your statement. It is forthright, and you have presented matters which I think the representatives of the upper basin States should well consider, namely, that you are not opposed to them putting their water to beneficial use, but that you are opposed to the people, not only in the upper basin States but anywhere in this country, spending more money on a project than the net result is worth.

Mr. MILLER. That is correct.

Mr. SAYLOR. In other words, that is an economic loss that can never be recovered?

Mr. MILLER. Yes, sir.

Mr. SAYLOR. And that same principle is true whether it be in the upper basin, whether it be in Pennsylvania or New York or the lower basin or anywhere else?

Mr. MILLER. That is right.

Mr. SAYLOR. And the standards that you would suggest to be applied in the upper basin, both to the storage projects and to the participating projects, should be that the total amount spent both for the storage projects and participating projects should not exceed the actual bene-

fits, and the direct and indirect benefits should not exceed the value of the land upon which the water is being put?

Mr. MILLER. No, I did not say that, exactly, Mr. Saylor. The value of the land, that is, the sale of the land in the market we consider a direct benefit, but the indirect benefits are those that attach to community life generally, the overall economy.

In the whole picture of our economy that farm may be worth $500 an acre, let us say, and that is over and beyond the actual value of land as land, you understand.

Mr. SAYLOR. That is right. In other words, it may be worth a dollar or $2 or even $10 or $15 or $25, as it stands right now.

Mr. MILLER. Yes.

Mr. SAYLOR. And with the improvements that you would put on, you would go as far as, in direct and indirect benefits, $525, if I understand you right.

Mr. MILLER. Yes, sir.

Mr. SAYLOR. If it were possible for the upper basin States to take some of these participating projects which would comply with the standards which you have set and to build some of the storage projects for the purpose of paying what the irrigators could not, and it came within the framework of your outline, you would have no objection to building any of those, would you?

Mr. MILLER. No, sir.

Mr. SAYLOR. That is true whether or not it is in the upper basin or lower basin or anywhere else where reclamation is used?

Mr. MILLER. That is correct, yes, sir.

Mr. SAYLOR. In other words, you are not an enemy of reclamation?

Mr. MILLER. I am not, no,sir.

Mr. SAYLOR. And you are approaching this merely from an economic standpoint and as an economist who is interested in the overall welfare of the entire country?

Mr. MILLER. I think, Mr. Saylor, I could hardly be called an economist, but otherwise I am in agreement with what you say.

Mr. SAYLOR. Mr. Brower, I think you have made an excellent presentation. I had a chance to read the statement which you presented this morning, and I think you have pointed out some of the things which this committee should investigate and which the Department of Reclamation should furnish us answers on before this project is reported out of the committee.

That is all the questions I have, Mr. Chairman.

Mr. ASPINALL. The Chair recognizes the former chairman of the committee, Dr. Miller.

Dr. MILLER. Mr. Miller, I did not hear your testimony this morning or cross-examination, but I have read hurriedly the prepared statement you have here, and I know generally your views on reclamation and have read some of your reports relative to the Hoover Commission recommendation on the development of some of the resources.

I am wondering how you feel about the flood-control projects that have been carried on by the Army engineers all over the country. You know we have spent up to 1952, a few short years, more than $7 billion on the flood-control projects not connected with irrigation or

reclamation at all. As you know, flood-control projects do not pay back a penny of interest on principal. Do you think that the money the taxpayers must spend generally over the country should go into great flood-control projects? We spent nearly $600 million in Louisiana alone on flood-control projects, and in the State of Pennsylvania, $324 million on flood-control projects. They do not pay back any principal or interest.

Mr. MILLER. Yes.

Dr. MILLER. Do you think that the flood-control projects might well be asked to pay back some of that money? Or shall we make it a complete subsidy?

Mr. MILLER. My position is that the beneficiaries should pay reasonable assessments of the costs of those projects, whether they be flood control or navigation.

Dr. MILLER. Has that always been your stand?

Mr. MILLER. Yes, sir, it has.

Dr. MILLER. The State of Wyoming up to 1952 received $135,950,670 from the Bureau of Reclamation for irrigation projects. That is from the beginning of reclamation in 1906. Do you think that money was poorly spent in the State of Wyoming for reclamation projects?

Mr. MILLER. Some of it has been poorly spent. Not all, by any means, at all. And it has been a good thing in Wyoming, generally speaking.

Dr. MILLER. You understand that reclamation pays back the principal and does not pay back the interest.

Mr. MILLER. Yes, sir; directly and indirectly.

Dr. MILLER. They do pay back the principal directly. Of course, power projects have to pay for reclamation projects and pay interest.

Mr. MILLER. Your statement should be qualified, that irrigation pays part of the cost and power pays the balance.

Dr. MILLER. Yes; power helps to pay back reclamation costs.

Mr. MILLER. Yes.

Dr. MILLER. And the power not only pays back the principal but pays back the interest.

Mr. MILLER. That is right.

Dr. MILLER. In contrast to flood-control projects which just do not pay back a thing.

Mr. MILLER. That is right.

Dr. MILLER. You said you felt that the flood-control projects of the Army engineers ought to pay back principal and interest. Can you sometime tell them that and see if we can get it done? That would be quite a monumental task. It would be quite a change from what we have been doing. As you know, they have cheerfully accepted flood-control funds without thought of paying anything back.

Mr. MILLER. In the Senate hearing last year, Mr. Congressman, I made this same statement and was questioned by Senator Watkins of Utah with respect to my stand that the beneficiaries of flood-control projects should be required to pay a reasonable part of the cost. He voiced the opinion that I was a pretty lonely spirit in that direction, and I said, "Yes, I recognize that probably mine was a voice crying in the wilderness, but I was perfectly willing to cry."

Dr. MILLER. When you were Governor of Wyoming we used to see each other once in a while, not because we are namesakes, but because

I practiced medicine at Kimball and went up to Cheyenne, Wyo., quite often on various occasions. I remember when you came down to Kimball and gave one of your usual fine talks to a group of people. I believe you were one of the original founders of the American Legion when it was formed down in St. Louis after the First World War, and you were on the platform committee. You have a fine background of public service.

You are also aware what has happened up in the North Platte Valley in the Scotts Bluff area, the Scotts Bluff Valley and the North Platte Valley with the beginning of reclamation. I think it is one of the oldest reclamation districts in the United States. You knew what Scotts Bluff was before they had reclamation—barren, sandy, worthless ground. What is your estimate now of the value of irrigation to that Scotts Bluff area and going up into Wyoming and all the way down where they have had irrigation? Do you think it has been money well spent for those communities and for the United States? What is your honest opinion about the value of irrigation up and down that great valley?

Mr. MILLER. I think it is wonderful. It is a fine community. It is a fine stretch of farms up and down that valley.

Dr. MILLER. Would you agree they have paid back to the United States Government several times the money it cost to build them, through taxes, through industries, new industries, new people locating there, and new businesses?

Mr. MILLER. I would not have any idea whether they have paid back several times, Dr. Miller, but I do think it has been a wonderful development, has been a great contribution to the West and to the country as a whole. As I pointed out before you came in, when we were discussing this thing, those people have done that without huge Government subsidies.

Dr. MILLER. They did it under the Reclamation Bureau, however. It was a Bureau of Reclamation project.

Mr. MILLER. There was a good deal of farming down there before ever the Bureau of Reclamation came into the picture. But they came in, you remember, and did that development in the North Platte Valley before there was much power in the picture. The Guernsey Dam was finally built, but not until, I think—it got into operation along about 1938. Up until that time there was no subsidy in the formation of that district down there.

Dr. MILLER. That is right. Now, when you come to the water stored in the Pathfinder and Guernsey Dams, how do you feel about those dams having been built up in Wyoming so that you could sort of regulate the flow of water and the use of power for Wyoming and Nebraska and Colorado? Do you think that was a good thing?

Mr. MILLER. Surely.

Dr. MILLER. You think that was all right?

Mr. MILLER. Yes.

Dr. MILLER. How do you feel about the Glendo Dam that is under construction and is going to furnish additional water and additional power to Nebraska, Wyoming, and Colorado?

Mr. MILLER. I do not think so much of that one.

Dr. MILLER. Because it is a recent one?

Mr. MILLER. No. But if you want to go into a little history of that, I can do so. I do not know whether you want to take the time.

Dr. MILLER. I will accept your answer. You just do not like it.

Mr. MILLER. I do not think it is justified by the requirements and the demand up in that part of the country.

Dr. MILLER. And your feeling here is this upper Colorado project, the building of Echo Park and these other reservoir sites to store the water and furnish power—not too much water for irrigation, but to furnish power for a large area—is economically unsound. Is that your thinking?

Mr. MILLER. No. I said, also before you came in, that I favor the building of Glen Canyon Dam, which is by far the greatest power producer in the project. I do not favor the building of Echo Park Dam because it is a very high-cost proposition and it is not actually needed for much irrigation. If you go into all of the details of the central Utah project, for example, you will find they have to have many other reservoirs and diversions and so forth to take care of the water there for irrigation.

Mr. ASPINALL. Will the gentleman yield?

Dr. MILLER. Yes.

Mr. ASPINALL. As I understand it, too, Governor, you also favor the application of the net power revenues above the cost of construction of the power facility to help pay part of the cost of participating projects?

Mr. MILLER. Yes, to the extent it is economically justified.

Dr. MILLER. Of course, there have been some folks that quarrel about reclamation. I am thinking of one man by the name of Raymond Moley. I think you know him. He has written some articles on the cost of irrigation where he has taken the interest and compounded it over a period of years and made a fantastic report about the cost of irrigation to these landowners, which is just in the realm of fancy as far as the costs are concerned. You have read Raymond Moley's articles, no doubt, because he——

Mr. MILLER. Not closely, no.

Dr. MILLER (continuing). Expressed the same thinking I have read in some of your articles at times.

I am wondering if you think we ought to accept the theory he has that we ought to add interest to these irrigation projects, and add it up over a period of 50 years and add it to the cost of the land all at one time, without showing the benefits when it is finally developed.

Mr. MILLER. I think you have to add the interest because it is applicable in our present situation of deficit spending, where the Government has to pay interest on the money it uses to run the everyday affairs of the Government, and the interest there is always compounded by the Treasury. When they talk about that they take it at compound values, and you will find in my paper here in the cost-benefit analysis that the Bureau of Reclamation uses that they figure compound interest. So that is an accepted term.

Dr. MILLER. I recently sent Mr. Moley a letter and sent this chart I have showing all the money spent on flood control, and I suggested he use the same formula he has used for reclamation so it would show just how much flood control is costing the country.

Mr. MILLER. It would make quite a figure.

Dr. MILLER. It will make quite a picture. I voted for flood control. I think we have to protect our land and our property.

Your State got a million dollars for flood control. Yes, you got just a pittance compared to some other States. But you were helping to pay the other $7 billion spent on flood-control projects. If Mr. Moley would use the same formula for compounding interest on flood-control projects, which is never paid back, it would be rather interesting and fantastic, and I am awaiting with a great deal of interest, his reply based on the formula he uses for reclamation.

You and I know, and I am glad you have stated, that there are a great many benefits that come from reclamation projects such as the Scotts Bluff area. I think it has been stated by those in authority that it has paid back several times the cost of the project in new businesses, new taxes to the United States of America.

My thought here—in the upper Colorado River project the new acreage of land brought under irrigation, of course, is not too large; but holding the water back so that it can be properly controlled would result to the benefit, not of you and myself, maybe, but our grandchildren 50 or 60 years from now when there will be over 300 million people in the United States of America looking for a place to go and a place to live and becoming a part of a great growing dynamic America. How can we grow and develop unless we do utilize and control some of the resources we have such as we have in the upper Colorado River—a tremendous amount of resources, not only power, but water for irrigation and water for development of that section of the country? Do you not think we ought to be broadminded enough to recognize that this water now is being wasted, not being used, and that future generations will need it, want it, demand it?

Mr. MILLER. Dr. Miller, I showed in my statement here—I will just read it. It is on page 5.

It is consistent here to point out that much more irrigation has been provided in the past, and is being provided today, by private enterprise than by the Government. Of all the 25 million acres of irrigated lands in the 17 Western States in 1950, considerably less than one-fourth had been watered by the Bureau. And in its contribution less than 2,500,000 acres was in new land—about 3 million acres were lands already in irrigated farming, established by private enterprise but needing more water. Irrigated land increased 7,028,000 acres in the 10-year period 1941 to 1950, less than 25 percent of which was provided by the Federal Government.

Now I make the point that irrigation is proceeding in this country and people are doing these things for themselves. We do not have to provide great subsidies to provide irrigation in this country. It is being done on the record, and as I point out a little later here, this great development of sprinkler irrigation is going to contribute even more than flood irrigation has in the past, in my judgment. And it is going to be done in your State; it is being done in your State. It is being done in Colorado, it is being done in Utah. It is being done by leaps and bounds and no subsidy attached to it.

Dr. MILLER. Governor, you recognize that the earlier irrigation was a very simple matter of running water out of the creek and running it onto the land.

Mr. MILLER. Yes.

Dr. MILLER. My people did it and your ranchers did it in Wyoming. But existing projects, such as this upper Colorado River, you would not expect the ranchers to start irrigating out of big dams needed to hold the water back. That would be an impossibility. The reclamation projects and irrigation projects that are going to be developed in

the future are going to be the toughest, the ones that are closest to the line of feasibility. They are going to need power to help pay for this, and the only way you get them developed is to have dams to create power to help pay for reclamation.

You are correct that the 25 million acres of irrigated lands has been mostly done by private individuals with enterprise and foresight and a lot of hard work. I am for it. But future developments are tough ones and would go pretty slow without projects such as you have here. Unless you had that, you would have very little irrigated lands in this Colorado Basin from here on out, in my judgment.

Mr. MILLER. I cannot agree with that thoroughly, no. I think those people even along those rivers are doing it. It is being done and being demonstrated. If you take right now, they are building up added irrigation acreage year by year. We discussed to some extent the program in Montana.

Dr. MILLER. There is some of that being done.

Mr. MILLER. Whereby without subsidy they have brought under irrigation in Montana something over 385,000 acres of land at $43 per acre, and they are not demanding great subsidies. Of course, those farmers up there could not build Hungry Horse dam. The Hungry Horse Dam is not an irrigation proposition, but a power proposition.

Dr. MILLER. Are you opposed to building power projects which help pay for irrigation?

Mr. MILLER. No. I am only opposed to the uneconomic features, as I have explained here. I do not think we should subsidize from power or from any other direction to the extent we pay out more than the thing is worth when we get through.

Dr. MILLER. That is all.

Mr. ASPINALL. The gentlewoman from Idaho, Mrs. Pfost.

Mrs. PFOST. I would like to ask Governor Miller a question. You answered a moment ago to Dr. Miller with reference to pump irrigation that you feel pumping is something that should be developed more extensively.

Now I note on page 6 of your statement you called attention to the fact that a dealer in the State of Colorado had sold in 1954 sprinkler equipment to irrigate 12,300 acres of land in northern Colorado, southwestern Nebraska and southeastern Wyoming. You further state this cost approximately $50 per acre, including the equipment and the well.

Mr. MILLER. Yes, ma'am.

Mrs. PFOST. That is for drilling the well?

Mr. MILLER. Yes, ma'am.

Mrs. PFOST. How deep do you have to drill in that area?

Mr. MILLER. That would vary, but in that general area the wells are, I would say, 50, 60, 90 feet. They are rather shallow wells.

Mrs. PFOST. Does this particular area contribute to the watershed of the Colorado River?

Mr. MILLER. It is outside that area.

Mrs. PFOST. I see.

Then on page 2 of your statement to Lyman, Wyo., and you mention that there is an existing farm area where the present water supply is 37 percent short of sufficient irrigation requirements. Do you suggest that wells should be drilled in this area to supplement this water supply rather than providing dams?

Mr. MILLER. Mrs. Pfost, I do not know. I am using here the report of the Bureau of Reclamation. I do not know whether there is underground water in the Lyman area that would lend itself to that program.

Mrs. PFOST. That is the question I wanted to ask you. In other words, do you not feel if you are going to be opposed to a project that there should be an alternative offered?

Mr. MILLER. I have suggested an alternative here, that they confine their program more to small projects such as were developed in Montana, and they might find a part of the Lyman project that could be built to greater advantage than another and keep the costs down within economic reality.

I think that same thing will apply perhaps to other of the participating projects—where the costs are so excessive to construct the irrigation works, they might take another look there and see if they cannot reduce the size of it a little bit and pick out some better areas that will stand the required costs. But the overall cost of the Colorado project I deem to be uneconomical.

Mrs. PFOST. In view of the fact you say you are not sure of the circumstances in this area, would it be your policy to let those people continue to wait and have their land dry up year after year getting only half a crop, so to speak, until we get around to looking into the matter? Or how would you provide for such irrigation that they too could live in a normal manner?

Mr. MILLER. I think, Mrs. Pfost, I ought to say this: That the Lyman area has been in existence for a great many years, more years than I know about, and they have gotten along pretty well even though they may be 37 percent short of normal supply of water. I do not know any of them deserting the place. They stay on and raise big families and get along.

Perhaps they could go to work and form a conservancy district. Perhaps they could expand the area of responsibility and take in some more country around there upon which they could levy taxes, and do something for themselves, Mrs. Pfost, as I pointed out they were doing over in Mr. Dawson's State in the Sevier Valley where they have greatly extended and improved their irrigation there without Federal subsidy.

Mrs. PFOST. I am not familiar with Lyman, Wyo., but I think having a 37-percent shortage of water would certainly be quite a problem. Do you have any idea what it is costing in this particular area to drill wells then?

Mr. MILLER. No, I have never investigated that.

Mrs. PFOST. And you do not know whether there is an underground water supply?

Mr. MILLER. No, I would not know.

Mrs. PFOST. And do you know over the area in general whether or not there is an underground water supply where they could use this sprinkler system and drill wells instead of setting up the upper Colorado project?

Mr. MILLER. No, I do not, Mrs. Pfost, because, as I say, the sprinkling system of irrigating is generally new. Most of the sprinkler irrigation has come in since 1950. As I was saying this morning—I do not think you were here—I received some information since I came to Washington the first of this week, that in the State of Utah the

sprinkler irrigation has increased to where, according to authority I have here and can cite, it is close to 25,000 acres in Cache and—what is the next one there, Mr. Dawson?

Mr. DAWSON. Box Elder.

Mr. MILLER. In Cache and Box Elder Counties had increased sprinkler irrigation 700 percent since 1950. It is increasing in different places.

Now that is a new development and they will be looking for underground water where this can be expanded unquestionably over quite a period of years. It does not come all at once.

Mr. DAWSON. Will the lady yield?

Mrs. PFOST. Yes.

Mr. DAWSON. Insomuch as you mentioned my State, Mr. Miller, I think I might tell you something about the Sevier Valley you are talking about and Box Elder and Cache Counties.

In the first place, our experience on sprinkling is very similar to yours in Wyoming. The gentleman from Wyoming has just related to me the fact that our costs on sprinkling, while they are low for initial costs for drilling a well—you say $50 per acre and we will assume that is correct—the pumping costs are so prohibitive they are just giving it up.

In Box Elder County, the one you referred to, we have a supply of water coming from the Pine View Dam reclamation project, of which you might disapprove, which brings water to the sprinkling systems. But without the reclamation projects we would be absolutely lost.

The people in Sevier County, the one to which you referred, are 100 percent back of the upper Colorado River project and the central Utah project.

Mrs. PFOST. I will say to the gentleman we have a great many wells we use for sprinkling in Idaho, and the cost of power is practically prohibitive for irrigation in some of the areas, depending upon the lift and how deep we have to go for water.

That is all.

Mr. ASPINALL. The hour of 4:30 has arrived. Unless there is request made of the Chair to extend the time, the session will have to be adjourned.

Mr. DAWSON. Mr. Chairman, I request we extend the time. I have been waiting here all afternoon for an opportunity to interrogate Mr. Brower. I thought I would before when I finished with Governor Miller, and I assume this is the last opportunity we will have to interrogate the witnesses.

Mr. ASPINALL. Your assumption is correct. But, of course, the gentleman from Utah did have 2 minutes more than anybody else.

Mr. HOSMER. A point of information. As I understand it, we have only 12 hours for the opponents, and there has been consumed at the present time 4 hours. I do not know who in addition you have planned as witnesses from California, but I notice their testimony is quite bulky. Will this time, if extended, be taken out of the opponents' time?

Mr. ASPINALL. Off the record.

(Discussion off the record.)

Mr. ASPINALL. We will stay another 10 minutes to permit the gentleman from Utah to examine Mr. Brower. The time will not be charged against the opponents' time.

Mr. DAWSON. I am sorry, Mr. Chairman, I do not have more time, so I will of necessity just have to restrict this to a minimum.

Mr. ASPINALL. If the gentleman will yield, it is just the same old story again as far as our time in Congress is concerned. Go ahead.

Mr. DAWSON. Mr. Brower, I recognize the fact that you make the statement several places in your presentation that you have no objection to the upper Colorado River project development, but then you go on to recount various things as to why it should not be built.

Now we are deeply concerned over the viewpoint of the nature lovers on this matter. As you stated in your statement, Governor Lee, I believe you said, had advised you that you had better change your attack from one of opposing Echo Park Dam because of the esthetic values and proceed to attack it from the standpoint of the economics. Apparently this time you have followed that line, a little different than you did last year, if I recall.

Mr. BROWER. Mr. Dawson, our position in the Sierra Club and most of the organizations that I speak for—I will go no further for the California Wildlife Federation than the opposition to the Echo Park Dam. The others are concerned about the project if it is an unsound project, and if it invades the national Park system, because we feel that if it is not sound and Echo Park Dam, for example, were taken out temporarily, or at least were apparently out, and it was not redesigned and not going to work without Echo Park, the danger to the national park system would still exist. That is where we are quite concerned about the feasibility of the whole thing and that the restudy of it will bring about an entire development that will be self-sufficient in itself without Echo Park Dam.

Mr. DAWSON. Could you answer me this question then?—if Echo Park were out of the picture, would you then approve the project?

Mr. BROWER. That is with the reservation I just stated—if it is really out. You have to underline "really."

Mr. DAWSON. Is it not a fact, Mr. Brower, you have made a statement to the effect that California is entitled to the water because of your population increase down in California?

Mr. BROWER. What are you referring to?

Mr. DAWSON. Let me read your statement.

Mr. BROWER. A quotation from the Pacific Spectator?

Mr. DAWSON. Let me read the statement and then you can tell me whether or not this is correct. You made this statement in a booklet entitled "Dinosaurs, Parks, and Dams." I will quote from the booklet:

> The intelligent layman * * * might further wonder how frequently the Federal Government should support a 1922 river-allocating compact which in 1954 emerges as a costly device to lift Colorado River economy by its bootstraps. Or to take what four Peters are using in the lower basin (population 12 million), and can continue to use at their own expense, or order to give it to one Paul in the upper basin (population 3 million)—a Paul who hasn't used it yet, but thinks he can if Uncle Sam will stake him to it and throw in Dinosaur free.

Did you or did you not make that statement?

Mr. BROWER. I wrote that statement, Mr. Dawson, and you will recall the paragraph starts, "The intelligent layman should ask these questions." The article also says a good many other questions should be asked in scrutinizing the entire thing.

Mr. DAWSON. This is the question I asked you: Is that your viewpoint now?

Mr. BROWER. My viewpoint now is that population is not one of the important criteria.

Mr. DAWSON. Then you do not agree with this statement.

Mr. BROWER. I still agree that the question should be asked and should be answered.

Mr. DAWSON. In other words, you have a population of 12 million people in California, we have 3 million in the upper basin; therefore, the Colorado River compact should be broken?

Mr. BROWER. No, I do not say that.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. No, I refuse to yield at this time.

Mr. BROWER. No, I do not say that. We do not advocate breaking the compact.

Mr. DAWSON. That is what you say in your statement.

Mr. BROWER. We advocate that this question be considered in the national interest in that respect. We also ask that other questions be considered in the national respect, such as the objections raised by other Government agencies.

Mr. DAWSON. Why should it be considered? It was a solemn compact and agreement made in 1922 between the States. Why should it now be reconsidered?

Mr. BROWER. As I answered Senator Watkins on the same question on the same paragraph, it should be reconsidered because a lot of time has gone by. The compact in itself is an imperfect document because it was the best that the man could bring about. We have found out now, for example, that there was less water in the river than we thought there was, than there was thought there was at the time of the compact.

Mr. DAWSON. Mr. Brower, do you realize this compact was approved by the President of the United States and by the United States Congress and is a solemn agreement?

Mr. BROWER. I certainly do. I realize it even has precedence over the laws of the Congress, and that we approve. That was the best thing that could be done. Maybe it could be done better. With 70 million acre-feet of water in California, for example, maybe some other solution could be found so that more of the only water you have could stay up there. That is a possibility. Those are questions that should be asked and have not been asked thoroughly at this point.

So we now come to the year 1955 with the compact quite old, with less waters than there were, and still struggling and struggling to try to find out what to do about it.

Mr. DAWSON. Will you now admit then, it is the water you are concerned about for California?

Mr. BROWER. No, sir; that is absolutely incorrect.

Mr. DAWSON. You say you think it should be modified and more water allowed to go down there?

Mr. BROWER. I did not say that, sir. I said perhaps more water should be allowed to stay up. I take no position. I think the question should be asked.

Mr. DAWSON. Perhaps I should read you what you say. You say you have a population of 12 million and can continue to use the water at your own expense in California, and that we of the upper basin, referred to as Paul, only have a population of 3 million, and we have

not used it yet, and we will not be able to use it unless Uncle Sam subsidizes us.

Is it not plain enough that you mean if the water can go down there you will continue to use it, and you want to use it?

Mr. BROWER. First, I do not use it. I do not live in that part of the State. Second, if it goes down there, the existing uses will probably continue. There is no attempt made to get any more than was allocated by the compact, as I understand it. There is no argument made for that point.

There is, as I understand it, some concern about whether as much as has been allocated will come down and how adequate it will be for use when it does come down. What appealed to me was the figure that Mr. Hosmer used last year in this committee room where he did not want to see one oasis dried up in order to create another. You can have two oases.

Mr. DAWSON. Regardless of whether it is allocated by solemn compact?

Mr. BROWER. You can have two oases within the compact. But I think that somewhere along the line, perhaps when the Supreme Court has made its decision or later, the States of the upper division and the lower division are going to have to get together again and see what they can do since they do not have the full dollar but only have 78 cents to divide instead.

Mr. DAWSON. You do not contend that you should have an oasis down in Los Angeles, with Hoover and Parker and Davis Dams and all those projects, and not have an oasis up in the upper basin where we have not been permitted to use it?

Mr. BROWER. I do not understand.

Mr. DAWSON. You said you did not want 2 oases where you would now have 1.

Mr. BROWER. Quite the opposite. We can have two if we do this thing with careful planning. If we do not plan carefully, we can dry up part of one in order to get another, and that would not make national sense.

Mr. DAWSON. You understand the compact provides that we shall not deliver in any 10-year period less than 75 million acre-feet. Of course, that will be complied with.

Mr. HOSMER. Will you yield at that point?

Mr. DAWSON. No. I only have a few minutes. You can have your own time.

I would like to know, Mr. Brower, if this statement you made represents the views of all the members of your Sierra Club. Do they all agree with you on this?

Mr. BROWER. I would not know.

Mr. DAWSON. I want to ask one more question on this matter. You say that you represent, I have forgotten, how many thousands of sportsmen in California?

Mr. HOSMER. 39,000, I think.

Mr. DAWSON. How many?

Mr. HOSMER. I think it totaled up to 39,000.

Mr. DAWSON. 39,000 sportsmen. Do you realize the Western Association of Fish and Game Directors of the 11 Western States, including California, have gone on record unanimously in support of the Echo Park Dam?

Mr. BROWER. I remember that action, and it was an unfortunate action. It was one which, I think, some of them may regret, but probably some of the others do not.

Mr. DAWSON. I think Mr. Seth Gordon, who represented California there, summed it up neatly when he said:

> A certain club in California certainly will not like this action, but I have been up there and seen for myself, and I am sold on it.

I am not going to take more time, but I just hope more independent people can go up there who will not have preconceived notions before they start.

Mr. BROWER. Mr. Gordon, I think, learned more about that since from people all over the country, not just our little club.

Mr. ASPINALL. The session is adjourned.

(Whereupon, at 4:40 p. m., the subcommittee recessed to reconvene at 10 a. m., on Friday, March 18, 1955.)

COLORADO RIVER STORAGE PROJECT

FRIDAY, MARCH 18, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND
RECLAMATION OF THE COMMITTEE
ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for the further consideration of the legislation having to do with the authorization of the upper Colorado River program.

At this time the Chair calls to the witness stand William J. Welsh, Mayor of Price, Utah.

As the members of the committee will remember, yesterday afternoon the Chair brought to the attention of the members of the committee the fact that Mr. Welsh wished to appear and asked for the introduction into the record of these hearings a statement in opposition to the Gooseberry project in Utah. The Chair had delivered to each of the members of the committee a copy of Mayor Welsh's testimony with the understanding that the mayor would present it this morning.

STATEMENT OF WILLIAM J. WELSH, JR., MAYOR OF PRICE, UTAH, ACCOMPANIED BY THERALD N. JENSEN

Mr. WELSH. Mr. Chairman and gentlemen of the committee, in approaching a discussion about the areas involved in the project, it might be well to go into a little history of the Price River area.

It was first settled in January 1879 when the first pioneers established residence along the riverbanks in the vicinity of what is now Price. They started to irrigate lands and use waters from the Price River shortly after that date and established the first canals and diversions from the Price River. The area became more settled and agriculture formed as the base for the economy of the area and use of water expanded for all purposes.

The storage of water became a paramount necessity and the formation of irrigation districts consolidated the farmers of the area when in 1906 they constructed what is known as the Mammoth Dam, what is now proposed as the site of the Gooseberry. This failed in the year 1917 due to faulty construction.

They constructed the original Scofield Dam, which had a capacity of 51,000 acre-feet, and bonded themselves for $750,000. They had

a major failure on this structure in the year 1928. After the break of 1928, due to the condition of the reservoir and the dam, the Utah State engineer condemned the dam, and limited its storage capacity to 30,000 acre-feet of water.

In 1944–45 a new dam was built as a war emergency measure and reclamation project. In 1945 the dam was in full use and was completed, and is in full use today. It has an active storage capacity of 65,000 acre-feet and overall storage capacity of 73,000 acre-feet. It has been a decided asset to our area and has enabled us to make full use of our waters.

The Carbon County area under discussion has a general altitude in the valley of about 5,500 feet. It is bounded on two sides by mountains and towering cliffs reaching an altitude of over 9,000 feet. The floor of the valley sweeps to the south and east in gentle undulations of the land to Cedar Mountain in Emery County and thus into the San Rafael swell. It is the gateway to southeastern Utah and is on the edge of the desert bordering on the Green River and Colorado River. Our climate is arid and very dry. The precipitation during 1953–54 averaged about 6 inches total for the year. A part of the Wasatch Range raises up on the west side of Carbon County and separates that county and Sanpete County economically, commercially, and culturally. There exists a physical barrier in the form of mountains towering up to over 9,500 feet and forms the divide between the Colorado River Basin and the Great Basin.

USE OF WATER IN PRICE RIVER DRAINAGE

(*A*) *Farm use*

1. The present principal use of the water in the drainage area is for agricultural purposes. In this instance final proof was made in 1938 for 16,803 acres of farmland under filing number 8989A filed with the Utah State engineer.

2. The actual usage for acreage being irrigated is 68,000 acre-feet of water annually.

3. It is interesting to note that out of 16,803 acres in the proof, 11,000 acres have only storage rights that are impounded in the Scofield Reservoir; 5,803 acres have some primary water and use reservoir water as a supplemental supply to mature late crops.

(*B*) *Municipal and industrial*

1. Municipalities use as their source of water, the primary water of the watershed. They acquired this water by virtue of direct purchases made from primary and certificated rights previously owned by individuals in various canal companies. This water is the sole supply of approximately 18,000 people for culinary and domestic purposes in the metropolitan areas of the cities.

2. Industrial users are limited in supply at the present time with the exception of the railroad and a major coal company who have a decreed continuous water right in the Price River. New industries now establishing in the area have not acquired any water rights.

(*C*) *General use*

1. The usage of water in the area is very high because of the arid climate and the small amount of precipitation that falls during the year. Many of our communities have been in short supply of water

and restrictions have been placed in effect to curtail the general use of water in many instances. It is a situation which cannot be ignored due to continued increased growth.

2. As a prelude to the anticipated activity in the security of water, the cities have caused a geological survey to be made by Dr. Ray Marcel of the University of Utah and retained him on the basis of giving us data regarding underground sources of water. His report states that due to the mancos shale in the valley in Carbon County, a source of water would not be obtainable. This indicates to us that the water now in use on our watershed is our last source of water.

GOOSEBERRY PROJECT

The Gooseberry project proposes to divert 12,000 acre-feet from the Price River drainage area on a transmountain diversion with no exchange of water with us involved. This water shall be conveyed into a basin that is not in the Colorado River Basin (Sanpete County, State of Utah). Bureau of Reclamation estimates as of January 1953 advise that the cost of this project will be $5,781,000. This diverted water is to be a supplemental supply for 16,400 acres of land.

The county into which it is proposed to divert this water has a population of 13,891 (1950 census), in an area of 1,616 square miles. The total assessed valuation of the county is about $13 million.

None of the water proposed to be diverted has ever been put to beneficial use in Sanpete County and none of their economy has been based thereon.

The use of this water in its present drainage is the backbone of the economy of 24,901 people (1950 census) living in Carbon County. This county has an area of 1,487 square miles and has an assessed valuation of $30,500,000.

The economy so established is such that the people enjoy the highest per capita family income of any area in the State of Utah, and as a result pay a high per capita family income tax and other taxes. It it interesting to point out that a survey of the residents of Price City indicates that they have a lifetime earnings of $137,000 as compared to $114,500 for the other areas of the State of Utah (Park Row News Service, NYC, January 1955).

Total payrolls in the area amount to about $25 million per year, and the cash income from crops raised in the county amount to $973,310 for the year ending 1954. With the livestock industry included, our cash income from all sources of agricultural pursuits brings in excess of $3 million per year.

Effect that proposed diversion will have on the economy:

1. Will reduce agricultural acreage as well as livestock and crop production by approximately 30 percent.

2. Will limit industrial, culinary and other uses to our economy as it was in 1944 when a survey was made by the Bureau of Reclamation of the Price River Basin (Planning Report No. 50A, March 1943 and Revised May 1944). By making the diversion on the basis of that survey, it would tie our economy down to that period forever. It would absolutely curtail future growth and expansion and would reduce our standard of living. The effect of this might be realized when it is pointed out that the area is aggressive and progressive and

have sought and obtained many improvements. Carbon County showed a growth from 1940–50 by increasing its population more than any other rural county in the State of Utah by having a 25.83 percent increase in population while the entire State population growth rate was 25.2 percent.

3. The water proposed to be diverted is now being used beneficially and if diverted would cripple the area for any future growth.

PRESENT AND FUTURE DEVELOPMENT

Aside from the agricultural industry in the area, there has developed a vast coal mining and coal processing industry during the past 50 years. When you hear someone speak of the vast coal reserves in the State of Utah, they are talking about Carbon County. Reserves are so vast that it is estimated that this small area alone could supply the needs of the entire United States for the next 100 years. The coals have good physical and chemical characteristics. Those that are not suitable for coking are high in volatiles. An average ton of coal, if distilled by low temperature distillation, will yield about 30 gallons of oil, 2,000 cubic feet of gas, and 1,300 pounds of smokeless fuel. It is felt that a diversification of the coal industry in Carbon County is needed particularly leaning toward the synthetic liquid fuel and toward the chemical industry where coal plays a vital part. To operate those facilities requires certain amounts of water. For instance, to operate an anhydrous ammonia plant for commercial fertilizer producing 500 tons per day, would require about 3 second-feet of water with a continuous flow.

The present coal-mining operations include the domestic and captive mines. The two mines at Sunnyside, Utah, produce coal and coke exclusively for the Kaiser Steel Co. at Fontana, Calif. The Geneva steel mines at Horse Canyon and Columbia produce coal exclusively for the largest steel plant west of the Mississippi; that is, the Geneva Steel Works at Geneva, Utah, and furnish the entire production needed by that facility for coking. As a consequence of the value of the coal this company has programed $18 million for expansion of their plant facilities to produce commercial fertilizer.

The Carbon County area is ideally situated for several types of advancement. We have the natural resources of coal and shale in vast quantities, together with deposits of titanium, gallium, and germanium in commercial quantities. A new gas field has been brought into production and it is programed to have 10 or 12 drilling rigs in the area to further the exploration and development of natural gas and oil this coming summer. We have experienced a great deal of uranium activity, and together with Grand Junction, Colo., and Moab, Utah, share in that industry to a great extent.

As a result of the continued good prospects of the area, the Utah Power & Light Co., the major utility in the State, has just completed and put into operation a new $11,500,000, 66,000 kilowatt-hour powerplant at Castle Gate, Utah. This is a mine mouth steam generated plant, and has proven to be very efficient and workable. It is our understanding that this utility plans on adding two new 75,000 kilowatt-hour units in the same location. They, too, require water to operate these facilities generally in the amount of about 3 second-feet for each unit. This power feature is a decided asset to all of southeastern Utah

and as a consequence they are presently constructing, at a cost of $2 million, a 150-mile-long 130,000 kilovolt line into Moab, Utah, and Monticello, Utah, to alleviate the power shortage experienced in that area because of increased growth and also the mushrooming growth of the uranium mining and milling industry.

Like most western areas we are still in the development stage and based on past history, the future continues to look bright and untarnished for ourselves and generations to come.

The area has been prominently mentioned as a location for an atomic furnace reactor, which installation requires some of our resources, among which is water.

In order to insure these bright prospects, we must have the most vital one of all—the continued use of our water.

Our mountain hideaway is ideal for dispersal of industries and for the development of the natural resources. We are served by two transcontinental highways, and have a main-line railroad bisecting the county. The railroad has good facilities, both for yards and for repairs, and is a division point.

COMPREHENSIVE PLAN OF GOOSEBERRY INTEGRATED WITH SCOFIELD RESERVOIR

1. It is proposed, if the Gooseberry goes into effect, that our water usage would be limited to 46,000 acre-feet of water per year, and our present use by measure of the river commissioner, who is a deputy of the Utah State engineer, indicates we have consistently used 68,000 acre-feet to satisfy the users of the decreed and certificated water on Price River. In other words, if the diversion is made, we would out of necessity have to reduce our acreage currently using irrigation water beneficially to less than 11,000 acres.

2. These waters now being used consist of 258 cubic feet per second of primary (direct flow) water which, based upon the stream efficiency determined by the Utah State engineer, would amount to 44,640 acre-feet during the irrigation season, plus 30,000 acre-feet of storage water in Scofield Reservoir. This makes a total of 74,640 acre-feet of water that has been beneficially used by the water users of the Price River system and upon which certificates have been issued and adjudicated. By Utah law the storage water is appurtenant to the land and since certificates have been issued it would seem that 30,000 acre-feet for storage water as shown above cannot be legally separated from the land.

3. The contemplated Gooseberry project is based primarily upon a so-called tripartite contract between the United States Government, Price River Water Conservation District, and Carbon Water Conservancy District. The Sanpete Water Users Association is not a party to this contract though they will be the third party beneficiary. The users of the primary water of the Price River system including the cities are not parties to this contract nor did they in any manner assent to its execution; however, this contract seriously affects the lawful rights of the primary water users including the cities in that the Government proposes to take part of their primary rights and divert them into Sanpete County by constructing the Gooseberry project. The water rights represented by recognized filings by the Utah State engi-

neer are assigned to the Bureau of Reclamation and held in trust by them.

The Government in said contract then attempts to protect these primary rights by passing that obligation on to the users of the storage water in the Scofield Reservoir. Through this manipulation and from the figures of water use hereinbefore mentioned, the users of the storage water in Scofield Reservoir will be deprived of a major portion of their water in order to sustain the primary flow rights in Price River. After accomplishing this, the Government, its successors and assigns—its assigns in this case being the Sanpete Water Users Association— will be relieved of any further liability and saved harmless from any future claim to the waters diverted by them at the Gooseberry project.

It is difficult for the primary water users of the Price River system and cities to understand under what lawful right, if any, the Government is depriving them of portions of their primary water without their consent. The Government, as has been pointed out before, has attempted to make up such primary water by passing the obligation on to the users of the storage water in the Scofield Reservoir, but in no way assumes any responsibility to guarantee same.

The primary water users have grave doubts as to the ability of the reservoir water users to fulfill this contractual condition. This grave doubt is based on the fact that full beneficial use has been made of the water now available and that the yield of the watershed has not been up to expectations.

The figures used by the Bureau of Reclamation to justify the construction of the Gooseberry project completely ignored the water loss by evaporation and transpiration which in fact amounts to approximately 33 percent of the primary and storage water in the Price River System. If the Bureau of Reclamation did not in fact disregard this loss, then they have attempted to pass it off to the water users of the Price River.

There are serious legal doubts as to whether the tripartite contract can lawfully invade the vested rights of individual water users under the Price River Water Conservation District. This contract in effect requires that the Gooseberry rights be satisfied by an invasion of the storage rights of water users under the Price River Water Conservation District. These users allege that their board had no authority to convey away their waters by said contract.

It has been intimated that one of the prime bases in fact for this proposed transmountain diversion is because of certain amounts of so-called surplus water that have not been used in the drainage area. Carbon County interests contend that if such surpluses do exist, it is uncontrollable water and not available for use at the time and place needed.

The construction of the Gooseberry project on the site proposed is at a place where the water is fully controlled and where no waste could ever be evident.

By no stretch of the imagination could it be construed that by the completion of the Gooseberry project, a so-called surplus would be used or eliminated.

It is further pointed out that the soils along the Price River system have been found by use to require in excess of 3 acre-feet of water per

acre on the land in order to obtain the greatest yield therefrom. When this use was pointed out to the Bureau of Reclamation officials, they stated that in making their survey to determine the feasibility of the Gooseberry project they had estimated the use for the Price River area at a theoretical value of 2.90 acre-feet per acre at the head of the ditch and not on the land. When this discrepancy was pointed out, they stated that on that basis we were entitled to a resurvey of the area to more accurately determine the requirements of water for the Price River area. In accordance with that suggestion, the users of the waters of the Price River had made application to the Utah Water and Power Board that such a resurvey be made. This further points out the fact that the Gooseberry project should be deleted from the upper Colorado River project, and should continue to be so until a resurvey be made on the present requirements for water in the Price River system. For this reason alone, and all others stated, the Gooseberry should be deleted from the Colorado River storage project.

Mr. ASPINALL. Thank you, Mr. Welsh.

Mr. SAYLOR. Mr. Chairman?

Mr. ASPINALL. Yes, Mr. Saylor.

Mr. SAYLOR. Mayor Welsh, I had the privilege of meeting you and the mayor of Helper, Utah, several weeks ago. For the record will you give us the name of the mayor of Helper?

Mr. WELSH. Steve J. Diananti.

Mr. SAYLOR. And, as the mayor of Price, Utah, and the mayor of Helper, Utah, you are here because of the fact that if the Gooseberry project goes through it will vitally affect the going economy of your two thriving communities?

Mr. WELSH. Yes, sir.

Mr. SAYLOR. In other words, it is my understanding from your statement and from discussion with you that these two towns are now presently using every drop of water that is available in that area, and that the reason that you are so vitally opposed to this Gooseberry project is that it will take some of the water which you are presently putting to beneficial consumptive use for domestic purposes and, by means of a transmountain diversion, take it over and try to start another community somewhere else?

Mr. WELSH. That is partly true, Mr. Saylor. The full basis of it is, of course, that full use of the water by nearly everyone in the county is now undertaken. When I represent myself as the mayor of Price, at the same time we are also representing nearly all of the population of Carbon County.

Mr. SAYLOR. What is the population of Carbon County?

Mr. WELSH. About 25,000.

Mr. SAYLOR. About 25,000?

Mr. WELSH. Yes.

Mr. SAYLOR. That is all.

Mr. WELSH. Mr. Chairman, I have a letter addressed to this committee from the Carbon County Commissioners which they requested be introduced into the record.

Mr. ASPINALL. Without objection, it will be introduced at this place in the record.

Hearing no objection, it is so ordered.

(The letter referred to follows:)

CARBON COUNTY,
Price, Utah, February 25, 1955.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
House of Representatives, Congress of the United States,
Washington, D. C.

HONORABLE SIR: The Board of County Commissioners of Carbon County, State of Utah, wishes to be on record as opposing the inclusion of the Gooseberry project as a participating project in Colorado River storage project. This project would deprive the residents of Carbon County of a large portion of their decreed water rights, which have been in use for the past 75 years.

During the period between 1940 and 1950 the population of Carbon County increased from 18,459 to 24,901 or 25.87 percent, and the municipalities of the county are already experiencing an acute water shortage for culinary use and the problem of securing sufficient water for additional industrial expansion is very serious, as the county economy is based on farming, coal mining industry, and other industry is needed for proper balance of working force.

If the Gooseberry Dam is built as presently set up, by a tight dam, it will deprive Carbon County water users of the most important source of spring and summer runoff, and seriously impair the decreed rights of primary water users and the equalizing of storage in the Scofield Reservoir.

The people of Carbon County favor the enactment of the upper Colorado River project, but are unalterably opposed to the inclusion of the Gooseberry project, and for this reason, the county has not appropriated money to the Utah Water and Power Board, which has been active in promoting the Gooseberry project, and we wish to correct the record against any misrepresentation by the water board in this matter.

Respectfully yours,

BOARD OF COUNTY COMMISSIONERS,
By B. H. YOUNG, *County Clerk.*

Mr. DAWSON. Mr. Chairman. I assume that the Carbon County group you are submitting a statement for, opposes this project?

Mr. WELSH. Yes, sir.

Mr. DAWSON. I ask unanimous consent that the other group be permitted to file their statement.

Mr. ASPINALL. Whom do you mean by the other group?

Mr. DAWSON. The group who favor the Gooseberry project, what we call the Sanpete County group.

Mr. ASPINALL. Unless there is an objection, the request will be granted.

Hearing no objection, it is so ordered.

(The statement referred to follows:)

STATEMENT OF JOHN S. MCALLISTER AND DON V. TIBBS ON BEHALF OF THE SANPETE WATER USERS ASSOCIATION AND SANPETE COUNTY, UTAH

Mr. Chairman and members of the committee, my name is John S. McAllister. I am a lawyer in private practice at Mount Pleasant, Sanpete County, Utah. I represent the Sanpete Water Users Association, with me in Don V. Tibbs, Sanpete County attorney.

The Gooseberry project contemplates building a water-storage dam at the so-called Mammoth site on Gooseberry Creek, a tributary of Price River, and by a tunnel diverting the water into Sanpete Valley. The project is situated near the geographical center of the State of Utah. The dam would store 17,200 acre-feet of water, 1,200 of which would be used for silt, fish culture, and recreation, leaving 16,000 acre-feet of active storage. The project would provide an average of 11,700 acre-feet of storage water and 2,300 acre-feet of return flow annually as a supplemental irrigation supply for 16,400 acres of farming land. The storage water would be provided from surplus flows of Gooseberry Creek that would be regulated at Mammoth Reservoir and then conveyed by the Mammoth Tunnel through the divide into Sanpete Valley. The transmountain diversion is made practicable by adequate storage in Scofield Reservoir, also on the Price River, which storage is necessary to regulate the waters of Price River in such manner

as to satisfy all existing prior rights. In order to fully protect the storage rights in Scofield Reservoir, as well as the rights of the users of the waters of Price River, and the right to store water under the Gooseberry plan, the tripartite contract was entered into by the Government, the Carbon Water Conservancy District, and the Price River Water Conservation District.

By that contract the rights of the Government for the benefit of the Sanpete water users through the Gooseberry project or some similar project are fully recognized. The water storage commission, the predecessor of the present Utah Water and Power Board, specified that the water from the Gooseberry Reservoir should be reserved for Sanpete County. Based upon this reservation, the present Utah Water and Power Board has recommended the Gooseberry project to be among the first of the participating projects of the Colorado River storage project. The Gooseberry project is among the first developments recommended by the States of the upper Colorado River Basin for participation in the benefits and revenues of the storage project. The Legislature of the State of Utah by a joint resolution in the 31st session (1955) made a similer recommendation. The Bureau of Reclamation has recommended the project to the Secretary of the Interior as a participating project. (See U. S. Bureau of Reclamation report, December 1953).

The Gooseberry project has been the hope of the people of Sanpete County for many years. Like other Utah settlements, this area was pioneered in the 1850's. The economy developed almost solely upon agriculture—and produced the one-time sobriquet "Granary of Utah." But the flush of virgin fertility has given way to a limited economy which maintains modern homes, schools, and respectable living by dint of the pioneer qualities of thrift and hard work—limited, that is, only by a lack of late-season irrigation water. Direct runoff supplies sufficient early-season water, but between July 15 and September 30, irrigation water in so deficient that maturing of late-season crops is impossible and utilization of the best growing weather is prevented.

This hope was given some semblance of reality, when in 1924 the application to the State engineer of Utah to appropriate 15,000 acre-feet of storage water was filed on behalf of the water users on Sanpete County. In 1938 that hope was further strengthened when the State district court of jurisdiction, sitting in Carbon County, found, "That at the time of the filing of said application No. 9593, there was unappropriated water in said Gooseberry Creek at the point where it is sought to store said water and to divert the same from said Gooseberry Creek, and that from time to time and from year to year and has, ever since that time, been water over and above all prior appropriations and subject to be appropriated under said application, and that no rights of the defendants (Carbon County Water Co., a corporation, et al) or either of them, will be prejudiced by the granting and approval of said Application No. 9593."

Over continuous protest and objection the application has been kept in good standing in the State engineer's office—the last extension of the time in which to submit proof of appropriation to the State engineer being to March 11, 1958. The Gooseberry project's studies, reports, and recommendations by the Bureau of Reclamation are all based on the water covered by that application.

The basic planning by the Bureau and the interested parties projected the Scofield and the Gooseberry projects as a single, inseparable project, intended for simultaneous development. But the Scofield phase of the project was built as an emergency, as part of the war effort, in order to protect railroads, power lines, mines and communities during a time when failure of the old Scofield Dam, due to faulty construction and no spillway capacity, would seriously cripple our national defense. The cost of the construction of the new Scofield Dam was assumed by the United States Government, except for $216,000 which was undertaken by the Carbon County people, $116,000 of which was to be repaid by the Sanpete people upon completion of the Gooseberry project.

Fears of the Carbon County folks that the original Scofield Dam might fail completely found sympathetic consideration in Sanpete County. The following is a quotation from the minutes of the meeting called February 4, 1942, to solicit consent of the Sanpete water users: "the Sanpete people, recognizing the necessity of the Scofield Dam, will no doubt allow it to go through as the first unit of the entire project and later come in with the Scofield project for their extended development that will allow diversion from the Gooseberry". From those minutes is also the following by Price City mayor, J. Bracken Lee (now Governor of Utah): "We the people of Carbon County are trying to see if we can get this declared an emergency by the Government, and advance the immediate funds for the construction, as it cannot be satisfactorily repaired, then we

could go on with our present plans of organizing conservancy districts, and later on enter into an agreement with the Sanpete people to permit them to come in with us as co-partners in the entire development."

The tripartite contract contains the recital that it is in the interest of the irrigation district that the Scofield Dam be reconstructed, and among the other mutual agreements contained therein are the following:

"12 (c) The irrigation district shall have the right to the full use of the active capacity. The reservoir shall be operated to the end that, within the limits of the water supply, there will be available in Price River at the Heiner station enough water to permit the diversion, when required, of the amount needed to satisfy the existing rights below the Heiner station but not in excess of the amount of water that can be beneficially used, *Provided*, That no stored water shall be released during periods that the beneficial use requirements for existing rights below Heiner station can be met with water from other sources available at the points of diversion; and *Provided further*, That no more water shall be passed through Scofield Reservoir, when storage capacity is available therein, than is necessary to meet beneficial use requirements for existing rights below the Heiner station."

"12 (e) The irrigation district agrees that, in the event existing rights to the use of the waters of the Price River are adversely affected by the exercise of rights as defined in subsection (d) [Gooseberry plan] of this article, by the United States or successors, or assigns, there shall be released from water available into the active capacity of Scofield Reservoir sufficient water to offset such adverse affect, the releases to be in such quantities and at such times as may be determined by the officer or agency charged by law with the responsibility for the regulation and distribution of the waters of the Price River system. Any such relases, as between the parties to this contract, shall be without diminution of the rights of the United States, or successors or assigns, under said subsection (d), or otherwise, under this contract, and without cost to the United States its successors and assigns."

"23. In the event of disputes between the parties hereto arising out of this contract involving questions of fact and insofar as provisions hereof require a determination of facts to be made, the Secretary is hereby designated as the arbiter of such questions and is the one required to make such determination of fact, and his decision thereon shall be conclusive and binding upon the parties hereto."

"26. The board of directors of the irrigation district shall commence and prosecute to final judgment proceedings in a court of competent jurisdiction under title 100, chapter 9, sections 45–52, both inclusive, determining the validity and legality of this contract and the terms thereof insofar as the irrigation district is concerned and approving and confirming all the proceedings for the authorization of this contract."

An analysis of the tripartite contract reveals that in the reservoirs (Gooseberry, to be constructed at the old Mammoth site with 16,000 acre-feet of active storage and the Scofield as now constructed with 65,000 acre-feet of active storage) were recognized as being sufficient to control the Price River and provide sufficient hold over storage to protect the lower users in their primary and storage rights. There shall be released from the Scofield reservoir sufficient water to offset any adverse effect which the storage in the Gooseberry Reservoir by the United States under the Gooseberry plan might have on any existing rights below the Scofield Reservoir. Most of the primary rights on Prince River can be satisfied without the benefit of storage. The remainder are dependent in part of Scofield storage. All can be satisfied from the natural flow of the river at the Heiner gage and the storage in the Scofield Reservoir. The records show that the annual flow at the Heiner gage is approximately 81,000 acre-feet while requirement of natural flow plus storage is only 46,000 acre-feet under the tripartite agreement.

More specifically, to protect the rights of the Price River water users, the contract provided that when the works of the Gooseberry plan shall have been placed in operation, the irrigation district shall have the right superior to the United States annually to impound 30,000 acre-feet, exclusive of water held over from prior seasons, until Scofield first fills or 5 years after the first storage in Gooseberry. The irrigation district agrees that, while its superior right is operative, releases from the Scofield Reservoir shall not exceed 30,000 acre-feet per year, and shall be so made that the aggregate below the Heiner gaging station shall not exceed 46,000 acre-feet.

The Bureau has by several surveys determined that Carbon County does not have in excess of 15,000 acres of irrigable land under the Price River. The State

engineer of Utah has determined that a duty of 3 acre-feet per acre per year is a reasonable duty for most irrigated land in the State. On the Scofield project lands the Bureau allowed 2.90 acre-feet per acre per year, including conveyance and application losses, making the total, 46,000 acre-feet per year.

The contract also provides that the water released from Scofield shall not in in any event exceed that which, with the other flows available, can be used beneficially.

Canal diversions below the Heiner gaging station during the past several years have been as follows (based on the Water Commissioner's reports):

1946	54,442	1951	66,141
1947	66,687	1952	63,782
1948	57,808	1953	71,722
1949	62,190	1954	58,233
1950	68,465		

Obviously, there is sufficient water in the Price River system to satisfy all established rights, and particularly, there is sufficient over and above the prior rights to provide the 11,700 acre-foot average annual yield required for the Gooseberry plan at the Mammoth Reservoir site.

Sanpete County's need for supplemental water is urgent and critical. The Bureau of Reclamation's report on the Gooseberry project shows a benefit-cost ration of 1.2 to 1.

The report of the Bureau of Reclamation in 1953 was based upon detailed studies by the Bureau of Reclamation and supported by studies and investigation by the following agencies:

Geological survey
Coast and Geodetic Survey
Soil Conservation Service
United States Weather Bureau
State engineer of Utah
Utah Water and Power Board
Agricultural agent of Sanpete County
National Park Service
Fish and Wildlife Service
Forest Service

It is our firm belief that the conclusions reached by the Bureau of Reclamation are sound and valid, and based upon their report, the people of Sanpete County urge the inclusion of the Gooseberry project in the Colorado Storage project.

Summarizing, the following is a brief statement of the Sanpete County people:

SUMMARY

The Sanpete water users hold legal and valid filings on the water which is contemplated will be impounded and diverted by the Gooseberry Reservoir at the Mammoth site, in Sanpete County, Utah. (2) The Scofield and the Gooseberry projects are inseparably one development, planned (and the Scofield part constructed) for the purpose of controlling the Price River, equalizing its flow, and protecting the rights of interested parties. (3) The Bureau of Reclamation studies show that the full development of the project is necessary to accomplish these features, i. e., to provide for the rights of the Gooseberry plan, as well as to protect the rights of the Carbon County people in Price River. (4) The Sanpete water users cooperated with the Carbon County people and the Bureau of Reclamation, and the Utah Water and Power Board in their mutual arrangements to initiate these projects in good faith, and will continue to do so. (5) It is our sincere belief that no existing rights in Carbon County shall be placed in jeopardy by the Gooseberry project as proposed by the Bureau of Reclamation. (6) The people of Sanpete County urge the inclusion of the Gooseberry project in the first phase of the Colorado River storage project.

Mr. ASPINALL. Thank you, Mr. Welsh.

Mr. WELSH. Thank you.

Mr. ASPINALL. At this time and for the hearing today we shall listen to representatives from California. The Chair will endeavor to get permission for this committee to sit this afternoon. He has been advised that the work in the House should be finished by 2 or 2:30. Announcement will be made later this morning.

The Chair is glad to call upon his colleague, Mr. Hosmer, of California, to present the witnesses to the committee. The Chair will then call them in order.

Mr. HOSMER. Thank you, Mr. Chairman. It is with a great deal of pride I assume this opportunity to present to the committee these gentlemen, all of whom represent either the State of California, subdivisions of the State of California, or local government agencies within the State of California.

I should like to present them to you so that you will know who they are, and then they will give their testimony later, and I shall present them in the sequence in which they will give their testimony.

First will be Mr. Fred Simpson, of San Diego, who is the chairman of the Colorado River Board of California.

Second will be Mr. Northcutt Ely, special counsel for the Colorado River Board. He is accompanied by Mr. Robert L. McCarty, and Mr. Ely is also a special assistant to the attorney general of the State of California.

Third will be Mr. Raymond Matthew, who is the chief engineer for the Colorado River Board of California, which, incidentally, is an agency of the State of California.

The fourth witness will be Mr. Gilmore Tillman, of Los Angeles, who is chief assistant city attorney for water and power for the city of Los Angeles.

Next we will hear from James H. Howard, who is chief counsel for the Metropolitan Water District of Southern California, and he is appearing before the committee representing Joseph Jensen, the chairman of the board of directors of the Metropolitan Water District of Southern California and a member of the Colorado River Board.

Mr. DAWSON. And a former resident of the State of Utah.

Mr. HOSMER. Mr. Jensen is?

Mr. DAWSON. Yes.

Mr. HOSMER. After him will follow Mr. Samuel B. Morris, who is from Los Angeles—I do not know where he was from before that—a member of the Colorado River Board and general manager and chief engineer of the Department of Water and Power of the City of Los Angeles.

After him will be Mr. Ben P. Griffith. He is not with us this morning, but he is the president of the Board of Water and Power Commissioners of the City of Los Angeles.

Then following him will be Evan T. Hewes of El Centro, Calif., who is not here either, who is a member of the Colorado River Board and president and general superintendent of the Imperial Irrigation District.

Mr. ASPINALL. With that introduction, the Chair will remind the witnesses that we do have a limited amount of time and wherever possible, we would wish you make a summary of the statement. Inasmuch as others have read their statements in full, you have that privilege, if you desire.

The first witness is Mr. Fred W. Simpson.

STATEMENT OF FRED W. SIMPSON, CHAIRMAN, COLORADO RIVER BOARD OF CALIFORNIA

Mr. SIMPSON. My name is Fred W. Simpson. I live in San Diego, Calif. I am chairman of the Colorado River Board of California, and a director of the San Diego County Water Authority.

The Colorado River Board of California is a State agency created by statute of the State of California Legislature, passed in 1937, for the express purpose of protecting California's contractual rights to water and power from the Colorado River. The Colorado River Board consists of six members. They are appointed by the Governor of California and represent the following six agencies: Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, Metropolitan Water District of Southern California, San Diego County Water Authority, and Los Angeles Department of Water and Power.

I would like the privilege at this time to present a resolution adopted by the Colorado River Board. In the interests of time I will not read it but do ask that it be inserted in the record at this point. It defines the official position and attitude of the Colorado River Board with regard to the legislation now being considered by this committee.

Mr. ASPINALL. As I understand it, the resolution is at the back of your statement; is that correct?

Mr. SIMPSON. That is correct.

Mr. ASPINALL. Unless there is an objection, the request is granted. Hearing none, it is so ordered.

(The resolution referred to follows:)

RESOLUTION OF COLORADO RIVER BOARD OF CALIFORNIA OPPOSING PENDING LEGISLATION AUTHORIZING COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

The Colorado River Board of California opposes the enactment of S. 1555 and H. R. 4449, 83d Congress, bills to authorize the Secretary of the Interior to construct, operate, and maintain initial units of the Colorado River storage project and participating projects, and for other purposes.

California favors the continuation of the development of the water resources of the Colorado River Basin on a sound economic basis, as the need for such development occurs. This State recognizes the right of the upper basin States to so utilize the waters apportioned to that basin by the Colorado River compact as approved by the Boulder Canyon Project Act, but subject to the terms and conditions of those documents as the Supreme Court may construe them in the case of *Arizona* v. *California* now pending.

By the same token, California, in the protection of its investment of nearly $700 million in water-development projects which it has made in reliance upon the Colorado River compact and the Boulder Canyon Project Act, and the economy and population of more than 4 million people dependent upon these works, must resist legislation which would encroach upon the rights recognized in the lower basin States by those documents.

The proposed Colorado River storage project legislation adversely affects the lower basin States in much the same way as would the proposed central Arizona project legislation. Both are based upon interpretations of the Colorado River compact and the Boulder Canyon Project Act with which California cannot agree and which are now at issue in the United States Supreme Court. Each of them contemplates developments which would encroach upon the compact and Project Act, as interpreted at the time of enactment of those laws, to the extent of more than a million acre-feet per year. Both proposals are based upon unrealistic water-supply estimates. Each is in conflict with the presentation made to the Senate by the supporters of the Mexican Water Treaty. Each ignores the legal claims which are in conflict with it, and both ignore the damage

which their construction would cause to the investments already made by their neighbors. Each of these proposals is dependent upon Federal subsidies for irrigation amounting to many times the value of the land when fully developed, and most of these subsidies are concealed. Both would commit the Congress to new feasibility standards and pay-out formulas with which this board and other California State agencies have officially expressed disapproval.

The Colorado River storage project would intercept the lower basin's water supply with giant reservoirs at Glen Canyon, Echo Park, and Curecanti, capable of storing several years' flow of the river. In the absence of statutory controls of the operation of such reservoirs designed to protect the output of firm power at Hoover Dam, upon which the United States and the power contractors relied, the use of such large storage could result in seriously curtailing the revenues at Hoover Dam and other dams on the lower river and upon which these lower projects depend for financing. It is against the best interest of both the power users in the lower basin and the Federal Treasury to so legislate.

Both Glen Canyon and Echo Park Reservoirs would be located downstream from any point of use by the proposed irrigation projects in the upper basin and their major purpose would be to provide revenues, commencing almost 50 years hence, to pay the capital cost without interest of the irrigation projects proposed for construction now. This postponement for nearly 50 years of the commencement of repayment of irrigation would result in a Federal subsidy amounting to over $2,500 per acre of irrigated land; an unwarranted and unjustified burden on the Nation's taxpayers.

California, as a major taxpaying State, is doubly affected, for the amount of the overdraft on the water supply of the Colorado River Basin is directly related to the amount of Federal subsidy to the irrigation projects creating the overdraft.

The bills delegate to the Secretary of the Interior power to resolve the feasibility of the participating irrigation projects. If reclamation feasibility standards are to be changed, that should be done by Congress, in general legislation, after the Hoover Commission has had an opportunity to report upon this very matter, heretofore committed to their study.

The proposed legislation includes some, and foreshadows other, large transmountain diversion projects in the upper basin using several million acre-feet of water annually, thereby impairing the quality as well as the quantity of the water available to the lower basin and to which the lower basin is entitled under the Colorado River compact.

For all these reasons, the Colorado River Board of California respectfully requests the representatives of this State in the Senate and House of Representatives of the United States to oppose the enactment of legislation to authorize construction of the Colorado River storage project and participating projects as proposed in these bills—S. 1555 and H. R. 4449—or similar legislation, and instructs its officers and staff to make the appropriate presentation of the views of this board to the congressional committees and executive agencies concerned with such legislation.

STATE OF CALIFORNIA,
County of Los Angeles, ss:

I, Harold F. Pellegrin, executive secretary of the Colorado River Board, do hereby certify that the foregoing is a true copy of a resolution unanimously adopted by said board at a regular meeting thereof, duly convened and held at its office in Los Angeles on the 2d day of June 1954, at which a quorum of said board was present and acting throughout.

Dated this 2d day of June 1954.

HAROLD F. PELLEGRIN,
Executive Secretary.

Mr. SIMPSON. Mr. Hosmer has already introduced our witnesses, so I will not take any more of the committee's time at this time. With your permission we will have our first witness, Mr. Ely, and if it suits the convenience of the committee that Mr. Matthew attend Mr. Ely here at the witness table at this time, Mr. Chairman, we would like him to do so.

Mr. ASPINALL. That will be in order, but the Chair reserves the right, of course, to call the witnesses as he desires.

Mr. SIMPSON. I might ask while I am here, Mr. Chairman, that the statement of Mr. Hewes, who is not with us, either, be inserted in the record.

Mr. ASPINALL. We will take care of that when we get to it.

Mr. SIMPSON. Thank you.

Mr. ASPINALL. The Chair at this time calls Mr. Ely, who has been before this committee on many different occasions. We are glad to have you with us again this morning, Mr. Ely. Mr. Matthew if you so desire, you may accompany Mr. Ely at the witness table at this time or later on, whichever you desire.

STATEMENT OF NORTHCUTT ELY, SPECIAL COUNSEL, THE COLORADO RIVER BOARD OF CALIFORNIA

Mr. ELY. Thank you, Mr. Chairman. It is an honor to be before your committee again.

My name is Northcutt Ely. I am an attorney, with offices in the Tower Building, Washington 5, D. C., and appear here as special counsel to the Colorado River Board of California, a branch of the State government.

California, as a party to the Colorado River compact, and with heavy investments made under the Boulder Canyon Project Act, is seriously affected by this bill in the respects which I shall outline. California is also a party to the pending suit in the Supreme Court entitled *Arizona* v. *California et al.*, No. 10 Original, October term, 1954, as are Nevada, Arizona, and the United States. I have the honor to represent California in that action as an assistant attorney general of my State, under the direction of Attorney General Edmund G. Brown of California.

The Bureau of Reclamation and the upper basin States, in planning the project now before you, have made interpretations of the compact and the project act which we challenge in the pending Supreme Court action, and which have necessitated our motion to implead these States in that suit. The Supreme Court, on February 28, 1955, referred that motion to the special master, Hon. George I. Haight, whom it had previously appointed, with instructions "to hear the parties and report with all convenient speed his opinion and recommendation as to whether the motion should be granted." The master has set April 12 in Phoenix, Ariz., for hearing upon that motion.

I shall discuss the pending project, our own projects which are affected, the conflicting interpretations of the compact and project act involved, and the effect upon our very large investments if the pending upper basin project were built and operated in the manner proposed.

I. THE PENDING UPPER BASIN PROJECT

The Colorado River storage project is variously described in bills now before Congress, but all of them have the four following objectives:

First: Authorization of the construction of eleven to thirty-odd reclamation projects. The aggregate consumptive use of these projects is said to range from about a half-million to about one and a half million acre-feet. These quantities, when added to about

2,500,000 acre-feet, said to be required by projects already constructed or authorized, would represent a total use of say 3 million or 4 million acre-feet in the upper basin. The larger of these figures is still within the quantity of 7,500,000 acre-feet per annum, the use of which is apportioned to the upper basin by article III (a) of the Colorado River compact. Moreover, the engineering studies indicate that this total could be put permanently to use without the construction of any new holdover storage whatever.

Second: Nevertheless, these bills authorize the immediate construction of 2 to 6 storage reservoirs: Echo Park, Flaming Gorge, Glen Canyon, Cross Mountain, Navaho and Curecanti. The ultimate storage program amounts to over 48 million acre-feet. These storage dams, with the partial exception of Curecanti and Navaho, are far downstream from the irrigation projects. They would not store water to be used on these projects. That is, the ones named in this bill. They would, instead, store the water which is not used on the irrigation projects in the upper basin, but which can only be used physically in the lower basin and in Mexico. It is proposed that this lower basin water supply, so intercepted, be impounded and used to generate electric energy, the power sold, and the proceeds used to pay out the cost of the storage dams, and thereafter, starting 44 years from completion of Glen Canyon, to commence paying for the reclamation projects named in section 1 of the bill. The irrigation projects thus subsidized are called "participating projects," and the subsidy is over 85 percent of the construction cost allocated to irrigation. The Secretary of the Interior is required to submit new feasibility reports, but the O'Mahoney-Millikin amendment to the Flood Control Act of 1944 is waived, except as to two projects, and the Secretary thus need not clear these supplemental feasibility reports with the affected States. The power would be sold to 10 privately owned utilities at a rate in excess of 6 mills per kilowatt-hour, in contrast with Hoover Dam, where 91 percent of the firm energy is sold to public agencies at a switchboard cost of about 2 mills per kilowatt-hour, equivalent to a cost at the receiving stations of 3 to 4 mills.

Third: These bills all declare, in section 2, the intent of Congress to authorize the future construction of other projects, to use all the water apportioned to the upper basin. These projects are not named in the bill, but the Department of the Interior has inventoried over 100 projects in various publications, particularly House Document 419, 80th Congress.

Fourth: When, as, and if the additional irrigation projects referred to in section 2 are built, it will be necesary to store water in downstream storage reservoirs, not for use by any reclamation project in the upper basin (all of the storage reservoirs, as previously stated, are so far downstream that no water stored there can ever be physically used for irrigation or domestic purposes in the upper basin)—I should say with the exception of the ones I have mentioned—but for quite a different reason: To enable these future section 2 projects to increase the consumptive use in the upper basin above the 3 million to 4 million acre-feet required by existing projects plus all the section 1 projects without violating the provisions of article III (d) of the Colorado River compact. That article of the compact stipulates that the States of the upper division (Colorado, Utah, New Mexico,

Wyoming) will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years. In the driest decade so far, 1931–40, the flow at Lee Ferry was more than 100 million acre-feet, during a time when the upper basin projects were using about 2 million acre-feet per year; and engineers tell us that the upper basin uses can safely rise to about 4,300,000 acre-feet (which exceeds the total uses of all existing and authorized projects plus all the uses of all the section 1 projects proposed in the most ambitious of these bills), before this 100 million total would shrink to 75 million.

Thus the ultimate purpose of Glen Canyon Reservoir, and the other holdover storage reservoirs, is to enable the unnamed section 2 projects to be built in the upper basin at some remote time in the future without violating article III (d) of the compact.

The bills all make clear that this measure is intended to commit Congress to a program for the full utilization of all the water which the upper basin claims under the Colorado River compact. Such a declaration of policy appears in section 2. Otherwise, the storage reservoirs are not needed for any water conservation purpose, nor for compliance with the compact, will never be needed for compliance with the compact, and are strictly power dams.

The total storage capacity proposed, 44 to 48 million acre-feet, is enough to intercept the whole flow of the river for several years. It is planned to fill them gradually, over a period of 20 years. After they fill, is is planned to hold over storage in these reservoirs for 20 to 35 years. This is like holding back from the lower basin water which reached Glen Canyon in 1920 in order to release it to Hoover Dam in 1955, a period of 5 to 9 presidential administrations. The evaporation loss from these power reservoirs will be 600,000 to 1 million acre-feet per year, enough to supply a city of 3 million people. The evaporation loss is over 1½ times the consumptive use of the 11 participating projects recommended by the Department. Over 58 million acre-feet, including evaporation losses during filling, would be intercepted by these six reservoirs.

II. CALIFORNIA'S STAKE IN THE COLORADO RIVER

While the water stored in the upper basin storage reservoirs can never be physically used in the upper basin, there are great projects in the lower basin, already constructed, which are dependent upon the water which these upper basin reservoirs would intercept, and which are therefore vitally interested in how these reservoirs are filled and operated, and in the quantities of water which will reach those reservoirs after the upper basin is developed up to its compact apportionment.

The Federal works which California water and power users have underwritten, and the projects which they have built themselves, dependent on the waters of the Colorado River system, represent a total commitment by California of more than $500 million.

From north to south, these are:

(1) Hoover dam, whose cost was underwritten in its entirety by the water and power users of southern California under the authority of the Boulder Canyon Project Act, plus the transmission lines built by California agencies to bring Hoover Dam power to the people in

this State (Arizona and Nevada subsequently withdrew 36 percent of the power underwritten by California power contractors). It is the existence of Hoover Dam which makes possible the use of water by the proposed upper basin "participating projects" without infringement on the prior appropriations in the lower basin, now served by Hoover Dam storage contracts; 91 percent of Hoover Dam's firm energy is taken by public agencies.

(2) Parker Dam, about 155 miles below Hoover Dam, paid for by the metropolitan water district of Southern California. Its power production is equally divided between that district and the Government.

(3) The Colorado River aqueduct, built and paid for by the metropolitan water district, which carries Colorado River water over 300 miles from Parker Dam to some 60 cities and districts on the coastal plain, of which the largest are Los Angeles and San Diego.

(4) The Palo Verde Irrigation District, an area about 212 miles below Hoover Dam, which has the oldest rights on the river and has been diverting water there since about 1877.

(5) The All-American Canal, which diverts water at Imperial Dam, 303 miles below Hoover Dam and 22 miles above the Mexican border, and transports it into the Imperial Irrigation District and Coachella Valley County Water District. Imperial Valley's appropriations date back to 1891. This dam and canal were built by the United States, along with Hoover Dam, as part of the Boulder Canyon project, but these districts were required to underwrite the cost in advance. The Project Act separated out the financing of Hoover Dam and the All-American Canal, requiring Hoover Dam power revenues to repay the former but prohibiting their use to subsidize the canal, and requiring the irrigators to pay for the canal but not for Hoover Dam. The powerplants on the canal have been financed by Imperial Irrigation District, but their net revenues go to the United States until the canal is paid for.

This list omits Headgate Rock Dam, which serves the Colorado River Indian Reservation, and Davis Dam, which is a treaty structure. The list might properly have included Laguna Dam, below Imperial Dam, which Imperial Irrigation District was required to pay for, although that dam serves only Arizona.

The quantity of Colorado River water which California claims, for which her public agencies hold contracts with the United States and which the Colorado River aqueduct, the All-American Canal, and the Palo Verde works have been built to use, is 5,362,000 acre-feet per year. Only water enough for these three diversions was provided by the Colorado River compact and the Boulder Canyon Project Act; all other projects, including some very good ones, had to be jettisoned. California is not seeking more water for new projects but to defend the water supply of these three old projects, and no more.

More than 5 million people—closer to 6 million—live within the areas served by the Colorado River in California. The assessed valuation exceeds $12 billion. The economy of southern California is dependent on the permanent availability of these waters. California could, in fact, use a great deal more than this, if it were available. The metropolitan water district will outgrow its present Colorado River supply, which is 1,212,000 acre-feet per year, in about 25 years on present forecasts, and must look elsewhere for additional water.

California is concerned by the impact of the proposed Colorado River storage project upon the lower basin projects in two respects: First, the immediate impact to be occasioned by the interception of all of our water supply at Glen Canyon and other storage dams, and, second, by the long-term effect of the expansion of consumptive uses in the upper basin, all under interpretations of the Colorado River compact and the Boulder Canyon Project Act with which we disagree, and which are now before the Supreme Court. Some 2 million acre-feet are at stake on these issues. I shall endeavor to give the background of the controversy and to identify these issues.

III. THE HISTORICAL BACKGROUND OF THE CONTROVERSY

The dispute which brings us here, and into the Supreme Court, turns primarily upon conflicting interpretations of the Colorado River compact and the Boulder Canyon Project Act, which, ironically enough, were themselves supposed to settle the conflict between the upper basin and the lower.

The chronology is as follows:

Developments prior to 1922

Irrigation in the lower basin developed much more rapidly than in the upper. Palo Verde Valley commenced irrigation in 1877; Imperial Valley's appropriations date from 1891; those of the Yuma project in Arizona from 1904. By 1916 the whole natural flow had been appropriated, and the river was dry for critical periods in several summers at the Mexican boundary. Nevertheless, the spring floods, depositing great quantities of silt and thereby raising the river bed several feet in some years, were an increasing menace to lands in Imperial Valley, which is below sea level, and to lands in the Yuma Valley in Arizona. Junior appropriators in the upper basin faced a probable lawsuit by senior appropriators in the lower basin. The whole natural flow during the irrigating season having been overappropriated and fully used, a great storage dam was a necessity not only for flood control, but also to make possible any further expansion of consumptive use in either the upper basin or the lower, and for power generation. But the upper basin, knowing that the lower had a 2 to 1 population ratio (now over 3 to 1), more accessible lands, lower capital costs, and a longer growing season, rightly feared that if the flood waters were stored, the lower basin would appropriate and use them. The upper basin wanted insulation against the law of priority of appropriation, which is "first in time, first in right." The United States Supreme Court, in 1922, in the case of *Wyoming* v. *Colorado* (259 U. S. 419) applied this rule on an interstate stream, regardless of State lines. The Colorado River compact was the resultant of these forces.

The Colorado River compact

The Colorado River compact was signed by representatives of all seven States at Santa Fe, N. Mex., November 24, 1922, subject to ratification by their legislatures and the consent of Congress, the latter being a constitutional requirement.

Article II defined the Colorado River system as including the main stream and its tributaries, the upper basin as being the drainage area above Lee Ferry (a point on the river in northwest Arizona), and

the lower basin as the drainage area below that point. The 4 States of Colorado, Utah, New Mexico, and Wyoming were defined as the States of the upper division and the 3 States of Arizona, California, and Nevada as the States of the lower division. The terms "division" and "basin" are not the same. Utah, New Mexico, and Arizona have areas in both basins.

The negotiators gave up any attempt to allocate all the water, or to allocate to individual States. They agreed on the idea of allocating "beneficial consumptive uses" of water instead of allocating the flow of a stream, and made a general division as between upper and lower basins, leaving to the future any allocation to States as such. Nor did they attempt to dispose of all the water supply, leaving, as they thought, about 25 percent of it unallocated and untouched by the compact. The mechanics of the compact were as follows:

In article III (a) the compact apportioned in perpetuity the beneficial consumptive use of 15 million acre-feet of the waters of the Colorado River system, one-half to each basin, to include any rights which "may now exist." This was the protection against the law of priority of appropriation demanded by the upper basin. As article II defined the Colorado River system to include "the tributaries," the apportionment in article III (a) included the existing uses on the tributaries as well as on the main stream. The most important lower basin tributary is the Gila, which originates in New Mexico and traverses Arizona. The compact did not define the term "beneficial consumptive use."

Article III (b) permitted the lower basin to "increase its use" of waters of the system by 1 million acre-feet per annum.

These two paragraphs thus disposed of 16 million acre-feet, of which 15 million was insulated against the law of appropriation, basin versus basin, by a perpetual apportionment. A compact title to the other 1 million acre-feet could be obtained by "increase of use" in the lower basin, but not by apportionment in perpetuity, irrespective of use.

These two paragraphs did not dispose of all the water available throughout the system. This total was estimated, in reports of the negotiators to Congress, as over 20 million acre-feet.

Article III (c) provided, in effect, that if the American Government should recognize rights in Mexico, the Mexican burden should be met first out of any water in excess of the 16 million acre-feet specified in article III (a) and III (b), and if that was insufficient, the deficiency should be equally borne by the two basins. The four States of the upper division agreed to deliver water to Lee Ferry to supply one-half the deficiency in addition to their obligation under article III (d).

In article III (d) the four upper States promised that they would not—

> cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years.

Article III (e) provided that the States of the upper division—

> shall not withhold water, and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses.

Article III (f) provided, in effect, that further equitable apportionment of the beneficial uses of the system unapportioned by paragraphs (a), (b) and (c) might be made after October 1, 1963, if and when the upper basin should have reached a beneficial consumptive use of 7,500,000 acre-feet per annum, or the lower basin 8,500,000 acre-feet.

Article III (g) provided the mechanics for calling such a future conference.

Article IV provided that water might be impounded for power generation, but that—

> such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

Article VII provided that—

> Nothing in this compact shall be construed as effecting the obligations of the United States of America to Indian Tribes.

Article VIII provided that—

> Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact.

Article XI provided that the compact should become binding when ratified by the legislatures of all seven States and when Congress should give its consent.

Ratification by six States, rejection by Arizona

In 1923 all States but Arizona ratified the compact. Her legislature rejected the compact, after one house or the other had adopted reservations excluding the Gila River and subjecting all power development to a $5 per horsepower royalty.

In 1925, at the suggestion of Colorado, the other 6 States ratified it again, as a 6-State document, waiving 7-State ratification, and presented it to Congress in that form.

The Boulder Canyon Project Act

The Boulder Canyon Project Act was enacted in December 1928. It authorized construction of Hoover Dam and the All-American Canal, on condition that the beneficiaries should first contract to repay their cost. As stated elsewhere, it separated the financing of the dam and canal, directing that power revenues should pay for Hoover Dam but should not afford any subsidy to the All-American Canal, and that the users of that canal (primarily holders of old appropriative rights in natural flow) should pay off the canal. Section 4 (a), however, provided that the act should not take effect for any purpose unless, at the end of 6 months, the President should proclaim either that the Colorado River compact had been ratified by 7 States, or, failing that, had been ratified by 6 States including California, and, in the latter event, California's Legislature had enacted a statute, in terms prescribed by Congress, limiting California's rights in the Colorado River in the manner which I will later describe. The upper basin, in other words, had demanded in 1922 a 7-State compact as the price for the construction of Hoover Dam. Failing to get Arizona's ratification, they demanded (and got) a second price from California: the enactment of the Limitation Act, to avoid the possibility that California and Nevada might use all the water apportioned to the lower basin, and that Arizona would "raid the river," as they called it, out-

side the compact, that is, establish priorities against slower upper basin development.

The Boulder Canyon Project Act, in granting consent to a substitute 6-State compact accompanied by a California Limitation Act, cut across the 7-State compact in several particulars, included the following: Whereas the compact made no allocations to individual States, but only to basins, the project act recognized California's right to specified quantities—and required her to limit herself thereto—that is, 4,400,000 acre-feet of the waters apportioned by article III (a), plus not to exceed one-half of the excess or surplus waters unapportioned by the compact. As to the latter, that is, the excess of surplus waters unapportioned by the compact, whereas the compact, in article III (b), had recognized the lower basin's right to appropriate 1 million acre-feet of surplus, the project act recognized California's right to appropriate one-half of the excess or surplus, which might be more or less than 1 million acre-feet.

The project act makes no specific reference to article III (b). The compact did not define "consumptive use," but the project act did, as "diversions less returns to the river." Whereas article IV (c) speaks of State "regulation and control" of "the appropriation, use, and distribution of water," the project act in section 5, directed that no one should have the use of waters stored by the United States under that act except by contract with the Secretary, but directed him to make contracts in accordance with section 4 (a), that is, the California Limitation Act, and section 6 directed him to use the reservoir, among other purposes, for satisfaction of "present perfected rights" in pursuance of article VIII of the Colorado River compact. (For brevity, the term "appropriation" is used throughout my discussion as including not only rights acquired by appropriation under State law, but rights in waters stored by the United States acquired or confirmed by contract with the United States.) Elsewhere, in section 13, the statute subjected all rights of the United States and of those claiming under it to the compact. Whereas article IV of the compact had declared the Colorado River to be nonnavigable, sections 1 and 6 of the project act directed the dam and reservoir to be used in aid of navigation and flood control.

California passed the required limitation act in 1929, to take effect only in the absence of seven-State ratification. The resulting agreement with Congress is referred to in our discussions as the statutory compact between the United States and California, to distinguish it from the Colorado River compact.

The President, on June 25, 1929, proclaimed the failure of 7-State ratification, and the completion of 6-State ratification, including with the latter the enactment by California of its Limitation Act.

The 6-State compact, the California Limitation Act, and the project act thereupon became effective, authorizing the construction of Hoover Dam and the All-American Canal, on the further condition that money should not be appropriated or spent unless the beneficiaries should agree in advance to repay the cost of these works.

Water and power users in California executed the required contracts in 1930.

The water contracts now under attack by Arizona in the Supreme Court disposed of 5,362,000 acre-feet per annum, equal to 4,400,000 acre-feet of water available under article III (a) of the Colorado

River compact, and about 1 million acre-feet of "excess or surplus" available in accord with the limitation act. This water, as previously stated, is diverted by three projects: the Colorado River aqueduct of the Metropolitan Water District of Southern California, the Palo Verde Irrigation District, and the All-American Canal.

IV. INTERPRETATIONS OF THE COLORADO RIVER COMPACT AND THE BOULDER CANYON PROJECT ACT INVOLVED IN THE UPPER BASIN STORAGE PROJECT LEGISLATION AND THE PENDING LITIGATION

Putting to one side the questions at issue in *Arizona v. California* which concern only the lower basin, there are about a dozen issues which involve the lower basin's interests as against the claims of the upper basin asserted or implied in the pending legislation. These involve, altogether, about 2 million acre-feet per year. They are identified below in the order in which they appear in the Colorado River compact.

1. Does the compact apportion only the use of main stream water or the use of waters of the entire system?

Arizona, and some upper basin spokesmen, identify the apportionment made by article II (a) with the waters of the main stream, treating that article as an equal division of 15 million acre-feet at Lee Ferry. California says that the apportionment is of the use of waters of the system, defined in article II to include the tributaries. This underlying difference involves articles III (a), (b), (c), (d), and (f), and is referred to in this discussion as those articles are reached in numerical order.

2. The method of measurement of consumptive use

Article III (a) of the Colorado River compact, in a single sentence, apportions from the Colorado River system in perpetuity to the upper basin and to the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet per annum, which it states shall include all water necessary for the supply of any rights which may now exist. Manifestly this one sentence must have the same meaning in both the basins to which it refers. But there is controversy over the meaning of the term "beneficial consumptive use." The question is whether it means the quantity in fact used, measured at the place of use, or whether it means the effect of that use measured in terms of stream depletion at some point hundreds of miles downstream, in this case Lee Ferry. The same question arises under the Mexican Water Treaty's so-called escape clause. This question of interpretation of the Colorado River compact and the Mexican Water Treaty is directly at issue in the present Supreme Court case. The quantity involved in this dispute, so far as the planning of the upper basin storage project is concerned, is 300,000 to 500,000 acre-feet, according to engineers' estimates. The Reclamation Bureau assumes that the measurement is to be made in terms of downstream depletion in the case of the upper basin project, but in terms of diversion minus return flow, measured at the place of use, with respect to California. The Boulder Canyon Project Act defines it in the latter terms, and the Mexican Water Treaty says (art. I (j)):

"Consumptive use" means the use of water by evaporation, plant transpiration, or other manner whereby the water is consumed and does not return to its

source of supply. In general, it is measured by the amount of water diverted less the part thereof which returns to the stream.

That corresponds with California's allegation of the meaning of the term in *Arizona* v. *California* (answer to Arizona, par. 8). Arizona denies that this definition applies to her uses (reply, par. 8), and the Reclamation Bureau, in the project before you, assumes that it does not apply to the upper basin, although the projects to be built under these bills are recognized as being subject to the terms of the Mexican Water Treaty.

Another problem arises if the depletion theory prevails. One of its postulates is that when water is stored in a reservoir, the stream below is depleted, and therefore that the consumptive use takes place then and there, in the year when the water is put in storage, not when it is taken out and used. On that premise, to what years is the forty-odd-million acre-feet of holdover storage, i. e., of stream depletion, to be charged under this legislation? If water is retained in holdover storage for 35 years, as planned, will its use be charged to, say, 1960, when it goes into storage, or 1995, when it is taken out and used? If the water stored in Glen Canyon Reservoir can never be physically consumed in the upper basin, is it nevertheless charged to that basin's apportionment because its storage there depletes the stream at Lee Ferry? And, in future operations, how is the storage of more than 7,500,000 acre-feet in any 1 year to be charged? Is the same principle, whatever it may be, applicable to the lower basin reservoirs? We think the depletion theory is totally unworkable, quite aside from its conflict with the legislative history of the compact and the definitions of consumptive use in the project act and the Mexican Water Treaty.

3. The meaning of "per annum" in article III

Article III (a): Does the apportionment of the use of 7,500,000 acre-feet "per annum" in article III (a) mean an average of that amount over a period of years, or a maximum in any one year? Manifestly, as in the interpretation of "consumptive use," the Compact must be given the same interpretation in both basins.

The Reclamation Bureau, in submitting this upper basin storage project, makes the assumption that the apportionment means an average over an extended period, apparently 35 years or more. The effect of this theory is that the upper basin may use, say 9 million acre-feet or more of water in 1 year, and consider it as apportioned under article III (a), if it uses, say 6 million or less in some other year, to average 7,500,000 acre-feet.

California alleges in the pending lawsuit that the apportionment means a maximum, like a speed limit on a highway, not an everage. If the speed limit says 50 miles per hour, that does not mean an average of 50. We allege (answer to Arizona, par. 8) that the words "per annum" in the compact means "each year," and not an average of uses over a period of years, whether they are our uses or anyone else's. Arizona admits this, but says that the issue is not yet material in the lower basin (reply, par. 8). But the Reclamation Bureau, in House Document 364, 83d Congress, at page 152, the underlined report which you have before you, assumes that the lawful "ultimate use of upper basin apportionment" may be as high as 9,500,000 acre-feet in a wet year, and may exceed 7,500,000 acre-feet in 17 out of the 35 years in its study. Its "determination of active storage requirement to permit

full utilization of apportioned consumptive use" in the upper basin, on the same page, is calculated upon that assumption. That is why 35 years' holdover storage is provided in this legislation. But if California is right, use by the upper basin in a given year of any quantity in excess of 7,500,000 acre-feet constitutes the use, to that extent, of unapportioned surplus, in competition with the appropriations of unapportioned excess or surplus waters which have been made in the lower basin, and subject to the Mexican treaty burden, which, under article III (c) of the compact, is to be supplied first out of surplus. The amount involved in this particular issue is very large. It is more than 2 million acre-feet in extreme years, and averages about a million acre-feet in the 17 years of excess use in the upper basin shown in the Bureau's study. If the compact means what we think it means, the Reclamation Bureau is in error that much in its assumptions as to the quantity of water which the upper basin can lawfully claim under article III (a), and, by the same token, that much more water must be let down to satisfy the Mexican Water Treaty and prior appropriations of surplus in the lower basin. The same problem arises in the lower basin, but there the Reclamation Bureau has assumed that the limitation imposed upon California's uses by the Boulder Canyon Project Act is a maximum, not an average; so also with its assumptions as to the deliveries to be made under the Mexican Water Treaty and the amounts to be delivered under its water contracts with users in Arizona, California, and Nevada.

Both assumptions cannot be correct. One or the other must apply to both basins, because the compact phrase which is in dispute applies to both.

This problem of whether the apportionment under article III (a) is of an annual amount, or of an average available over a 35-year period, has no relation at all to the guaranty in article III (d) that the States of the upper division will not deplete the flow at Lee Ferry below 75 million acre-feet in each 10 years. That problem is discussed below in connection with article III (d) and the Mexican Treaty burden.

4. Rights which may now exist

Article III (a): Does the statement in article III (a) that the apportionment of the use of 7,500,000 acre-feet per annum "shall include all water necessary for the supply of any rights which may now exist" include two categories of uses in dispute in *Arizona* v. *California*: (1) the use on the lower basin tributaries, particularly those of Arizona on the Gila River, which she says are not to be charged against the lower basin's apportionment of III (a) water, and (2) Indian uses in both basins? The significance of the Gila appears in connection with the upper basin's obligations under article III (c) and III (d) of the compact, and that of the Indian uses in connection with article VII, and will be outlined when those articles are reached in numerical order.

5. The lower basin's rights under article III (b)

Article III (b) of the compact permits the lower basin "to increase its beneficial consumptiove use" by 1 million acre-feet per annum. Arizona says that this is an "apportionment," good in perpetuity against the upper basin. California says that it is not an apportionment, but a license to appropriate, and that this million acre-feet

is a part of the "excess or surplus," of which California may use one-half under the Limitation Act. Arizona says all the III (b) water is in the Gila. California says that article III (b) is applicable to the main stream and all the tributaries in the lower basin.

6. The guaranties in article III (c) and III (d)

Article III (c) provides that the Mexican burden which, under the 1944 treaty, is a minimum of 1,500,000 acre-feet per annum measured at the border (and closer to 2 million measured at Lee Ferry) shall be borne first out of surplus, over amounts specified in articles III (a) and III (b) and, if that is insufficient, that the burden of the deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the States of the upper division, namely, Colorado, New Mexico, Utah, and Wyoming, shall deliver at Lee Ferry water to supply one-half of the deficiency, in addition to that provided in article III (d).

Article III (d) covenants that the States of the upper division will not cause the flow of the Colorado River at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years.

The interpretation of these two clauses is at issue in *Arizona* v. *California* and is involved in the present bill. The Reclamation Bureau apparently assumes that there need be made available at Lee Ferry, after the section 2 projects are built, only about 75 million acre-feet every 10 years. It makes no provision whatever for storage or delivery of water for Mexico. Arizona says (reply, pars. 8, 11) that all this 75 million is III (a) water; that is, that this figure is merely 10 times the quantity apportioned to the lower basin by article III (a) of the compact, and that all of the lower basin's III (a) uses are to be made from the main stream. California (answer to Arizona, pars. 8, 11) and Nevada (petition, par. XIV) deny this, and say that the uses of Arizona and New Mexico on the Gila, the uses of Nevada and Utah on the Virgin River, and any other uses on the tributaries, to the extent that they were "rights which may now exist," in the language of article III (a), are chargeable to (and protected by) article III (a). Arizona retorts that her uses on the Gila are covered by article III (b) of the compact, an article which says that, in addition to the apportionment in article III (a), the lower basin is given the right to increase its beneficial consumptive use by 1 million acre-feet per annum. If Arizona is sustained by the Court in this position, there is no water for Mexico in the 75 million acre-feet at Lee Ferry referred to in article III (d), and the upper basin, under article III (c), must, in addition, deliver water to supply one-half of any deficiency in meeting the Mexican burden. As I have said earlier, the project before you makes no provision whatever for storage or delivery of water for Mexico. The Reclamation Bureau report so states. This would add about a million acre-feet per year, or 10 million in 10 years, on Arizona's contention to the 75 million required by article III (d). When the Reclamation Bureau reported favorably on the central Arizona project, it was on the assumption that Arizona's interpretations were correct, without, however, indorsing them. If California and Nevada are correct, a portion of the 75 million acre-feet at Lee Ferry referred to in article III (d), equal to the total of the water supply available and used on the Gila, Virgin, and other tributaries

under III (a), is excess or surplus unapportioned by the compact, available in part for the service of the Mexican Water Treaty and in part for appropriation, contract, and use in the lower basin. We view the 75 million as a minimum of "wet water," unclassified and unrelated to article III (a), and to be met whether or not there remains available to the upper basin, after meeting that obligation, water to sustain a maximum use of 7,500,000 acre-feet per annum of water apportioned to it by article III (a).

On the other hand, the upper basin view appears to be that the compact means that if the upper basin lets down 75 million acre-feet in each 10-year period, it is entitled to keep and use what is left. Moreover, the view of some upper basin spokesmen apparently now is that the covenant in article III (d) is not a guaranty at all, and that the apportionment to the upper basin in article III (a) takes precedence over it. We vigorously challenge that interpretation.

7. The right to demand or withhold water; uses for power generation

Article III (e) of the Colorado River compact provides that the States of the upper division shall not withhold water, and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural use.

Article IV (b) provides that the impounding and use of water for power generation shall be subservient to the use and consumption of water for agricultural and domestic purposes.

Glen Canyon Reservoir and the other proposed upper basin mainsteam reservoirs will be so located, physically, that no water stored therein can ever be applied to domestic or agricultural uses in the upper basin. All of the water stored in such reservoirs will be required for domestic and agricultural use in the lower basin and Mexico. The water which passes by the upper basin diversion points and is impounded by downstream reservoirs, such as Glen Canyon, is in no sense upper basin water. The compact does not apportion water, but the use of water, and the water stored in the downstream reservoirs is water which is not used by the upper basin.

Nevertheless, it seems to be the position of the upper basin States that the water which escapes consumptive use in the upper basin may be impounded downstream at Glen Canyon or other dams, and withheld there for power generation, even though required for irrigation and domestic use in the lower basin, so long as 75 million acre-feet are allowed to flow past Lee Ferry in each 10-year period. We deny this, and say that under article III (b), III (e) and IV of the compact, water appropriated or covered by Government contracts in the lower basin, even though excess or surplus waters, may not be withheld from us, in the upper basin, for the generation of power.

8. Appropriation of surplus

Article III (f): Does the provision for a further apportionment, by unanimous consent after October 1, 1963, mean that no State may validly appropriate surplus until a new contract is made? California alleges, in the pending litigation, that any State, including the upper basin States, may appropriate surplus water unapportioned by the compact, subject only to their being divested by a new compact to which such a State is party, or by court decree. Arizona and Nevada say that no State may acquire any right in surplus until a new com-

pact is made. If they are sustained, then the upper basin can acquire no right in the waters it may use in any years in excess of 7,500,000 acre-feet, and House Document No. 364 assumes uses in the upper basin of as much as 9,500,000 acre-feet in extreme years, and nearly 8,500,000 in about half of the 35 years covered by its holdover storage study (p. 152). California says that under the Boulder Canyon Project Act and the Mexican Water Treaty, excess and surplus water of the Colorado River system has already been appropriated or obligated to the extent of about 1 million acre-feet per annum for use in California, another 1,500,000 acre-feet or more for use in Mexico, and in an undetermined amount for use in Arizona.

9. The quantity of surplus

The methd of measurement of consumptive use, referred to previously in connection with article III (a), bears also on the calculation of surplus and hence on the Mexican Treaty burden. Manifestly, if the States of the upper division, under article III (c) of the compact, must make up half the deficiency in the Mexican burden not covered by unapportioned surplus, they are interested in the method of calculating the quantity of that surplus. Arizona's method of measuring consumptive use, namely, by main stream depletion, and her contention that no charge shall be made under the compact for the use of salvaged waters, produces a much smaller figure for the total uses of the waters of the Colorado River system than does California's evaluation of these same uses, for we believe that the use of salvaged water must be charged, and that uses must be measured at the place of use in terms of the quantities actually burnt up. The engineers estimate that the difference between the two methods amounts to about 2 million acre-feet throughout the system.

10. Indian rights

Article VII of the Colorado River compact provides that nothing in the compact shall be construed as affecting the obligations of the United States to Indian tribes. The upper basin compact (art. VII) provides that use by the United States or its wards shall be charged as a use by the State in which the use is made. California, in the pending suit, takes the same position (answer, par. 14). The United States denies this (petition of intervention, paragraph XXXVII), and says that—

> the rights to the use of water of the Indians and Indian tribes are in no way subject to or affected by the Colorado River compact.

The Government's petition tabulates (appendix II) 1,747,250 acre-feet of diversion claims of Indians in the lower basin, of which about 1,556,250 are in Arizona. In addition, there are large Indian claims in the upper basin, tabulated in Reclamation Bureau reports, to diversion rights exceeding 1 million acre-feet per year. Arizona says (reply, par. 14), that "the obligations of the United States to the Indians or Indian tribes are not material or relevant * * *." It is understood that the Office of Indian Affairs construes article VII of the compact as meaning that (1) the Indian claims come ahead of the compact, are not chargeable to any State, and the compacting States simply divided the residue after the Indian claims; (2) Indian claims relate back to the date of establishment of the reservation, even though not put to use, and take priority over uses by non-Indians even though

the uses by non-Indians may in fact long antedate the actual putting of water to use by the Indians. The Government's pleadings leave it free to make both these assertions, and the Interior Department has stated that the question of what position it shall take is under active study. As to the first of these contentions, Arizona has refused, so far, to disagree with the Indian Bureau's position. Naturally, if Arizona can hope for 1,500,000 acre-feet for Indian diversions, outside the compact, in addition to the 3,800,000 acre-feet she demands under the compact, there is a temptation to try to get it. Just where the water would come from is not very clear. Arizona, at a meeting with the Attorney General of the United States on December 3, 1953, was invited to join the upper basin States, California and Nevada, in a common statement of position that Indian uses are to be charged under the compact against the State in which they are situated, but declined to do so. The first meeting with the Master appointed by the Supreme Court, August 5, 1954, produced the same impasse. The existence of the Indian claims, and uncertainty as to their accounting, raises serious questions as to the water supply for the projects in both the upper and lower basins. The United States, in this suit, also claims independent rights for the use of the Bureau of Land Management, the Forest Service, the Park Service, for Fish and Wildlife, et cetera, and denies that all of its rights are subject to the Colorado River compact. The magnitude of these additional claims is not stated. Those questions will not be resolved until this suit is decided.

11. Present perfected rights; quality of water

Article VIII provides that "present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact." In the present suit California alleges (answer to Arizona, par. 15) that "unimpaired" as used in this article means unimpaired as to both the quantity and the quality of the waters to which these perfected rights relate. California alleges that as of the effective date of the compact, her present perfected rights were not less than 4,950,000 acre-feet (answer to Arizona, par. 28). Arizona admits California's present perfected rights as of 1929 to be about 2,900,000 acre-feet per annum, measured by stream depletion (reply, par. 28). The report of the Reclamation Bureau contains no data beyond estimates on the effect of large transmountain diversions, coupled with other upper basin uses, on the quality of water. Such a study should obviously be made. We know that when the compact was ratified, the report of the Colorado commissioner, Delph Carpenter, stated that—

> natural limitations upon the use of the waters within each of the upper States will always afford ample assurance against undue encroachment upon the flow at Lee Ferry by any 1 of the 4 upper States. Colorado cannot divert 5 percent of its portion of the river flow to regions outside the river basin (Hoover Dam Documents, H. Doc. 717, 80th Congress, p. A 79).

At about the same time the Director of the Reclamation Service reported that Colorado's transmountain diversions would not exceed 300,000 acre-feet per annum. By contrast, the Colorado transmountain diversion projects inventoried in the Reclamation Bureau's various reports aggregate 2 million acre-feet, or over 50 percent of the water allocated to Colorado by the upper basin compact. There would be that much less water to absorb salts in passage to Lee Ferry, and concentrations of salt in waters reaching the lower basin would in-

crease. The effect on the lower basin is one which the lower basin States are entitled to have studied and reported upon, to the end that their present perfected rights, in the language of article VIII, shall remain unimpaired.

I have summarized in the preceding discussion, the major points of interpretation of the Colorado River compact on which we think the Reclamation Bureau and the upper basin States are wrong in the planning of this project.

We are not the only ones who entertain doubts on this subject.

On December 20, 1954, Governor-elect Ed Johnson of Colorado issued a statement to the press on this subject, which he recently placed in the record in the hearings on S. 500, 84th Congress, before the Senate Committee on Interior and Insular Affairs, as "an exploratory document." This statement discusses particularly the interpretation of articles III (b), III (d), III (e), and IV (b), of the compact.

Governor Johnson, saying "If my conclusions are in error I want to be shown wherein the error lies," went on:

> Either the seven-State compact specifically denies to the upper basin the right to withhold water which it cannot use for agricultural and domestic purposes or it does not deny us such a right. Either it denies to the upper basin the right to withhold water to develop power or it does not deny us that right. Let us look at the document which has been ratified by the legislatures of seven States for the correct answers to these pertinent questions.

After quoting articles II (h) and III (e) of the compact, Governor Johnson continued:

> The Honorable Herbert Hoover, Secretary of Commerce of the United States, was appointed by the President to serve as Chairman of the Seven State Compact Commission as the official representative of the Government of the United States, pursuant to an act of Congress. He was the chairman of the Colorado River Commission that drafted and signed the seven-State Colorado River compact. In answer to the question propounded by Congressman Hayden these points in the compact were interpreted officially by him on January 27, 1923, before any State had ratified the compact, as follows:
>
> "Question 14. Can paragraph (d) of article III be construed to mean that the States of the upper division may withhold all except 75 million acre-feet of water within any period of 10 years and thus not only secure the amount to which they are entitled under the apportionment made in paragraph (a) but also the entire unapportioned surplus waters of the Colorado River?"

Mr. Hoover's answer:

> No. Paragraph (a) of article III apportions to the upper basin 7,500,000 acre-feet per annum. Paragraph (e) of article III provides that the States of the upper division shall not withhold water that cannot be beneficially used. Paragraph (f) and (g) of this article specifically leave to further apportionment water now unapportioned. There is, therefore, no possibility of construing paragraph (d) of this article as suggested.

After quoting further questions and answers from Mr. Hoover, Governor Johnson continued:

> On December 15, 1922, Hon. Delph E. Carpenter, commissioner for Colorado, reported to Gov. Oliver H. Shoup his analysis of this compact which he helped to formulate. His comments and observations are especially pertinent. In this official report he said:
>
> "Power claims will always be limited by the quantity of water necessary for domestic and agricultural purposes. The generation of power is made subservient to the preferred and dominant uses and shall not interfere with junior preferred uses in either basin."
>
> On March 20, 1923, Delph E. Carpenter, in a joint letter to Colorado Senator M. E. Bashor and Colorado Representative Royal W. Calkins, said among other things:

"All power uses in both basins are made subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes."

At a later point, Governor Johnson quoted questions propounded January 30, 1923, by Congressman Hayden of Arizona to A. P. Davis, Director of the Reclamation Service, with Mr. Davis' answers, including the following:

"Question 19. Any further comment that you may care to make relative to the approval of the Colorado River compact by the Arizona State Legislature will be appreciated.

"Answer. The Colorado River compact provides that the lower basin shall be guaranteed an average of 7,500,000 acre-feet of water annually from the upper basin and all of the yield of the lower basin, and that any water not beneficially used for agricultural and domestic uses shall likewise be allowed to run down for use below."

It should be noted that these official interpretations were made before the compact was ratified by any State except Nevada and were not disputed by Colorado or any other State at the time it ratified the compact. Most certainly we are bound hand and foot by them.

After quoting articles III (c) and III (d), Governor Johnson said:

If the upper basin States build storage reservoirs at the Glen Canyon and Echo Park sites as is now contemplated, the water withheld thereby will of necessity be surplus water since the upper States cannot use it for agricultural or domestic purposes, and the upper States, therefore, must deliver such water to Mexico as is allocated to her under the provision of the 7-State compact.

Later, Governor Johnson, referring again to Colorado's compact negotiator, Mr. Carpenter, said:

Delph Carpenter in his official report to Governor Shoup said:

"Any waters necessary to supply lands in the Republic of Mexico (hereafter to be determined by international treaty) shall be supplied from the surplus flow of the river. If the surplus is not sufficient, any deficiency shall be borne equally by the upper basin and the lower basin. * * *"

Governor Johnson continued:

I am certain that Mr. Carpenter would have added, had he thought such a doubt were to be raised, "Watershed in the upper basin to generate power and which for physical reasons could not be used by the upper basin for agricultural or domestic purposes is surplus water to the upper basin." Such an interpretation must be crystal clear to any student of the seven-State compact and the official interpretations of its provisions.

The upper and lower basins were each apportioned from the Colorado River system the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, and in addition the lower basin was given the permission to increase its beneficial consumptive use of an extra million acre-feet per annum of surplus water. However, the 7,500,000 acre-feet awarded to the lower States had a very clear priority over the 7,500,000 acre-feet awarded to the upper states. In reality, the compact gave the lower States 7,500,000 acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States used that water only for domestic or agricultural purposes.

After quoting articles III (a), (b), and (d) of the compact Governor Johnson said:

The following quotes from the questions by Senator Hayden and answered on January 27, 1923, by Chairman of the Commission Herbert Hoover leave nothing to the imagination with respect to the extra 1 million acre-feet of surplus water awarded the lower basin. The extra-million acre-feet is to be met out of surplus waters over and above the 7,500,000 acre-feet allocated annually to each of the 2 basins and it does not take priority over the upper States award of 7,500,000 feet provided they use all of their 7,500,000 for agricultural and domestic purposes. If the upper basin stores water for power purposes at least a million acre-feet per annum must go to satisfy this demand.

"Question 6. Are the 1 million additional acre-feet of water apportioned to the lower basin in paragraph (b) of article III supposed to be obtained from the Colorado River or solely from the tributaries of that stream within the State of Arizona?

"Answer. The use of the words 'such waters' in this paragraph clearly refers to waters from the Colorado River system, and the extra 1 million acre-feet provided for can therefore be taken from the main river or from any of its tributaries."

Governor Johnson continued:

It should be noted, and I repeat, that Secretary Hoover's official interpretations were made before the compact was ratified by any State; furthermore it was not disputed by any of them when they did ratify it.

At a later point, Governor Johnson continued:

The Honorable Herbert Hoover, who, as I have said, was the chairman of the commission that drafted and approved by its unanimous vote the seven-State compact, said:

"The lower basin will, therefore, receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes."

The Honorable A. P. Davis, Director of the Reclamation Bureau, on January 30, 1923, announced that:

"The Colorado River compact provides that the lower basin shall be guaranteed an average of 7,500,000 acre-feet of water annually from the upper basin and all of the yield of the lower basin, and that any water not beneficially used for agricultural and domestic uses (in the upper basin) shall likewise be allowed to run down for use below."

Governor Johnson continues:

This data proves conclusively that the extra 1 million acre-feet of water per annum allocated to the lower basin is to be acquired from the surplus and otherwise unallocated water of the Colorado River system. The same is true of the 1,500,000 allocated annually by treaty to the United States of Mexico.

I am compelled to keep emphasizing that whatever water is stored in the Glen Canyon and Echo Park Reservoirs will be surplus to the agricultural and domestic needs of the upper basin, and must be delivered to the lower basin to satisfy the award of 1,500,000 acre-feet to Mexico and 1 million acre-feet to the lower basin. Furthermore, should the lower basin require an additional supply of water for agricultural and domestic purposes the water stored in these reservoirs must be released.

Under the 7-State compact the upper States must deliver at Lee Ferry in each 10-year period 75 million acre-feet to the lower States and 7½ mililon acre-feet to Mexico before they can use one drop of water themselves beyond what they used before the 7-State compact was ratified.

Unfortunately, the project is planned by the Reclamation Bureau on just the opposite of Governor Johnson's assumptions: namely, the claim of a right to deprive the lower basin of all waters in the main stream in excess of 75 million acre-feet in each 10-year period, which is about 25 percent less than the expectation under the interpretations of the compact and project act on which this same Reclamation Bureau relied in making water and power contracts in the lower basin, and in recommending the Mexican Water Treaty to the Senate.

V. CONCLUSION

California's basic position is that our State is conforming to the Colorado River compact, the Boulder Canyon Project Act, and the other enactments which comprise the "law of the river," and we must insist that the Reclamation Bureau and the upper basin States do likewise in the planning and administration of the Colorado River storage project.

The project, as now planned, is based upon interpretations of the compact which, in our view, are wrong, and constitute encroachments upon the rights of the lower basin for the benefit of the upper basin to the extent of more than 2 million acre-feet per year.

Essentially, the proposed Colorado River storage project implies the destruction of a substantial portion of the value of the Boulder Canyon project, in terms of water and power production, to enable construction of a new project in the upper basin which will generate power at twice the cost and irrigate lands at many times the cost of the power and irrigation furnished by Hoover Dam, and in violation of the Colorado River compact. We are in court now to protect California's rights under that compact.

We say that the water and power users of California, who have invested more than a half billion dollars upon the faith of the Colorado River compact, the Boulder Canyon Project Act and their agreements with the Federal Government, are entitled to the protection of their stake in the Colorado River, both in Congress and the Supreme Court.

In view of the hazard to California's water rights under the compact and Project Act which this legislation presents, the Colorado River Board of California, on June 2, 1954, adopted a resolution opposing the Colorado River storage project. That has been placed in the record by the chairman of the Colorado River Board, Mr. Simpson.

Thank you, Mrs. Chairman.

Accompanying my statement, Madam Chairman, I ask to have placed in the record a number of exhibits.

Mrs. PFOST (presiding). Do you want to make those a part of the record or of the file?

Mr. ELY. The record, if you please.

Mr. METCALF. Madam Chairman, is that to be printed in the record or as a part of the file of the committee?

Mrs. PFOST. He is making a request that they be made a part of the record rather than the files.

Mr. RHODES. Could they be identified?

Mr. ELY. I shall be happy to identify them if the clerk will bring them back to me.

The exhibits which I have asked to be included are as follows:

A. List of organizations which have registered objection to the Colorado River storage project.

Mr. RHODES. Madam Chairman, because there are several exhibits here, I might suggest that the Chair rule on each one as it is presented, if that might be possible.

Mrs. PFOST. Thank you. The Chair will so rule.

Mr. ELY. The first is a list of organizations which have registered objection to the Colorado River storage project, three pages in length.

Mrs. PFOST. Without objection, it will be admitted for the record.

(The list referred to follows:)

OPPOSITION TO COLORADO RIVER STORAGE PROJECT

At least some one, if not all, of the features or policies of this legislation, since it was first introduced in 1953, have been opposed either during the course of the hearings, or through the submission of statements, the enactment of resolutions or other pronouncements, by the following:

Engineers Joint Council (a federation of the eight major engineering societies—American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the Ameri-

can Water Works Association, American Institute of Electrical Engineers, the Society of Naval Architects and Marine Engineers, American Society for Engineering Education, and American Institute of Chemical Engineers)

American Public Power Association
Izaak Walton League
National Parks Association
The Wilderness Society
Sierra Club
The American Planning and Civic Association
National Wildlife Federation
Wildlife Management Institute

And the following California entities:

Colorado River Board of California
Imperial Irrigation District
Metropolitan Water District of Southern California
Los Angeles City Council
Department of Water and Power of the City of Los Angeles
San Diego County Water Authority
San Diego City Council
Imperial County Board of Supervisors
Imperial County Farm Bureau
Holtville Chamber of Commerce
Calexico Chamber of Commerce
Calexico City Council
Coachella Valley County Water District
Rainbow Municipal Water District, San Diego County
California State Chamber of Commerce, Southern California Council
Brawley Chamber of Commerce
Brawley City Council
Calipatria Chamber of Commerce
Westmorland City Council
Council of the City of Burbank
Board of Supervisors of Orange County
Board of Directors of the City of Pasadena
City Council of San Jacinto
City Council of Santa Ana
City Council of Torrance
City Council of Hemet
Council of the City of Glendale
City Council of Costa Mesa
City Council of Laguna Beach
City of Beverly Hills
City Council of Chino
City Council of Newport Beach
City Council of Compton
City Council of Ontario
City Council of Long Beach
City Council of Fullerton
City Council of Perris
Board of Supervisors of Los Angeles County
Council of the City of Anaheim
City Council of Santa Monica
City Council of San Marino
City Council of Fontana
City Council of Upland
Council of the City of Pomona
City Council of El Centro

Also:

Central Labor Council of Los Angeles
Railroad Brotherhoods Joint Legislative Council of California
Executive committee, California State Grange
Property Owners' Association of California, Inc.

And the—

Los Angeles Clearing House Association.

In addition, taxpayers' associations throughout the country have expressed alarm at the tremendous burden this legislation will place upon citizens everywhere to subsidize this project.

Mrs. PFOST. Proceed, Mr. Ely.

Mr. ELY. B. Copies of resolutions of California cities and other bodies against the Colorado River storage project.

Mr. ENGLE. I wish to raise a question with reference to these items just offered, Madam Chairman. The statement itself shows on its face, and I think it should be emphasized, that some of these resolutions relate to parts, and not all, of the upper basin storage project.

For instance, I notice the Wilderness Society and certain of these conservation groups. Their opposition, I understand, is limited to the Echo Park proposal and not necessarily to other features.

Mr. ELY. The resolutions will speak for themselves, if admitted.

Mr. ENGLE. It will if a part of the record; it will not if the record does not happen to have it.

Mr. METCALF. Madam Chairman, I have made a brief examination of the matters that have been submitted, the series of resolutions that have been submitted for the record, and there is one resolution after another of numerous cities and municipalities in California, all of which are repetitious. I will object if they are to be printed in the record, but I have no objection to their being made a part of the file.

Mr. ELY. We would like to have the full expression of California's views on this project made available in the printed record. I think it is important that the views of our people be of record in that way, and in the file no Member of Congress except the members of this committee are likely to see them.

Mr. METCALF. I have no objection to having a full report.

Mr. ELY. Thank you, sir.

Mr. METCALF. But I feel that the repetitious nature of a series of whereases from the city of Anaheim and the same series from the city of Beverly Hills, and right on through, is of no special benefit to the committee, and it will increase the cost of the printing of the record so that maybe we will not have any money left to build the project.

Mr. ELY. Would that be bad? [Laughter.]

Mr. DAWSON. Madam Chairman, I am going to object to the inclusion of these statements in the record for another reason. I have read the testimony of each of the witnesses who have now appeared and who will appear representing California, and practically each one of them has made the statement that they have some connection with the Colorado River Water Board which represents all of these communities that are referred to in these resolutions. So I think it is already in the record, it is repetitious, and I am going to object to making it a part of the record.

Mr. EDMONDSON. Will the gentleman yield?

Mr. DAWSON. Yes.

Mr. EDMONDSON. I wonder if the purpose could not be served here by supplying the committee with a list of the cities who have submitted resolutions on this subject and letting the resolutions be made a part of the file.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. I will be happy to yield, and I have no objection to that. I think it should be before the committee but not clutter up the record, being repetitious matter.

Mr. HOSMER. Madam Chairman, I move to place them——

Mr. ENGLE. Madam Chairman, I wish to be recognized.

Mr. HOSMER. I had the floor.

Mr. ENGLE. Madam Chairman, I am seeking the floor. The gentleman butted in without recognition.

Mr. HOSMER. The gentleman from Utah kindly yielded to me a minute ago.

Mr. ENGLE. Who does have the floor?

Mr. HOSMER. I would like a ruling on my motion that they be admitted to the record.

Mrs. PFOST. Mr. Dawson has the floor.

Mr. DAWSON. I yield to the chairman of the committee.

Mr. ENGLE. Madam Chairman, I ask unanimous consent that the list of the cities whose resolution are attached to this offer be made a part of the record and that the record then refer to the file for the detail of the resolutions, which are similar.

Mrs. PFOST. Are there any objections?

Mr. HOSMER. Will the gentleman yield?

Mr. ENGLE. Yes.

Mr. HOSMER. Will the gentleman withhold unanimous consent request pending a motion on my part to have them placed in the record in toto?

Mr. ENGLE. The gentleman can object to the unanimous consent request, if he desires. That is all it is. I have not moved it. I ask unanimous consent that the record show the names of the cities filing the resolutions and that the contents of the resolutions be referred to the file.

Mrs. PFOST. Are there any objections?

Mr. HOSMER. Will the gentleman yield further?

Mr. ENGLE. Yes.

Mr. HOSMER. My understanding is that you will not withhold your request pending my motion?

Mr. ENGLE. I am asking unanimous consent.

Mrs. PFOST. Are there any objections to the unanimous-consent request?

If not, it is so ordered.

(The resolutions referred to will be found in the files of the committee and the names of the resolvers are as follows:)

Resolutions of—

City of Anaheim
City of Beverly Hills
City of Brawley
Brawley Chamber of Commerce
City of Burbank
City of Calexico
Calexico Chamber of Commerce
California State Chamber of Commerce, Southern California Council
California State Grange
City of Calipatria
Calipatria Chamber of Commerce
City of Chino
Coachella Valley County Water District
Colorado River Board of California
City of Compton
City of Costa Mesa
County Supervisors Association of California
City of El Centro
City of Fontana
City of Fullerton
City of Glendale
City of Hemet
City of Holtville
Holtville Chamber of Commerce
City of Imperial
Imperial County Board of Supervisors
Imperial County Farm Bureau
Imperial Irrigation District
City of Laguna Beach
City of Long Beach

Resolutions of—Continued
City of Los Angeles
Los Angeles County Board of Supervisors
Los Angeles Central Labor Council
Los Angeles Department of Water and Power
Metropolitan Water District of Southern California
City of Newport Beach
City of Ontario
Orange County Board of Supervisors
City of Pasadena
City of Perris
City of Pomona
Railroad Brotherhoods Joint Legislative Council of California
Rainbow Municipal Water District, San Diego County
City of San Diego
San Diego County Water Authority
City of San Jacinto
City of San Marino
City of Santa Ana
City of Santa Monica
City of Torrance
City of Upland
City of Westmorland

Mrs. PFOST. Proceed, Mr. Ely.

Mr. ELY. Item C is a letter to the California delegation in Congress dated March 7, 1955, from the railroad brotherhoods California legislative board, signed by G. W. Ballard, chairman, and William V. Ellis, secretary, opposing upper Colorado River legislation.

Mr. DAWSON. Madam Chairman, do I understand Mr. Ely is making the same request that this be made a part of the record?

Mr. ELY. Yes, sir.

Mr. DAWSON. I object.

Mr. HOSMER. Madam Chairman, may I ask that the organization named be appended to the list of those objecting to the legislation?

Mr. DAWSON. I have no objection to that.

Mr. HOSMER. May I ask that it be placed in the files?

Mrs. PFOST. Without objection, it is so ordered.

(The letter referred to will be found in the files of the committee.)

Mr. ELY. Item D is a letter to the California delegation in Congress, dated March 3, 1955, from the Agricultural Council of California, signed by Allen F. Mather, executive secretary, opposing upper Colorado River legislation.

The CHAIRMAN. I make the same request.

Mrs. PFOST. Without objection, it is so ordered.

(The letter referred to will be found in the files of the committee.)

Mr. ELY. Item E is a memorandum prepared by myself which is captioned "California and upper basin projects," which lists the projects in the upper basin which have been passed upon the consent calendar with California's consent and their cooperation.

If you prefer, Madam Chairman, I will read that as part of my statement. I would rather enjoy doing that.

Mr. ENGLE. I ask unanimous consent that it appear in the record.

Mrs. PFOST. Without objection, it is so ordered.

(The document referred to follows.)

CALIFORNIA AND UPPER BASIN PROJECTS

It is frequently said that California has consistently opposed legislation to provide reclamation projects in the upper basin. The record shows that this statement is not true.

Under the Boulder Canyon Project Adjustment Act (54 Stat. 744, 1940), passed with the active support of California, a Colorado River development fund was established through the earmarking of $500,000 of Hoover Dam revenues each year for use in the investigation and construction of projects on the Colorado River system. For the first 15 years (through 1955) the entire development fund, or $7,500,000, was by this law devoted exclusively to applications in

the upper division States, i. e., Colorado, New Mexico, Utah, and Wyoming. After 1955 and until 1987 the $500,000 per annum will be equitably distributed for such purposes among all seven of the basin States. Accordingly, at least another $10 million of this fund will fall to the use of the upper States. It should be borne in mind that the great portion of Hoover Dam revenues, which support this fund, are derived from the homes and industries of California which utilize Hoover Dam power.

Many studies and investigations utilizing these funds have been made. A number of upper basin projects, none of which were opposed by California's congressional delegation and many of which had active California support, have been authorized or otherwise acted upon by Congress as follows:

Mancos project, Colorado (act of June 25, 1947; 61 Stat. 176)
Paonia project, Colorado (act of June 25, 1947; 61 Stat. 181)
Provo (Deer Creek) project, Utah (act of March 29, 1948; 62 Stat. 92)
Eden project, Wyoming (act of June 28, 1949; 63 Stat. 277)
Fort Sumner project, New Mexico (act of July 29, 1949; 63 Stat. 483)
Weber Basin project, Utah (act of August 29, 1949; 63 Stat. 677)
Vermejo project, New Mexico (act of September 27, 1950; 64 Stat. 1072)
Collbran project, Colorado (act of July 3, 1952; 66 Stat. 325)

In addition, no opposition was or has been registered to the Colorado-Big Thompson project, initiated under a secretarial finding of feasibility in 1937 through PWA funds and for which appropriations or other allocations of funds have been made for construction from that year to the present totaling $157,549,277.

Mrs. PFOST. Proceed, Mr. Ely.

Mr. ELY. Item F is a tabulation captioned "Agency investments and commitments for the use of Colorado River water and power in California," a summary of the investments made by public agencies and others of the State of California for use of water and power from the Colorado River.

Mr. DAWSON. Madam Chairman, I object to making that a part of the record. He has referred to all of that same material in his statement, as well as other witnesses who will follow having made an enumeration of these investments in their statements.

Mr. ELY. No, Mr. Dawson; I did the contrary to save the time. I did not include that in my statement so I would not occupy your time by reading it. I would like to have it incorporated as a part of my statement as an exhibit.

Mr. DAWSON. I think other witnesses who follow will make that statement.

Mr. ELY. They will not read that particular document.

Mr. DAWSON. But they do have it in their statement.

Mr. ELY. That document; no, sir.

Mr. DAWSON. Not the same material?

Mr. ELY. No, sir; not that detail.

Mr. DAWSON. I object, Madam Chairman.

Mr. ENGLE. Madam Chairman, I ask unanimous consent that the witness be permitted to summarize in a brief statement or brief paragraph the totals of these figures, with a reference to the details in the statement which will be referred to the file. The record itself will show the basic nature of the information and the details will be reflected in the document in the committee file, but not in the committee record.

Mrs. PFOST. Is there any objection?

Mr. HOSMER. Will the gentleman yield for a question?

Mr. ENGLE. Yes.

Mr. HOSMER. Would that reflect the intent and meaning and significance of that document by merely stating the total, Mr. Ely?

Mr. ELY. I will do the best I can to summarize it.

Mr. ENGLE. My purpose is to show the total investment of California in its works, which it seems to me is pertinent information.

Mr. ELY. Highly pertinent.

Mr. ENGLE. As to the detailed breakdown, it gets a little burdensome. That would be in the file. If the gentleman will summarize in a brief statement the totals for each category that he mentions here, with a conclusion which gives the grand total, and with a reference to the document made to make that a part of the file then anyone who has an interest in getting the detailed information can secure it from the file, which, as the gentleman knows, is the permanent record of this Congress. At the end of each session these files are put together and filed with the clerk.

Mrs. PFOST. Does the gentleman from Utah withdraw his objection?

Mr. DAWSON. I will withdraw it, Madam Chairman, but I wish the chairman of the committee would examine these various statements of various witnesses that follow, because each witness recounts this matter as to the total investment that they have in these projects. I think it is repetitious, but I am willing to do that.

Mr. ELY. If I may be heard, I think the contrary will appear, Mr Dawson. This is a summary of investments of California agencies for the use of water and power of the Colorado River system, rounded to the nearest million dollars.

First, with respect to water:

Water:	
Coachella Valley County Water District	$27,000,000
Imperial Irrigation District	54,000,000
Metropolitan Water District of Southern California	455,000,000
Palo Verde Irrigation District	6,000,000
San Diego County Water Authority	20,000,000
Yuma project in California	1,000,000
Los Angeles Department of Water and Power	9,000,000
Water total	572,000,000
Power:	
Hoover Dam and Powerplant	166,000,000
Imperial Irrigation District, hydroelectric facilities	18,000,000
Transmission circuits:	
California Electric Power Co	1,000,000
City of Los Angeles	32,000,000
Southern California Edison Co	10,000,000
Power total	227,000,000
Grand total	799,000,000

Mr. RHODES. Madam Chairman, it appears that the witness is merely reading the document.

Mr. ELY. I am reading a summary, Your Honor.

A grand total of $799 million.

Mr. RHODES. Madam Chairman, if that is the same material which the committee has previously stated will not be included in the record I am going to have to move the previous testimony on this particular matter be stricken from the record.

Mr. ELY. The statement is six pages long, Madam Chairman. I have read a summary which is less than one page, and going to comply with Mr. Engle's sugestion.

Mrs. PFOST. Does that complete your summary?

Mr. ELY. Except for the fact that if you want this record accurate, a number of those figures are subject to footnotes of explanation. If you do not want those figures, I will not give them, but I do not want the figures to be subsequently attacked on the ground they are too large and inaccurate, because the footnotes and the explanatory material explain each one.

Mr. ENGLE. What I had in mind was that the witness would prepare a short statement which would fully do justice to what he had in mind, referring to the details of the document, and supply it for the record.

Mr. ELY. This document is boiled down to a single line for each item. I do not know how I could boil it further.

Mr. ENGLE. The committe is not interested, I am sure, in how much each agency spent. It is interested, I assume, in the total investment of southern California agencies, but not in the details. I think it is a tempest in the teapot, and let us proceed.

Mrs. PFOST. Does this complete your statement, Mr. Ely?

Mr. ELY. There are several more items here.

Mrs. PFOST. What you have read will be a part of the record and the rest will be made a part of the file.

(The document offered by Mr. Ely will be found in the files of the committee.)

Mr. ELY. May I offer, also Madam Chairman, a summary of the controversy in *Arizona* v. *California*, which appears as one of the documents filed in the United States Supreme Court, which is a summarization of the issues as presented by the pleadings and their consequences in respect to the various States.

Mr. DAWSON. I am going to ask the witness who prepared this document.

Mr. ELY. That was prepared by a counsel for the State of California and the other California defendants.

Mr. DAWSON. Are you also going to make the request that the briefs be put in here from Arizona on the other side of this case?

Mr. ELY. If you wish. I had not planned to offer any of our briefs. This is a summary which is part of the pleading.

Mr. RHODES. It is part of the record in this case before the Supreme Court at the present time; is it not?

Mr. ELY. Yes.

Mr. RHODES. I would like to ask the witness to give a brief statement as to the relevancy of this particular document as it affects the upper Colorado project. I am reserving the right to object; I am not waiving the right to object. I would like to know what relevancy this has to this particular record.

Mr. DAWSON. Will the gentleman yield?

Mr. RHODES. Yes.

Mr. DAWSON. If this is going to involve a rehash of all of the testimony of the witness on this subject, which he has just been through, then we will be here for the next week. I must object to inclusion of it as a part of the record.

Mr. HOSMER. Madam Chairman?

Mrs. PFOST. The gentleman from California.

Mr. HOSMER. I move it be included as part of the record.

Mr. RHODES. I would like to have the witness answer my question, if he can do so, as briefly as possible. I am undecided as to whether it should go into the record or not.

Mr. HOSMER. I will yield to the gentleman for that purpose.

Mr. ELY. The document which has been handed to you, which is a part of the pleadings in the United States Supreme Court, is a statement of the controversy, related, first, to the quantities of water in question; second, the allegations of the various parties, which are presumably subject to proof, with respect to law and as to factual issues; the issues of interpretation of the documents involved; and cross-references to the terms of the Colorado River compact and the Boulder Canyon Project Act.

Mr. ENGLE. May I ask a question. If that is admitted, how can we refuse Arizona or any other party in the litigation a similar request, thereby opening our records to the inclusion of the summary of every party in the litigation, including the United States Government attorneys, as to what they say about it? It seems to me that unless the document has a clear relationship to the present controversy we mill make our record so voluminous that it becomes impossible for any practical use by anyone.

It is assumed that the witness in his statement made a clear presentation of what legal issues there are in the California-Arizona case which bear directly upon the question of whether or not this committee should authorize all or part of the proposal here with reference to the upper Basin storage project.

It seems to me we just open the door to all sorts of ex parte pronouncements. I hope the gentleman will withdraw his motion, and if he wants to put it in the files, it is all right. There has been sufficient discussion now to identify it.

Mr. HOSMER. Madam Chairman?

Mrs. PFOST. The gentleman from California.

Mr. HOSMER. I believe that the testimony given by the witness covered those points in the Arizona-California case which have a direct bearing on the project in question. The purpose of these hearings being for the information of the other Members of Congress who will have to evaluate this legislation, it seems to me there would undoubtedly be questions in some of their minds as to where these fit into the suit, and, as a consequence, the availability of this document in the hearings would enable our colleagues to make a more thorough study and accurate evaluation of Mr. Ely's statement as to the definite effect of certain issues in the total controversy of the upper Colorado project itself.

Mr. RHODES. Will the gentleman yield?

Mr. HOSMER. Yes.

Mr. RHODES. Of course, the gentleman is aware that the States of the upper basin, except for the State of Arizona, are not yet party to this lawsuit. In other words, the States of the upper Colorado Basin who would benefit directly from this particular project are not part of the lawsuit. There has been a motion to implead them by one of the parties to the suit. I do not see the relevancy of this particular matter at this time, but I will state, in the event that the gentleman's motion should prevail, I would then be compelled to ask unanimous consent to have included in the record immediately after the summary a similar summary prepared by the State of Arizona.

Mrs. PFOST. There is a motion before the committee.

Mr. HOSMER. Will the gentleman yield?

Mr. RHODES. Yes.

Mr. HOSMER. Even though the upper States may not be actual party to this suit, the very foundation of our legal system is based on precedent, and the precedent that would be established in the suit by *Arizona* v. *California*, would certainly apply to any subsequent litigation involving any of the other States where signatories to the compact are affected thereby.

Mr. ENGLE. Madam Chairman, may I be recognized?

Mrs. PFOST. The genleman from California, Mr. Engle, is recognized.

Mr. ENGLE. What the gentleman from California said puts a finger precisely on the point I am talking about: namely, that we would make this record then, a place in which the litigants over in the Supreme Court debate for their own protection the various issues in that lawsuit. The gentleman says, "Well, it will help them get information." I suppose we could put in all of the pleadings that everybody has over there, plus all the legal documents and improve their information. But we make our record so voluminous in that manner that it becomes of no practical use to anyone.

It is my view that it is sufficient to refer to the document and put it in the file for those who want to pursue it that far. Then you do not open the matter up to the point where everybody who has his nose in that lawsuit over there thinks for his own protection, in order to keep the record in balance, that he must file a similar statement on a proceeding in another forum entirely and in a separate agency of the Government. For that reason, I hope the gentleman's motion will be defeated and that the matter will be included in the file with an appropriate reference in the record.

Mr. METCALF. Madam Chairman, will the gentleman yield to me for a moment?

Mr. ENGLE. Yes.

Mr. METCALF. I have a clipping here from a recent notice from California that $220.000 has been added to hire additional attorneys in this case, and according to the clipping it says that—

> Ten attorneys are going to file briefs and pleadings in the case, which may take 6 to 8 years to resolve.

I would like to present a query to the committee: Are we going to put all these briefs and pleadings in the next 6 to 8 years in this record and fight this lawsuit here in this committee? If we are, we are truly going to have a voluminous record.

Mrs. PFOST. Is there any further discussion?

Mr. UDALL. I would like to be heard, Madam Chairman.

Mrs. PFOST. The gentleman from Arizona is recognized.

Mr. UDALL. Along the times of what Mr. Engle said, it seems to me since this is a matter of really deciding what is proper and fitting to go into the record, there is a full and complete record of this court litigation across the block in the Supreme Court. That is where it belongs. Anyone who wants information about it can, by walking an extra block, go over and get it, and I see no reason why our record should be cluttered up by this litigation, at all.

Mrs. PFOST. If there is no further discussion, there is a motion before the committee.

Mr. RHODES. A parliamentary inquiry. Has it received a second?

Mrs. PFOST. It has not.

Mr. UTT. I will second it.

Mrs. PFOST. It has been moved and seconded that the summary be made a part of the record. All those in favor will signify by saying "aye"; all those opposed, "no."

The "noes" have it and the motion is defeated.

Mr. ENGLE. I make the unanimous-consent request that the document be made a part of the file. It has already been appropriately referred to in the record because the record contains a transcript of these discussions. I request, therefore, that the document appear in the file for the information and convenience of anyone who wants it.

Mr. RHODES. Reserving the right to object, Madam Chairman. Would Mr. Engle also include in his unanimous-consent request that the other party to this lawsuit, the State of Arizona, be given 30 days in which to file another summary for the file in this case in the event that the legal authorities of the State of Arizona desire to do so?

Mr. ENGLE. The unanimous-consent request is so amended.

Mr. DAWSON. Madam Chairman, I object, then. It seems to me we are going to try this lawsuit before the Congress and we had better stop somewhere; so I object. I object to cluttering the record or the file, as well, in this manner, with something that has no place in here.

Mrs. PFOST. The objection is heard and, therefore, the summary is not made a part of the file.

Mr. HOSMER. Madam Chairman, I just wish to state that this entire matter is cluttered up with the lawsuit because it and its issues are at stake and involved in this legislation, and whether we like it or not, that is the fact we must recognize.

Mrs. PFOST. You may proceed, Mr. Ely.

Mr. ELY. My final request is to be included in the record as an exhibit to my testimony a document captioned, "Views of the State of California on the Supplemental Report of the Secretary of the Interior on the Colorado River storage project, and Participating Projects, Upper Colorado River Basin, Dated December 10, 1950." This is the formal report filed by the State of California under the procedure of the Flood Control Act of 1944 upon the Reclamation Bureau's report upon this project.

Mr. DAWSON. Madam Chairman, I am going to object to that appearing either in the record or the file, for the reason that we already have it in the record. We have it in the report which was made on the hearings before this committee last year in toto.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. Yes.

Mr. HOSMER. That was last year. This is this year, and these are different bills this year, and this is a new Congress. That record could be logically a part of this set of hearings, and it expresses the views of the State of California, the official views of the State of California, one of the many States vitally affected by this legislation.

Mr. ENGLE. I believe it is in House Document 364.

Mr. DAWSON. I read it last night and it is all there.

Mr. ENGLE. It is in House Document 364. You do not want it in the record again, do you?

Mr. ELY. I should like to have it in the record to be considered by the Congress. I assume in the debate on the bill House Document 364 will not be available on the floor.

Mr. ENGLE. Let us just say that it appears in House Document 364 which is a portion of the record on which this bill will be submitted to the Congress. I think the gentleman's objection is well taken because it is already in the record.

Mr. HOSMER. Madam Chairman, I move it be made a part of the record.

Mr. UTT. Second.

Mrs. PFOST. It has been moved and seconded that it be made a part of the record. All those in favor say "aye"; opposed "no."

The "noes" have it and the motion is defeated.

Mr. ELY. Madam Chairman, that concludes my direct testimony. Thank you and the members of the committee for your courtesy and patience.

Mrs. PFOST. Thank you, Mr. Ely. The House is now in session and the committee will recess until 2 o'clock this afternoon.

(Whereupon, at 12 noon, the committee stood in recess, to reconvene at 2 p. m. of the same day.)

The subcommittee reconvened at 3:30 p. m., upon the expiration of the recess.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for further consideration of the bills before it.

Due to the fact that we were not able to have quite as much time as we had planned on this afternoon, I have asked the witnesses to keep their time within certain bounds, and each one of them has agreed to do so. We will stay as near to that as is possible, so that we can get all the direct testimony in this afternoon.

If you do not finish all your testimony within the time set, please request of the committee that your remaining formal remarks be printed in the record as if read.

At this time, the committee is glad to have before it Congressman Chet Holifield, of Los Angeles.

We are pleased to have our colleague here, and we shall be glad to listen to him.

STATEMENT OF HON. CHET HOLIFIELD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. HOLIFIELD. Thank you, Mr. Chairman. I appreciate the honor of appearing before this committee.

I am sure I need not tell any member of this committee how vital to the present and future economy of southern California is the Coloradio River water for which we hold contracts. We, the people of southern California, have invested enormous sums of money to bring this Colorado River water to our industries, homes, and farms. We did this with the belief that we had unassailable contracts with the Federal Government for certain amounts of water. It is difficult for me to believe that these contracts were not valid, or that they may be infringed upon by new interpretations of the statutes under which they were written. Namely, these statutes are the Colorado River compact and the Boulder Canyon Project Act.

These Federal laws made it possible for us in southern California to proceed with the development of the water and power which we considered legally ours.

Now we are confronted with a series of bills which would impose upon us interpretations of these basic laws with which we do not and cannot agree. We seek a Supreme Court determination, therefore, on what we consider basic differences in interpretation between members of the Colorado River compact.

In examining these bills, and as a result of my association with the water problems of southern California, I find it necessary to oppose at this time their enactment.

California attorneys and engineers inform me that the approval of these bills would mean a sharp curtailment in the production of hydroelectric power at Hoover Dam. Southern California underwrote the financing of Hoover Dam by agreeing to buy power, whether we needed it or not, and since Hoover Dam power was produced we have carried out our agreements, and Hoover Dam has paid handsomely on the Federal investment in it, including interest charges.

We do not have too much water in Los Angeles, nor in southern California. We are not now using all the water for which we have contracts, but as history will show, we have been farsighted in attempting to determine future needs. Every drop of Colorado River water awarded to us will be used in the near future, and we are now wondering where our water supply will come from to meet the demands we know are coming.

In attempting to pass through Congress these upper basin bills, the proponents are, in my opinion, disregarding what we believe to be basic interpretations of the Colorado River compact upon which southern California has invested more than $700 million.

At the present time, as this committee well knows, the interpretation of the Colorado River compact is in litigation before the Supreme Court of the United States. California seeks a final determination by the highest authority as to points of dispute which have persisted for decades. We believe we are justified in asking that, until we know what our rights are in relation to the usable supply of water in the river, no substantial diversion of water shall occur, nor any precedent for a series of diversion projects be established.

We are aware that this will involve a delay in the authorization of new projects. We hope this delay will not be unduly long, and we believe it need not be, if all parties to the compact earnestly pursue an expeditious end to the litigation. Certainly California seeks not to delay a final court determination. We feel that a determinaation of the meaning of the compact should be final and binding on all parties to the compact and therefore we believe all parties to the compact should be willing to become a part of the present litigation.

When the ratification of the compact between the upper basin States was approved by the Congress, we of the lower basin States offered no opposition. In this present litigation which, in our opinion, will affect the basic compact and therefore all parties thereto, we believe we are justified in asking for the cooperation of the upper basin States until the litigation is terminated.

I reject the propaganda which seeks to place southern California in the position of opposing all upper basin bills. This is not true. At

least 10 upper basin projects have been established without opposition from California.

Until 1954, I personally never opposed upper basin reclamation bills. I did oppose the so-called Fryingpan-Arkansas legislation—not altogether because of the particular project, but because I believed it ill-timed and possibly precedent-setting for a number of other projects. Legislation since proposed, of various linking projects, seems to justify our fears.

The economy of 6 million people in southern California depends on water and power from the Colorado. Other millions are coming almost on a basis of 1 million in immigrants per year. California has contracts for an amount of water and power which only Supreme Court decisions can determine. When this basic clarification is obtained, then we can and will work with our friends in the western adjoining States to help them develop their areas, within the defined rights of the compact.

We realize the mutuality of our regional problems. We recognize that great centers of population, such as exists in southern California, provide a great market for the products of these great and good neighbors of ours. We send annually into your States our manufactured products and our vacationists. Our prosperity is intertwined with yours and yours with ours.

We must, in good conscience, support the position of knowing where we stand under the compact, before premature legislative action is taken which may jeopardize our basic rights.

That is the completion of my statement, Mr. Chairman. I thank you for the opportunity which you have given me to appear before your committee.

Mr. ASPINALL. We thank you for your appearance, Congressman Holifield.

The next witness is Mr. Raymond Matthew, chief engineer, Colorado River Board of California.

Mr. Matthew, you may proceed.

Mr. ENGLE. While Mr. Matthew is getting together his material, a couple of other members have asked for the privilege of filing statements in the record, and I would like to ask unanimous consent that such other Members of the House from California as desire may file their statements for inclusion in the record.

Mr. ASPINALL. Such consent has already been given, not only for the members of the committee but for any Member of Congress. Unless there is objection, we will grant this request also at this time.

Hearing none, it is so ordered.

(Statements of various members of the California congressional delegation are as follows:)

STATEMENT OF HON. PATRICK J. HILLINGS

Mr. Chairman, I appreciate this opportunity to present some of my views concerning H. R. 270, a bill which would create the upper Colorado project.

As a southern Californian, I am vitally interested in assuring the residents of our area an adequate supply of water to meet the needs of the future as well as those of today. In my opinion, the upper Colorado project would jeopardize California's rightful supply of water.

More than 6 million people live within the area served by the Colorado River in California. The property involved is assessed at more than $8 billion. Our entire economy is built on the water we obtain from the Colorado River.

California claims 5,362,000 acre-feet of water per year from the Colorado River. If the upper Colorado project were authorized, reservoirs would be built which would store 48 million acre-feet, or over 3 years' flow of the river. The irrigation projects would cost in excess of $1,000 per acre benefited.

In view of the facts I have cited above and for various other reasons in the interest of the economy of the State of California, I urge that your committee not take any action which would deprive our State of its fair share of the water in the Colorado River.

STATEMENT OF HON. GORDON L. McDONOUGH

Mr. McDONOUGH. Mr. Chairman, I appreciate the opportunity to present my views and opinions on the bills at present under consideration by your committee which propose to authorize the construction of a series of dams to store water from the upper Colorado River for irrigation, reclamation, and the development of hydroelectric power in the upper Colorado River Basin States.

Since the first settlers pushed westward across the Nation into the semiarid and arid regions of the United States, water rights have been a major issue which mean success or failure to the development of communities, agriculture, and industry. Without an adequate water supply, the land cannot produce, communities cannot exist, and industrial development must cease.

Whenever any issue vitally affects the quantity and quality of the water supply to any area in the West, that issue is of paramount importance to its people.

California, and especially southern California, has depended upon the Colorado River as a major source for water to supply its needs. And with each year the fabulous expansion in population and industry in southern California has increased the importance of maintaining a constant dependable water supply to meet the unprecedented demands of domestic and industrial consumers.

In 1922 with the signing of the Colorado River compact, the State of California together with the other States included in the lower Colorado Basin was guaranteed 75 million acre-feet of water from the Colorado River plus 1 million acre-feet per annum for beneficial consumptive use. The States of the upper Colorado Basin were allotted 75 million acre-feet of water per annum.

California does not desire to change the terms of the Colorado River compact. It does not seek to increase the amount of Colorado River water legally allotted for use in the State. California, however, must and will make every effort to protect its rights to its legal share of Colorado River water, and to prevent any decrease in the flow of the Colorado River which would deny California its just share of water from the river.

California does not object to projects for reclamation and irrigation and the development of hydroelectric power in any other State either in the upper or lower Colorado Basin, providing such projects do not decrease the quantity of water which can be delivered to the State of California to such an extent that California can no longer receive the amount of water to which it is legally entitled under the terms of the compact, and providing such projects do not have a detrimental effect upon the quality of the Colorado River water.

In any consideration of legislation for the proposed upper Colorado Basin projects, the present legal action involving the Colorado River compact must be taken into account.

The distribution of water from the Colorado River was established between States of the upper and lower basin under the terms of the 1922 compact. The compact clearly established that the use of Colorado River water is restricted to beneficial consumptive use. It also allots a specific amount of water for the upper and lower basin States which may be used per annum. The compact further provides that if water is guaranteed to Mexico from the Colorado River by treaty, and a treaty with Mexico to deliver a minimum of 1,500,000 acre-feet per annum was concluded in 1944, any deficit in water shall be borne equally by the upper basin and the lower basin of the Colorado River.

However, today the legal interpretation of the terms of the compact dealing with the distribution of Colorado River water and the responsibility for any deficit in the amount of water guaranteed to Mexico by treaty is now subject to court action, and, therefore, at the present time, the rights and obligations of the States which are a party to the compact are not clearly defined.

The pending case, *Arizona* v. *California*, is now before the Supreme Court of the United States. Arizona in this suit alleges that the Colorado River compact applies only to water flowing in the main stream of the river and does

not involve waters of the river system. The amount of water thus brought into dispute represents some 2 million acre-feet of water per annum.

Also involved in the pending suit is the legal definition of the term "per annum" as applied to the compact. California holds the term to apply to each year. This interpretation has also been accepted by the Department of the Interior as applied to California projects. Other States bound by the compact hold that the amount of water used from year to year may vary, and in some years exceed the maximum amount stated in the compact providing the average amount of water used over a period of some 10 years or other specific period does not exceed the stated maximum.

There are other sections of the compact also in dispute, and it is obvious that under these circumstances it is impossible to evaluate the effect of the proposed upper Colorado River Basin projects on the States of both the upper and the lower basin until these disputes have been settled by the Supreme Court, and the legal interpretation of the terms of the compact are clearly defined.

The upper Colorado Basin States, in urging approval of the upper Colorado River projects, claim that construction of these projects will not have a detrimental effect upon the water supply of the States of the lower Colorado Basin. But the facts as stated by one of the outstanding authorities on this subject, Mr. Raymond Hill, consulting engineer for the State of Colorado, do not support this claim.

According to Mr. Hill, his study of the Colorado River flow indicates that when the upper Colorado River is regulated, as it would be if the upper Colorado River projects are approved, there will not be enough water left in the Colorado River after treaty deliveries to Mexico to supply existing uses in the lower basin; and there will certainly be no surplus for new or expanded uses.

Any reduction in the flow of Colorado River water which would prevent California from receiving its legal share of water would have a disastrous effect, especially in southern California where the taxpayers have already spent more than $700 million in water development to bring water from the Colorado River through such projects as the Metropolitan Water District, the All American Canal, Hoover Dam, and others. And unless the supply of water thus developed can be maintained, the loss in investment by the people of southern California in homes, farms, and industries would be enormous.

If the combination of storage reservoirs and participating projects as proposed for ultimate construction in the pending bills are built and operated as planned, the surveys indicate this will result in the upper basin States using at least 1.5 million acre-feet more water annually than their entitlement under the compact.

In addition to the depletion of water available to the lower Colorado Basin States, there is a further threat that the quality of Colorado River water will be seriously impaired.

Colorado River water now contains, according to survey reports, about 1 ton of salts per acre-foot. This means that if in producing a crop, 3.5 acre-feet per acre is required, there will be 3.5 tons of salt put onto each acre of land with that amount of water. How much this salt content may be increased without adversely affecting crops is not known.

The proposed upper basin projects, especially those designated as transmountain diversion projects, would divert the highest quality water out of the Colorado Basin, because the diversion would be at a high altitude before the water had accumulated any salt. This would increase the percentage of salts in Colorado River water flowing into the lower basin sharply.

In addition to the foregoing, another important reason I oppose the projects proposed in the pending legislation before this committee is the fact that these projects have as one of their major purposes the development of hydroelectric power.

As has been pointed out by Edwin C. Johnson, Governor of Colorado, Colorado River water cannot be stored, as planned, without violating the Colorado River compact, if such water is needed for consumptive use in the lower basin.

The compact clearly provides that no water is to be withheld above (in the upper basin) that cannot be used for purposes of agriculture. The lower basin should, therefore, receive the entire flow of the river, less only the amount consumptively use in the upper States for agriculture purposes.

And it should be noted that the foregoing interpretation of legal use of Colorado River water by the States of the upper basin was made before the

compact was ratified by any State except Nevada, and none of the other States disputed this interpretation at the time they ratified the compact.

In addition to the question of the legality of water storage in the upper basin, there is also a serious problem of evaporation. It is estimated by the Reclamation Bureau that the proposed storage reservoirs will result in a loss of 880,000 acre-feet of water annually in evaporation.

Certainly in view of the facts which have been established by surveys and reports on the effect on the quantity and quality of Colorado River watch which could be delivered to the States of the lower basin, if the proposed legislation were approved, there can be no question as to the reason why California must oppose these projects to safeguard the legal rights of the people of California to this source of water which was guaranteed by the Colorado River compact.

There is, however, yet another question involved in consideration of the proposed projects which is not only of vital interest to the people of California, but to every taxpayer in the United States. That is the question of financial and economic feasibility of the projects.

The record shows that the proposed projects are financially infeasible and lack economic justification. For example, the projects proposed as the Colorado River storage projects on original estimated construction costs would average $1,000 per acre for the overall irrigation allocation. Under the financial program the Federal subsidy would amount to about $4 billion, or over $5,000 per acre.

The 14 participating irrigation projects included in this storage project are to be located at high elevations, averaging over a mile above sea level. The growing season is short, which limits the types of crops that can be grown, and on some of the projects there is frost in every month of the year. The Bureau of Reclamation reports show that only about 20 percent of the lands within these projects are listed as class 1 and that the average value of the land, fully developed, is about $150 per acre. Yet the Federal subsidy to be paid by the taxpayers would amount to over $5,000 per acre.

For the proposed Fryingpan-Arkansas project, the corresponding Federal subsidy has been estimated at about $1,600 per acre. And in this project there is serious question as to the engineering feasibility of some features of the project. Open canals are proposed over a distance of about 20 miles at elevations ranging from 7,000 to nearly 10,000 feet above sea level, in a rugged mountain region where during winter severe ice and snow conditions prevail.

The practicability of operating open canals under such conditions is highly questionable. Under similar conditions on the Colorado-Big Thompson project in Colorado, the Bureau of Reclamation found it necessary to substitute tunnels and covered conduits for the open canals originally proposed.

The Secretary of the Interior has reported that if covered conduits are found to be required in the Fryingpan-Arkansas project, the total construction cost would be increased about $64 million, or 37 percent, and that such increase would render the project infeasible even on a 70-year payout basis.

It is my firm belief, for the reasons that I have previously stated, that the projects proposed in the legislation now pending before this committee should not be approved.

There is the question of legality of the projects as pointed out by Governor Johnson, of Colorado, because the Colorado River compact prohibits the storage of water in the upper Colorado Basin for the primary purpose of developing hydroelectric power.

There are additional vitally important questions of legal interpretation of the Colorado River compact that must be settled by the United States Supreme Court in the case of California versus Arizona, and approval of legislation authorizing the proposed upper Colorado River projects prior to a final court decision on these issues could have serious consequences since decisions of major importance affecting their construction cannot be made prior to final court action.

Furthermore, a reduction in the available quantity and a detrimental change in the quality of water which could be delivered to California and the other lower basin States after construction of these projects has been clearly indicated by the report of Raymond Hill, consulting engineer for the State of Colorado, and by numerous other reports and surveys completed by authorities on this subject.

Current upper basin bills are not the same as originally approved by the President. There are 4 additional major dams, bringing the total to six, and

16 additional irrigation projects, bringing the total to 30, and raising the cost from $920 million to $1 billion, 600 million, as a starter.

The Interior Department would be permitted to bypass the Agriculture Department in the reappraisal of some of the projects. Considering the vast investment in the land involved, it would seem essential for the Congress to have the best sort of soil appraisal by that Department.

Under the proposed plan of financing, the construction costs and concealed subsidies to be paid by the Nation's taxpayers would be more than $4 billion. This would be to supply 730,000 acres of land of which 450,000 acres would receive only a supplemental water supply. The subsidy would cost $5,000 an acre. The cost to taxpayers for each 150-acre farm would be $750,000.

The same method of financing is proposed for the Fryingpan-Arkansas project as above described for the upper Colorado River Basin projects, except that repayment of costs allocated to irrigation would be permitted for a 70-year period instead of the 50-year period provided for the upper projects. This extension of the repayment period to 70 years more than doubles the interest subsidy under the 40-year repayment permitted by existing law.

Lastly, Congress created the Hoover Commission for the purpose, among others, of investigating and making recommendations as to all water and power policies. The Commission is expected to make its report on water and power policies within the next 4 months. No legislation should be adopted by the Congress, establishing new policies as sweeping as these, at least until it has received and considered the report of the Hoover Commission it created.

For all these reasons, I sincerely urge that the members of this committee disapprove the legislation now under consideration.

STATEMENT BY HON. CLYDE DOYLE, 23D DISTRICT, LOS ANGELES COUNTY, CALIF.

Mr. Chairman and members of the committee: As a member of the water policy committee of the California congressional delegation, I have not only enjoyed my duties, but I have acquired a fund of valuable information by reason of having met on occasions with the members of the Colorado River Association and staff members of the Reclamation Department and others, including some of the distinguished representatives from some of the upper basin and lower basin States.

Always recognizing, as I do, that water is the lifeblood which permits the steady progress of the civilized man which makes it possible to develop huge geographical areas so that more of mankind can be raised to a higher level of daily living and accomplishment, I feel that I must take firm position against the upper Colorado River project bills now before your distinguished committee. For, gentlemen, as my native State of California must needs be protected as to its inadequate water supply for its progress, also does each and every State in our great United States need to have adequate water supply. Mr Chairman, specifically I recognize also that our neighboring States concerned in this proposed upper Colorado River project as set forth in pending bills now before your committee, must also concern themselves about their supply of water. Their further demands for this necessity of life are caused by substantially the same factors which cause me, as a citizen of California, to manifestly and yet very sincerely and may I say with appreciation of the needs of our neighboring States, nevertheless, oppose this real threat to the inadequate water supply for California's needs.

First, may I say that I would not less oppose this project if I did not believe that the enactment thereof would constitute a substantial variation from the already established legal rights for supply of water in California as previously established valid and existing documents mutually entered into. Furthermore, the water and power situation in southern California is well known to be such that there cannot be taken away from the legally established supply thereof any amount without seriously jeopardizing the present and future economy of that vast and too rapidly growing population area. Of course, we will all agree it is one of the most significant and history-determining areas in our whole Nation.

Having relied for many years upon the provisions of the Colorado River compact and the Boulder Canyon Project Act, it appears to be crystal clear that California has abided by and lived within various established legal provisions. Furthermore, we intend to continue to abide by and be bound by them. However, it appears that the upper basin States have now chosen to place a different, a

new, and a conflicting interpretation upon those well-established authenticated legal documents. These more recent interpretations cannot be accepted unless there be recognized perils to the farmers, to the millions of homes, to the already thousands of great and small necessary industries.

By what reason is it justified that this proposed huge, major development in the upper basin, which it is estimated will cost over $1 million, should be authorized and started forward, in spite of the fact that many of the fundamental legal issues involving the conflicting interpretations raised by these proposals are now actually pending before the United States Supreme Court in a well-known case of *Arizona* v. *California*. Already a master has been named to process the case more rapidly than otherwise would be done. Already the issues are pretty well defined and well understood. I believe I have been reliably informed that the aforesaid legal case could reasonably be out of the way and decided by the Court within the next 2 or 3 years at most.

Gentlemen, I do not conceive of it as sound judgment nor practical to press forward this proposed legislation and to allow this huge sum to be thus allocated for this purpose until these conflicting legal issues have first been decided and announced by the highest court in our land.

Mr. Chairman, I have to date been unable to receive such factual information and engineering data as would convince me that it can be presently determined what is reasonably and practically a sound disposal of this common problem of water supply between these all important States in the western part of our great Nation. I do not take the position that the needs of the upper basin States should be neglected nor allowed to go unrecognized by this great Congress. But I firmly take the position that until the aforesaid case, pending before the highest Court, be determined there can be no sound or reasonable or practical recognition of the common interests for adequate water supply in these respective interested States.

What concerns the sound, substantial progress of the upper basin States also is of common concern to the people in the States of the west coast. And likewise, what concerns the progress and prosperity of the people of California of necessity concerns the economic soundness and prosperity of the people of all the upper river basin States. This problem, of necessity, challenges us to await the decision by the United States Supreme Court in the case of *Arizona* v. California. To do less, I believe, is to go forward with our eyes shut and, in addition thereto, with our eyes blindfolded.

STATEMENT OF CONGRESSMAN JOHN E. MOSS., JR., THIRD DISTRICT, CALIFORNIA

I am pleased to have an opportunity to appear before this subcommittee to express my views on the legislation pending before you which would authorize the Colorado River storage project and participating projects.

As a member of the California congressional delegation, my particular concern with the proposed development in the upper Colorado River Basin is the effect it will have on the legally established rights of California to the use of the waters of the Colorado River. Naturally, if the development adversely affects those rights I will oppose it with all the vigor at my command. The California State Engineer, in his official comments dated February 15, 1954, on the upper basin development expressed a similar concern when he said, among other things:

"The primary interest of California in the specific propects set forth in the report * * * is that in the construction and operation of any of these projects, California will receive its due apportionment of the waters of the Colorado River system as provided for in the Colorado River compact and related laws, instruments, and documents * * *" (H. Doc. 364, 83d Cong., 2d sess., at p. 297).

It is my understanding that official California witnesses who have appeared before Senate and House committees have testified that the upper basin can use at least 4,300,000 acre-feet per year (or about 2,300,000 acre-feet more than present actual and authorized uses) without any danger whatsoever to the water supply to which California is entitled under the Colorado River compact. It is my further understanding that these same witnesses have testified that existing and authorized uses in the upper basin plus the section 1 projects in the bill before you would not exceed 4,300,000 acre-feet per year.

I have examined the views of my State officials with respect to Glen Canyon Reservoir and found almost unanimous endorsement for that development.

In their official comments of February 15 of last year, the State engineer and the Colorado River Board of California recommended early construction of the Glen Canyon Reservoir and power development. Spokesmen for California have, I am told, endorsed that particular development before this committee and Senate committees for the past 2 years.

My understanding of the official position of the State engineer of California and of the Colorado River Board of California as clearly set forth on page 19 of House Document No. 364, 83d Congress, 2d session, is that Glen Canyon—in addition to supplying a much-needed low-cost power supply—will provide hold-over storage which will be adequate for the present and future development in the upper basin for 40 or 50 years. As a Californian I favor Glen Canyon because it is a logical step in the development of the upper basin and it will insure that California's guaranteed rights to the use of the waters of the Colorado River will not be jeopardized by upstream developments.

Briefly, then, while I do not endorse all of the projects included in the Colorado River storage plan, I will be inclined to support, on the floor of the House, a bill to authorize Glen Canyon Reservoir and participating projects upstream which will enable the upper basin to develop and use water to which the basin is entitled without interfering with California's rights under the compact.

STATEMENT OF HON. JAMES ROOSEVELT

The congressional district I have the honor to represent is in the heart of the city of Los Angeles. This great metropolis now has a population of 2,150,000 and its growth, especially within the last two decades, is unprecedented in our history. There is nothing to indicate that this swift increase in population will slacken in the years ahead.

Los Angeles lies, as everyone knows, in a semiarid country. In the past we have suffered long periods of drought, and we will suffer them again. While an adequate and dependable water supply is vital to the growth of any metropolitan area in any climate, it must be understood that by reason of its geographical location water is of transcendent importance to Los Angeles.

The first Los Angeles water supply came from wells and an erratic stream dignified by the name of the Los Angeles River. It often had more water below its bed than it had on top. As the city grew it was realized that this natural local supply would soon be inadequate, and that additional water must be brought into the area. As a result the city developed a substantial supply from the Owens River adjacent to the distant Sierras. The Owens River aqueduct was the beginning of importation of water into Los Angeles, and since that time every additional gallon of water used by Los Angeles has been brought from distant sources.

Farsighted engineers soon realized, after the building of the Owens River aqueduct, that it too would be inadequate. They went hundreds of miles to the Colorado River, across deserts and mountain ranges, to tap that mighty stream. Eventually the great Colorado River aqueduct was completed to serve not only the city of Los Angeles but many other cities and areas of southern California.

The future demands for water by Los Angeles must be served by the Colorado River aqueduct.

Thus, it becomes clearly evident that any legislation which in any way affects the quantity or the quality of Colorado River water is of vital concern to Los Angeles, as well as to all southern California. The Colorado River Board of California, established by State statute to protect California's rights to waters of the Colorado River, reports that the pending upper Colorado River project bills, now before the House Interior Committee, constitute a dire and realistic threat to both California's legal share of water and power from the Colorado River. This threat takes the form of diminishing the power output of Hoover Dam, upon which Los Angeles depends in a large way for electrical energy, and likewise takes the form of decreasing the water supply which is so vital to our economy.

We cannot afford to sacrifice 1 gallon or kilowatt of this supply. The people of Los Angeles and Southern California have invested more than $700 million to bring Colorado River water and power to their homes, farms, and industries. Southern California holds contractual rights to 5,362,000 acre-feet of Colorado River water. We are not asking for more than this share of the Colorado River awarded to us in the contracts approved by the Federal Government. But we do ask, in fact we demand, that every acre-foot of this amount of Colorado River water be available for our use.

The Colorado River compact of 1922 is the acknowledged law of the river. California signed it, California has abided by its provisions, and California intends and expects to conform to the compact as it has been interpreted all these years.

The upper Colorado River project legislation introduces new and conflicting interpretations of this cornerstone of river law. Certainly it is reasonable to ask that these conflicting interpretations be resolved before enormous projects are constructed and create great damage to the rights which we hold and upon which we have established our economy. Many of the issues in conflict are now before the United States Supreme Court.

For these and other reasons, I must firmly voice my opposition to the proposed upper Colorado River project.

STATEMENT OF HON. HARRY R. SHEPPARD

The cornerstone of my opposition to the upper Colorado River project bills is the fact that they would seriously damage the Colorado River water and power supply of California. They would bring about this damage by decreasing the quantity of Colorado River water and power now awarded to California in contracts with the Federal Government, and would deteriorate the quality of the Colorado River water we would be obliged to use.

I have noted that the upper basin States take the position that they are entitled to have the Federal Government build these projects for them because the Colorado River compact apportioned to the upper basin States certain amounts of water. There is no foundation for such an assumption.

Ownership of an automobile does not give a man a license to drive wildly down the highway, running over people, and damaging property. Ownership of some water does not give a State or group of States a license to raid the Federal Treasury.

There is nothing in the Colorado River compact that provides a sight draft on the Treasury of the United States to any signer of that document. There is nothing in the compact that requires the taxpayers of the United States to put up money to build projects of any kind for any State.

In all the years I have been in Congress I have maintained a watch to see that California's legal share of the Colorado River was not infringed upon. I do not need to reiterate here the details of the many long and bitter battles we in California have fought to preserve this resource without which we could not exist.

Because we have maintained this vigilance, and because we have fought to the best of our ability to protect our rights, we have been often maligned and slandered. I can testify that I personally have never maligned or slandered our opponents in the Congress. I do not intend to do that now. What I do intend to do is to protect and preserve every gallon of water and every kilowatt of power that belongs to California. The truth is that since the 80th Congress there has been an intensive drive to deprive California of Colorado River water to which it is legally entitled under contracts with the Federal Government. For years the upper basin States have been sitting up nights concocting schemes to develop their water and power at the expense of the taxpayers of the Nation. Until the last session of Congress I personally did not oppose an upper basin reclamation bill. Nor do I know of any other California representative who objected to the many upper basin projects now being constructed or authorized.

There should be an abrupt end to the irresponsible charges that California is either a water hog or that California maintains a dog-in-the-manger attitude as regards upper basin projects. The records of Congress refute any such charges.

What California is trying to do, and what I am trying to do, is to protect the Colorado River water and power which is our only hope of meeting ever increasing demands.

The present upper basin bills are based upon interpretations of the Colorado River compact with which we cannot agree, and which are in sharp contrast to interpretations under which the people of my State have invested more than $700 million in developing our share of Colorado River water and power.

The upper basin States have every right to develop their resources. If they want to do that, let them come into Congress with projects that do not injure others and do not violate the historical concepts of Colorado River water law,

Let the upper basin States come to Congress with proposals founded on sound and reasonable principles. Let them not ask Congress to approve totally unjustified and infeasible projects that benefit a few farmers who can themselves pay little or nothing of the cost. Let them not ask for gigantic gifts from the taxpayers of this country to grow more crops of the kinds that are already in great surplus and heavily subsidized.

These are some of the reasons why I must oppose with all power at my command these proposed upper basin project bills, and in doing so, I don't consider I am one of "a small group of rather perverted thinkers."

STATEMENT IN OPPOSITION TO THE UPPER COLORADO BASIN STORAGE PROJECT

(By Hon. Craig Hosmer, a Representative from California)

Mr. Chairman, in making this statement I am pleased to inform the committee that each and every of our colleagues who represent southern California congressional districts has authorized me to express his general concurrence with my views. This is not to say that each necessarily adopts specifically everything I will have to say, but it does reflect a concurring opposition to the project as now planned. These colleagues are the following: Hon. Gordon L. McDonough, of Los Angeles; Hon. Donald L. Jackson, of Pacific Palisades; Hon. Cecil R. King, of Los Angeles; Hon. Chet Holifield of Montebello; Hon. Carl Hinshaw, of Pasadena; Hon. Edgar W. Hiestand, of Altadena; Hon. Joseph F. Holt, of Van Nuys; Hon. Clyde Doyle, of South Gate; Hon. Glenard P. Lipscomb, of Los Angeles; Hon. Patrick J. Hillings, of Arcadia; Hon. James Roosevelt, of Los Angeles; Hon. Harry R. Sheppard, of Yucaipa; Hon. James B. Utt, of Santa Ana; Hon. John Phillips, of Banning; and Hon. Robert C. Wilson, of Chula Vista.

INTRODUCTION

A football field is slightly more than an acre of ground. Cover it a foot deep with water and you would have about an acre-foot of water. Cover it with a tower of water 11,000 miles high, and you have an idea of the amount of water parched southern California will lose if the upper Colorado Basin storage project is built as now planned.

Imagine a canal wide enough and deep enough to float the world's biggest ship, the Navy's new aircraft carrier *Forrestal*. Imagine that canal stretching from New York City to Los Angeles. During just 1 year enough of the Colorado River's water to fill it could be stopped from flowing downstream at the project's gigantic Glen Canyon Dam.

That is water that could not be used by southern California, Arizona, and Nevada because it would be withheld upstream and never reach them.

All this is true because the multi-billion-dollar project is designed to put approximately 48 million acre-feet of water in storage behind dams in Colorado, Utah, Wyoming, and New Mexico. Another 10 million acre-feet of water would be dissipated into thin air by evaporation during storage.

In all, 58 million acre-feet of water would not flow down the Colorado River from the upper basin States of Wyoming, Utah, New Mexico, and Colorado to the lower basin States or Arizona, Nevada, and California.

Yet so vital is this water in the lower basin that even today arid Arizona and California are before the United States Supreme Court litigating their rights to it.

California agrees that the upper basin is entitled to use some of that 58 million acre-feet, but contents that most of it must be left flowing down to the lower basin under provisions of a solemn contract entered into by these 7 States in 1922 known as the Colorado River Compact.

California's basic position is that she conforms to the compact and must insist that the States of the upper basin and the Federal Government do likewise in the planning and administration of the storage project. California thus is fighting only to preserve rights to water she already has and not for any new and additional water rights.

Relying on these existing rights, California carefully invested between one-half and three-fourths billion dollars of local money, not Federal money, for water projects calculated to make maximum use of her share of the Colorado River. Thereby, southern California was transformed from a semidesert into

an oasis constituting one of the Nation's key economic and agricultural regions, supporting millions who migrated to her borders from less hospitable climates.

As southern California continues to grow, her need for water becomes greater, not less. Should the bleak day ever come when her Colorado River water supply is cut off, on that day the jobs of the millions she supports will vanish and the value of everything they own that cannot be transported to another part of the country will be lost completely and forever.

That is why Californians in Congress are fighting so hard to prevent spending billions from the United States Treasury to build the upper Colorado project in such a manner as merely to transport the oasis of Southern California to Wyoming, Colorado, Utah, and New Mexico. In the process, financial ruin would be imposed on almost 6 million southern Californians. These States can plan their projects without this disastrous result and California demands that they do so.

The reason they have failed so far to do it is clear. To find a common ground for agreement among themselves, each of the upper basin States had to accept every project, good, bad, or indifferent, any of the others asked for. They ended up with a monstrosity that did not fit the interpretations and meaning of the Colorado River compact. Rather than recede, they adopted a technique of twisting, straining, and distorting the compact in an attempt to stretch it over the monstrosity.

The reason they have adopted this technique is not so clear. To understand it requires some knowledge of the Colorado River compact and the situation that produced it.

Early in this century southern California already had begun its miraculous expansion in population, agriculture, and industry. A water shortage was faced, and Los Angeles began reaching up into the Owens Valley for water to be transported through an aqueduct over 100 miles long. Even then, men of vision foresaw water needs beyond those satiable from the Owens Valley and began talk of more ambitious plans. Plans which 1 day would result in such great works as Hoover Dam, Davis and Parker Dams, the All-American Canal, and the Metropolitan Water District's vast Colorado River aqueduct with its extensions reaching even as far as San Diego.

Meanwhile, the upper basin States were experiencing little growth or progress. A Supreme Court decision had laid down a rule of law respecting use of river waters which said that whoever first begins using them obtains a right to continued use that cannot be taken away by someone who later wants to use the same water. The upper States foresaw burgeoning southern ralifornia acquiring first rights to almost all the river's water before they were able to appropriate uses themselves.

In this circumstance, according to the language of Delph Carpenter, Colorado's negotiator of the compact:

"The upper States had but one alternative, that of using every means to retard development in the lower States until the uses within the upper States have reached their maximum."

And that exactly is what they did. The Boulder Canyon Project Act authorizing Hoover Dam was stalled in Congress for almost 10 years by the obstructive tactics of upper basin Senators and Congressmen. It was passed only after tribute had been extracted from California and the lower basin in the following manner:

First, imposing the Colorado River compact which removed at least 7½ million acre-feet of water from appropriation by them; and

Second, requiring the California Legislature to pass a law further limiting the amount of water to which the State could acquire first rights.

The net effect was to place on California a limit of slightly less than 5½ million acre-feet of water per year that she could use. Thus limited, the State had to jettison many desirable projects. Nevertheless, California went to work and tailored her developments on the river strictly to the limitations and to the intent and meaning of the Colorado River compact. Even with only a portion of the great dreamed of projects built, no place in time or history has experienced developments of water resources comparable in scope and magnificence to those of southern California.

It is the water rights which underlie those developments that Californians seek to protect when they oppose the upper Colorado River storage project and charge that it tramples these rights.

Briefly, the upper Colorado River storage project now before Congress seeks the construction of 11 irrigation projects in the so-called upper basin States of

Wyoming, Utah, New Mexico, and Colorado. These would irrigate about 200 square miles of new land and supply supplemental water to about 400 square miles of land irrigated inadequately at present. They are known as "participating projects."

According to Government experts, they would cost about $300 million and that amount would be repaid to the United States without interest over a 50-year period as required by reclamation law and precedent.

The participating projects would use an estimated 400,000 acre-feet of Colorado River water a year for irrigation, domestic, and industrial purposes. This amount is well within what the upper basin is entitled to use and California cannot object on that score.

There is, however, a "but" to the proposal, and it is a big one. It is that revenues from the sale of water from the 11 participating projects during the 50 years would bring in only about 15 percent of the money needed to repay the Government for its investment.

As a consequence the proponents of the projects had to look elsewhere for an additional source of revenue to pay the remaining 85 percent of the price tag within the time limit. They seized on the idea of building vast power dams and utilizing the revenues from the sale of power for this purpose. In the proposals before Congress, these are called storage projects to obscure their true cash-register nature.

As a starter, 2 power projects are proposed—1 at Glen Canyon and 1 at Echo Park, within the boundaries of Dinosaur National Monument. Other power projects would follow later.

The Glen Canyon and Echo Park power projects are unrelated in any way to the 11 participating projects, except as cash registers. The latter could function to supply water entirely without Glen Canyon and Echo Park. Yet Congress is being asked to spend about $600 million additional for the power features for the sole purpose of paying the $300 million participating projects' cost.

It is little wonder that alert citizens throughout the Nation, concerned over the Federal debt and high taxes, have voiced opposition to the scheme. Federal taxpayers would be better off if Congress makes an outright gift of the 11 participating projects to the upper basin States and forgets the power features completely.

It is with these power features that Californians have also a special concern. They would hold back, for power use, most of the 48 million acre-feet of water to be stored by the project. In the storage process, another 10 million acre-feet of water would disappear by evaporation. Thereafter, they would evaporate another 600,000 acre-feet of water per year, enough to supply the needs of a city of 3 million people. The magnitude of the evaporation is apparent when compared with the 400,000 acre-feet figure that is to be put to beneficial use by all 11 participating projects.

That is mostly water that thirsty southern Californians claim they are entitled to have flow downstream to their State and which cannot legally be withheld from them because of their prior right to it established by contract, appropriation, and the Colorado River compact.

The Colorado River compact was negotiated at Santa Fe, N. Mex., in 1922 by the seven States bordering on the river. It is a contract between these States and authority for such interstate agreements is found in the United States Constitution. Herbert Hoover, then winding up his affairs as World War I Food Administrator for starving Europe, acted as chairman during the negotiations.

The compact did not attempt to divide up water in the river as such, nor did it make any specific allocations of water as such to the States involved. Rather, it proceeded by regarding the river as consisting of three parts: First, the upper basin: Wyoming, Colorado, New Mexico, and Utah; second, the lower basin: California, Arizona, and Nevada; and third, that part of the river which crosses the international boundary and flows into the Republic of Mexico.

The dividing line between the upper and lower basins was fixed at a point called Lees Ferry in northernmost Arizona, near the Utah border.

Thereupon, the negotiators proceeded to apportion "beneficial consumptive use" of the river's waters between the basins. The compact nowhere defines "beneficial consumptive use," and its meaning is one of the issues in the pending Supreme Court suit by Arizona against California. In general, it amounts to use of water for irrigation, industrial, or domestic purposes.

That kind of use of water in the amount of 7½ million acre-feet yearly was apportioned to each basin by the compact's article III (a). This totals 15

million acre-feet, and since that was not all the water the negotiators believed available, by article III (b) they permitted the lower basin to make use of an additional 1 million acre-feet of surplus water.

Having no authority to cut Mexico out of water to which she might legally be entitled, they wrote article III (c) saying Mexico was to have whatever might be determined by a later treaty. This, again, was to come out of "surplus," but if need be, equally out of each basin's III (a) apportionment. A subsequent treaty fixed Mexico's entitlement at 1½ million acre-feet a year.

At this point the negotiators had disposed of 17½ million acre-feet of water a year, but they thought there was even more in the river so in article III (f) they set up machinery for "a further equitable apportionment" of remaining water at a later date. Subsequent experience with the river has shown not only that this additional water is nonexistent, but also that part of the apportioned water likewise is nonexistent. The river in fact averages a critical deficiency of almost 2½ million acre-feet a year.

Unless she desires to enter into a one-party "suicide pact" California must resist to the utmost the upper basin's bold attempt, by means of the upper Colorado Basin storage project as now planned, to charge almost all this deficiency against California's preexisting water rights.

Unfortunately, this is only one of many ingenious ways in which the attempted invasion of California's water rights is being conducted. There are about a dozen other provisions in the compact on which upper basin proponents are placing weird interpretations trying to deny California and the lower basin even more water. Illustrative is the dispute involving article III (d).

Since the flow of the river varies widely from year to year, lower basin negotiators insisted on guarantees preventing the upper basin from manipulating its uses between wet and dry years to the disadvantage of the lower basin. This turned up as article III (d) prohibiting the upper basin from depleting the amount of water flowing past Lee Ferry below a total of 75 million acre-feet in any period of 10 consecutive years.

In their desperate water grab, project proponents now contend this proviso, rather than amounting to a minimum guarantee to the lower basin, amounts to the maximum amount of water they are required to turn down the river. They say they can keep everything in excess, storing it for power purposes or making any other use or nonuse they desire.

They persist in this contention even in the face of an interpretation of the compact made by Herbert Hoover at the time it was negotiated in his words as follows:

"* * * The compact provides that no water is to be withheld above what cannot be used for purposes of agriculture. The lower basin will therefore receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes. * * *"

In the past, California has not opposed upper basin developments. Many projects in Utah, New Mexico, Wyoming, and Colorado have passed Congress without an objection from the Golden State. But when schemes are proposed such as this that cut deeply into the vital water supply, like a man attacked in his own home, Californians must command their every means and skill for self-preservation.

That the proposed upper Colorado Basin storage project would euchre California out of vast quantities of Colorado River water to which she is legally entitled is well known and understood.

Two additional specific objections to the project must not be ignored by Californians:

(1) It threatens seriously to impair the quality of water, if any, southern California might receive from the river after project construction; and,

(2) Power generating capacity at Hoover Dam would be curtailed and the lost power would have to be replaced at a cost of millions to southern California consumers.

No one contends the quality of the water even now received from the Colorado River approaches excellence. Millions of dollars have been spent for purifying devices to remove hardening alkalis and salts before use in homes and factories. Yet witnesses for the Bureau of Reclamation have told Congress they neither concern themselves with water quality nor recognize any responsibility whatever to operate the proposed project with regard to this vital subject.

Only after searching cross-examination would they admit that their files contained no more than the most sketchy information on the subject. Based on it they reluctantly confessed even the initial features of the overall project would

raise these impurities by a thumping 12 percent when the water reaches California.

That figure would jump to 54 percent if additional projects now in the planning stage are added to those presently under consideration.

The reasons why southern California's water quality would suffer are simple: First, water returning to the river after new upstream irrigation uses would contain added impurities dissolved from the soil. Second, pure upstream water diverted in large amounts through mountains and out of the river system forever would not be available to dilute concentrated impurities further downstream. Third, water withheld in upstream storage reservoirs would likewise be for dilution purposes.

Competent engineers estimate 1.2 tons of alkali and salt would be added to every acre-foot of water available for use in southern California.

Irrigators use at least 3 acre-feet of water per acre in a year to grow their crops. That would deposit 3.6 tons a year of such impurities on every acre. Just how long soil could continue growing crops in face of this is speculative.

The effect would be similar in home and industrial water systems, to say nothing of the already irritated digestive tracks of almost 6 million southern Californians.

Adding further insult to these injuries, the project would cost home and industrial customers of the Southern California Edison Co., the Los Angeles Department of Water and Power, and other Hoover Dam power contractors an extra $2 million a year in higher electric rates. Gilmore Tillman, assistant Los Angeles city attorney, places the exact figure at $2,152,000 a year. This would be the cost of fuel oil burned in steam generating plants for replacement power, less what would have been paid for the same amount of Hoover power.

At the same time, and for the remaining life of the power contracts at Hoover Dam (until 1987) the Federal Government, and thus the United States taxpayers, would lose a total of $187 million in revenue from power not sold because there was no water to generate it.

This $187 million loss to taxpayers illustrates that there are substantial reasons not to build the upper Colorado River storage project in addition to those local to California. These reasons, shared by the citizens of all the 48 States, are varied and compelling.

Many people throughout the country find the project objectionable because Echo Park, one of its major power features, lies in the boundaries of Dinosaur National Monument. They point out that a precedent would be set for the invasion of any and all national parks and monuments by unsightly power facilities in disregard of the trust imposed on each generation of Americans to preserve these public shrines unviolated for future generations.

Naturalists also point to the possible destruction of, or at least damage to, Utah's famed Rainbow Natural Bridge during construction and operations at the Glen Canyon power site.

In their turn, taxpayer groups and economists attack the project's effect on Federal finances from several fronts.

Raymond Moley, one of ex-President Roosevelt's brain trust, has stated that by the time compound interest for 50 to 100 years is paid on the $1 billion the United States must borrow to construct the project, costs will run to not less than $4 billion. Even simple interest at 2½ percent amounts in 10 years to 25 percent of the money borrowed; in 40 years to 100 percent; and in 80 years to 200 percent.

Moley's figures indicate the total cost would amount to more than $5,000 per irrigated acre. So poor is most of the land, located as it is at high elevations where growing seasons are short, that even after irrigation its value will average only about $150 an acre.

In all, about 600 square miles would be irrigated to produce surplus crops involving further losses to taxpayers when purchased under price-support programs. Even if needed, certainly there lies somewhere within the borders of the entire United States another 600 square miles of land that could be brought under cultivation at a cost significantly less than $4 billion.

Project proponents point out that the Government can expect to recoup part of its outlay by selling electricity from power features. However, their calculations are based on selling power for 6 mills per kilowatt-hour for the next 75 or more years. This anticipation is utterly unrealistic because production cost of electricity from both conventional and nuclear fuels is plummeting. With these costs at far below 6 mills in the foreseeable future, the net effect will be

to leave the project's vast hydroelectric facility on the backs of Federal taxpayers as the most monumental white elephant in history.

There is a further fundamental concern pointed to by economists which must be faced both by the Nation and the people living in the upper basin who are even more directly involved. It is that the region is unbelievably rich in natural resources: coal, oil, natural gas, oil shale, uranium, gold, silver, copper, lead, zinc, molybdenum, vanadium, phosphate, and many other minerals.

The resources utilized toward development of an unlimited industrial economy, not a limited farm economy, are the real keys to the area's future and to its full contribution to the American way of life.

Water resources in the area are of measurable quantity and their potential benefits in an agricultural economy not great. On the other hand, the benefits which they can bring in a program of industrial expansion are immeasurable.

Should not this region, and must not the Nation, insist that the course of development be pursued which is to the greatest good of all?

It is clear that Californians must oppose the upper basin storage project to protect the quantity and quality of their Colorado River water supply and to protect an important source of their electric power.

It is equally clear that all other Americans should join in this opposition for protection of the Nation's finances and in pursuance of a sound national policy to develop each part of our homeland to its own, and to the country's highest good.

The whole upper Colorado project must be revamped to the end that it ultimately will produce results instead of merely consequences.

In so demanding California seeks only to protect its rights to Colorado River water as established by appropriation and by contract in the amount of 5,362,000 acre-feet annually.

California does not seek any additional water or any water rightfully belonging to any other State.

California cannot accept these proposals for the upper basin because they threaten substantially to invade and impair California's rights to the 5,362,000 acre-feet annually both as to quantity and quality of water.

The upper basin development almost totally disregard the rights of the lower basin in general, and California in particular.

Raymond Hill, a consulting engineer retained by the State of Colorado is on record that if these contemplated upper basin developments are made, less than 5 million acre-feet annually will be left for division between Arizona and California, to satisfy claims exceeding 8 million acre-feet.

The overall upper basin proposal would result in the upper basin States using at least 1.5 million acre-feet more water annually than their entitlement under the Colorado River compact of 1922.

Additional and separate transmountain diversion projects such as the Fryingpan-Arkansas, when combined with the central Utah phase of the current legislation threaten serious impairment of the quality of Colorado River water available to California.

The major power dams and reservoirs in the legislation contemplate storage of about 3 years' total flow of the river at Lee Ferry. Mere filling of these reservoirs would substantially reduce the lower basin's water supply.

The withheld water would not be available for power production for Hoover, Davis, and Parker Dams, and thus curtail power revenues.

The withheld water would not be available for irrigation or domestic uses.

In both cases vested rights and commitments in the lower basin could not be met and operation of existing developments would be impaired even after the reservoirs were filled.

Gov. Ed C. Johnson of Colorado in a statement made December 20, 1954, said storage of water in the upper basin for power production, as contemplated in the legislation, violates the compact which permits no withholding in the upper basin of water needed for beneficial consumptive use in the lower basin.

The only function for many years to come of the power dams would be the generation of electric power.

California is entitled to have the river administered to protect its rights both to quantity and quality of water. California agencies have tremendous investments in water and power facilities on the river which must be preserved.

The proposal also is objectionable on economic grounds. The cost involved averages about $1,000 per irrigated acre on the irrigation allotment alone. Water uses could repay only about 15 percent of this amount. The entire project,

including interest charges on borrowed money, would involve a Federal subsidy of about $4 billion, or about $5,000 per acre.

The pending bills seek to establish feasibility and repayment standards for reclamation projects which depart materially from existing law. Therefore the bills involve a fundamental matter of national reclamation policy which is already under study by the Hoover Commission and the President's Cabinet Committee. The recommendations of these should be awaited before Congress plunges ahead to establish new policy.

The upper basin States actually are trying to engineer a huge grab of Colorado River water in excess of their rightful share, based on strange and strained interpretations of the compact, which right now are before the Supreme Court.

Reduced to its essence, the proposal amounts to no more than a money grab to support a water grab.

Specifically these bills authorizing the upper basin storage project in its present form are objectionable because—

1. They are predicated upon interpretations of the compact which are now at issue before the Supreme Court in *Arizona* v. *California*.

2. These interpretations are prejudicial to and may seriously impair California's rights under the compact as she interprets them—to the peril of existing projects costing nearly three-quarter billion dollars which were built following California's interpretations.

3. The proposed projects are economically and financially unsound at this time, and might cost California taxpayers $372,800,000 of the total $4 billion cost of the projects when hidden subsidies are included.

As before mentioned, California's position today is similar to that of the upper basin States 35 years ago when California was trying to get approval of the Boulder Canyon Project Act. They opposed the legislation from 1919 to 1928 to get in all the protection they believed they were entitled. They were seeking protection for future developments, but today California is only seeking to protect its contract and appropriative rights for existing projects.

It should be noted that current records indicate there is less water in the Colorado River System than was believed at the time of the compact. This changed situation was apparent in the 1940's when the Mexican Water Treaty was under consideration. Nevertheless, the upper basin States endorsed it and thus Mexico was granted a million more acre-feet per year than she had ever been able to get from the natural flow of the river. The result is that the water supply available for use in the upper and lower basins is correspondingly reduced and thus compact interpretations become even more important.

Legal Issues

HISTORICAL BACKGROUND

The legal disputes here between the upper and lower basins with respect to the storage project and between Arizona and California in the Superme Court case turn on conflicting interpretation of the Colorado River compact and the Boulder Canyon Project Act, which, ironically, were supposed to settle the conflict between the upper and lower basins.

DEVELOPMENTS PRIOR TO 1922

Irrigation in lower basin developed early and by 1916 the whole natural flow of the river had been appropriated and the river was dry for long periods in the summer at the Mexican boundary.

But spring floods deposited large amounts of silt, raised the riverbed several feet at a time and menaced the Imperial Valley, which is below sea level. Same for Yuma Valley in Arizona.

Junior appropriators in the upper basin faced probable lawsuits from senior appropriators in the lower basin. A great storage dam was needed not only to control floods, but to make possible any further development in either basin, as well as for power generation.

But the upper basin, knowing the lower had a 2 to 1 population ratio (now over 4 to 1) better lands, and so forth, rightly feared that if floodwaters were stored, the lower basin would promptly appropriate and use them unless in some way the upper basin could be insulated from the law of priority of appropriation.

This law, which is "first in time, first in right" was announced by the Supreme Court in 1922 in *Wyoming* v. *Colorado*.

THE COLORADO RIVER COMPACT

The Colorado River compact was signed in 1922, subject to ratification by the seven States involved and the consent of Congress.

Article II defined the Colorado River system as including the main stream and its tributaries, with the dividing lines between basins at Lee Ferry. States in the respective basins are in the same "division," upper or lower. But division is not synonymous with basin.

The negotiators did not allocate water.

They agreed on the idea of allocating beneficial consumptive uses (without defining them) instead of the flow of the stream. They did not allocate amongst the States as such, but made a general division as between the upper and lower basins.

Article III (a) apportioned beneficial consumptive use of 15 million acre-feet of water per annum equally between the basins, to include any rights which may now exist. This got rid of the first-in-time, first-in-right rule, which protection the upper basin had demanded.

Article III (b) permitted the lower basin to increase its use of waters of the system by 1 million acre-feet per annum.

These 2 paragraphs disposed of 16 million acre-feet of which 15 million was insulated against the law of appropriation. The negotiators believed there were about 20 million acre-feet in the river, and did not attempt to dispose of all of it.

Article III (c) provided the Mexican burden, when established by treaty, should be met by water surplus to the 16 million acre-feet and, if insufficient, the deficiency was to be borne equally by the basins out of their III (a) entitlements.

Article III (d) provided that upper States would not deplete the flow at Lee Ferry below 75 million acre-feet in any consecutive 10-year period.

Article III (e) said upper division States would not withhold water, nor lower division States require delivery of water, which could not reasonably be applied to domestic and agricultural uses.

Article III (f) provided for a later equitable apportionment by unanimous consent, after October 1, 1963, of beneficial uses of the system not already apportioned if at that time upper basin should reach use of 7.5 million acre-feet per annum, or the lower basin 8.5 million acre-feet.

Article III (g) provided mechanics for calling a conference to make later apportionments.

Article IV provided that water might be impounded for power uses, but said "such impounding and use shall be subservient to use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominent purposes."

Article VII said "nothing in the compact shall be construed as affecting the obligation of the United States to Indian tribes."

Article VIII provided "present and perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact."

Article XI provided that the compact should become binding when ratified by the legislatures of all seven States and when Congress should give its consent.

RATIFICATION BY SIX STATES, REJECTION BY ARIZONA

In 1923 all States but Arizona ratified the compact. In 1925 the other 6 States, at Colorado's suggestion, ratified it again as a 6-State document and presented it to Congress in that form.

THE BOULDER CANYON PROJECT ACT

The Boulder Canyon Project Act was enacted in December 1928, but provided that it should not take effect unless at the end of 6 months the President should declare the Colorado compact had been ratified by all 7 States, or failing that, by 6 States including California, and in the latter event, California had passed an act limiting its use of the river.

In short, in 1922 the upper basin had demanded a 7-State compact as the price of construction of Hoover Dam. Failing to get it, they demanded and got a second price from California, the Limitation Act. This was to avoid letting California and Nevada use up the apportioned lower basin water while Arizona raided the river outside the compact by establishing priorities over slower upper basin developments.

There are defferences between the 6- and the 7-State compacts.

Whereas the 7-State compact made no allocations to States, the Project Act recognized California's right to specified quantities and required her to limit herself thereto, i. e. the use of 4,400,000 acre-feet of article III (a) water and one-half the excess or surplus water unapportioned by the compact.

As to the latter, the compact in article III (b) talked of 1 million acre-feet. The Project Act, however, talked only of one-half the surplus, which might be more or less, without making any specific reference to article III (b).

The compact did not define "consumptive use," but the Project Act did define it as "diversions less returns to the river."

Whereas article IV (c) of the compact envisages "State regulation and control" of the river, the Project Act directed no one should use the stored water except by contract with the Secretary of the Interior, who was directed to make such contracts in accordance with the Limitation Act. He also was directed to use the Lake Mead Reservoir for satisfaction of "present perfected rights in pursuance of article VIII of the Colorado River compact."

California passed the required Limitation Act in 1929 to take effect only in absence of a 7-State ratification. The resulting agreement is referred to as the statutory compact as distinguished from the Colorado River compact.

On June 25, 1925, the President proclaimed the failure of the 7-State ratification and the completion of 6-State ratification, which effected authorization of Hoover Dam and the All-American Canal on the condition that beneficiaries contract in advance to repay costs. Water and power users in California did so in 1930.

The water contract now under attack by Arizona in the Supreme Court case disposed of 5,362,000 acre-feet, equal to 4,400,000 acre-feet available under III (a) and about 1 million acre-feet of excess or surplus available under the Limitation Act.

PROJECTS PAID FOR BY CALIFORNIA

Since California went ahead with its projects relying on the foregoing and incurred the obligation to pay for them which amounts to about three-fourths billion dollars, the State is highly concerned with the proposed interceptions of water by the upper basin which might well withhold enough water to wreck the projects financially.

The projects involved are:

(1) Hoover Dam, cost underwritten by water and power users of southern California. Its transmission lines were built by California agencies.

(NOTE.—Arizona and Nevada subsequently have withdrawn 36 percent of the power thus underwritten by California power contractors.)

(2) Parker Dam, about 155 miles below Hoover Dam, paid for by the Metropolitan Water District of Southern California.

(3) The Colorado River aqueduct, built and paid for by the metropolitan water district to carry water some 300 miles from Parker Dam to about 60 cities and districts, including Los Angeles and San Diego.

(4) The Palo Verde Irrigation District, which has the oldest rights on the river and has been diverting water since about 1877.

(5) The All-American Canal, located 303 miles below Hoover Dam and 22 miles above the Mexican border. It transports water into the Imperial and Coachella Valleys. It was built by the United States as part of the Boulder Canyon project, but the local districts were required to underwrite the cost in advance.

The amount of water which California lays claim to by contract with the United States and upon which these projects were based is 5,362,000 acre-feet per year. It is this amount that California seeks to defend in connection with the upper basin proposals.

Almost 6 million southern Californians depend on this water. They live in an area in which the assessed valuation exceeds $12 billion. Their economy is dependent on the permanent availability of these waters. They will soon be looking for water from other sources as what is now available even from the Colorado is insufficient to meet the rate of growth.

These works were built in reliance on the compact and Project Act. The pending case of *Arizona* v. *California* in the Supreme Court involves interpretations of these documents. The pending legislation involves the same interpretations which presumably the decision of the Supreme Court will control.

SUMMARY OF ARIZONA *v.* CALIFORNIA

ISSUES AND PLEADINGS

The pleadings filed by Arizona, Nevada, the United States, and California, to date, disclose complex questions of fact and law, many of which are interrelated. The summary of principal questions presented below is divided into four parts: (I) the quantities of water in controversy; (II) the ultimate issues, from the standpoint of the respective prayers; (III) a tabulation of factual issues; and (IV) the issues of interpretation of the basic documents involved. Under this division, certain questions reappear and to this extent reflect the interlocking nature of the problem.

I. The quantities of water in controversy

The United States seeks to quiet title to rights to the use of water, consumptive and otherwise, "as against the parties to this cause," for Federal purposes, in unstated amounts.

Arizona seeks to quiet title to the beneficial consumptive use of 3,800,000 acre-feet per annum of the waters of the Colorado River system (measured by "man-made depletion of the virgin flow of the main stream") and to enjoin California's right to permanently use any water in excess of approximately 3,800,000 acre-feet per annum (measured by "diversions less returns to the river"), that being the effect of (1) reducing 4,400,000 acre-feet of III (a) water by reservoir losses, and (2) denying California any permanent right to use excess or surplus waters.

California asserts a right to the beneficial consumptive use in California of 5,362,000 acre-feet per annum of the waters of the Colorado River system (measured by diversions less returns to the river) under contracts with the United States, comprising 4,400,000 acre-feet of the waters apportioned by article III (a) of the Colorado River compact and 962,000 acre-feet per annum of the excess or surplus waters unapportioned by the compact, including in such excess or surplus the increase of use permitted to the lower basin by article III (b) of the compact.

Nevada seeks to quiet title to 539,100 acre-feet per annum (measured in part by both methods) of the beneficial consumptive uses apportioned by article III (a) of the Colorado River compact, and to not less than a total of 900,000 acre-feet from all classes of water.

As the States differ in their definition of beneficial consumptive use, their claims require restatement in terms of a common denominator in order to evaluate their effects. Thus:

The quantity to which Arizona seeks to quiet title, 3,800,000 acre-feet per annum, measured by the method she urges, "depletion of the virgin flow of the main stream occasioned by the activities of man," is equivalent to more than 5 million acre-feet measured by consumption at the site of use, or "diversions less returns to the river," the standard established by the Boulder Canyon Project Act and asserted by California. The difference is due primarily to the fact that under Arizona's interpretation, the compact deals with the virgin flow in the main stream only and that the use of water salvaged by man is not charged as a beneficial consumptive use, whereas under California's interpretation the compact deals with the waters of the entire river system and such salvage is so charged.

Conversely, the aggregate of the California contracts, 5,362,000 acre-feet per annum, measured by diversions less returns to the river, is equivalent to only about 4,500,000 acre-feet measured by man-made depletion (without charge for salvaged water). If Arizona's prayer should be granted, California's right would be reduced to about 3,800,000 acre-feet per annum, measured by diversions less returns to the river, or to about 3 million acre-feet measured in terms of depletion of the virgin flow of the main stream.

The impact of Nevada's claims on those of the other States is not readily evaluated.

II. Ultimate issues

The ultimate issues, in the sense of the results sought by each party, may be grouped as follows:

The United States

Does the United States have rights, as against the parties to this cause, to the use of water in the Colorado River and its tributaries in the following categories?

(1) For consumptive use of all projects in the lower basin, which it asserts independently of any rights claimed by the States in which such projects are located;

(2) to fulfill its obligations arising from international treaties and conventions; but this involves, with respect to the burden of the Mexican Water Treaty, the obligations as between the States of the upper division and the States of the lower division under articles III (c) and III (d) of the Colorado River compact, and involves also the effect of the so-called escape clause of article 10 of that treaty, which allows reduction in the guaranteed deliveries to Mexico, in the event of extraordinary drought, in the same proportion as consumptive uses in the United States are reduced, consumptive uses being defined in article 1 of the treaty;

(3) to fulfill all its contracts for the delivery of water and electric power, i. e., with or in Arizona, California, and Nevada; but it alleges that the water available is not sufficient to satisfy all these obligations;

(4) to fulfill the Government's obligations to Indians and Indian tribes; but this involves not only the questions of the magnitude and priorities of these claims but the questions of whether or not they are chargeable under the Colorado River compact to the basin and State in which such uses are made, what the obligation of the upper division States may be to release water for use by Indians in the lower basin, and what rights the United States may have to withhold water in reservoirs in the upper basin for use by Indians in both basins;

(5) to protect its interests in fish and wildlife, flood control, and navigation; but such rights as it may have for these purposes may require the impounding and release of water from reservoirs in both basins, and not merely reservoirs bordering or within Arizona and California, and again involves the question of accounting under the compact; and

(6) for use of the National Park Service, Bureau of Land Management, and Forest Service; but if the United States has claims "as against the parties to this cause" for these functions, such claims apply to all the waters of the Colorado River system in both basins.

The adjudication of these claims of the United States requires consideration and resolution of questions of fact, referred to later; the power of the United States to impound and dispose of water independently of rights derived from the States; the extent of its obligations under treaties and contracts; the impact and effect of its treaties upon rights of domestic water users; how its claims to the use of water shall be measured; the location, magnitude, and priorities of Indian claims, and claims for other alleged Federal purposes; the extent to which its rights and obligations are controlled by the Colorado River compact; and the extent to which its claims may be exercised in futuro in derogation of intervening rights and uses.

Arizona

Is Arizona entitled to a decree:

(1) Quieting title to 2,800,000 acre-feet per annum of the beneficial consumptive uses apportioned to the lower basin by article III (a) of the Colorado River compact, substantially all to be taken from the main stream, and measured in terms of man-made depletion of the virgin flow of the main stream?

(2) Quieting title to all of the 1 million acre-feet per annum by which the lower basin is permitted to "increase its use" by article III (b) of the Colorado River compact (notwithstanding the decision of this court in *Arizona* v. *California et al.* (292 U. S. 341 (1934)), to the exclusion of the other States of the lower basin, all to be taken from the waters flowing in the Gila River, and to be measured in terms of man-made depletion of the virgin flow of the main stream?

(3) Reducing California's right to the uses apportioned by article III (a) of the Colorado River compact to approximately 3,800,000 acre-feet per annum in consequence of reservoir losses?

(4) Enjoining California's right to receive and permanently use under its Government contracts 962,000 acre-feet per annum, or any part thereof, in excess of 4,400,000 acre-feet per annum?

The determination of Arizona's claims involves the questions of fact, later referred to; the standing of Arizona to seek a declaratory decree quieting title to a "block" of water for projects not yet constructed or authorized (about 1,600,000 acre-feet per annum of the 2,800,000 claimed from the main stream); the source of title to Arizona's claims to 2,800,000 acre-feet of III (a) water and 1 million acre-feet of III (b) water; the status of the uses on the Gila; the

measurement of uses thereof and of the main stream; whether Arizona's status is that of a party to the Colorado River compact or that of a third party beneficiary of the statutory compact between the United States and California, and if so, whether Arizona is bound by the interpretations placed thereon by the principal parties thereto in its formulation and administration; and the validity and effect of Arizona's water-delivery contract with the United States.

Most of the questions posed by Arizona's claims revolve around the issue of whether the Gila River shall be treated as a part of the Colorado River system for all purposes, or shall receive special treatment in respect of (1) the identification of uses thereon with the waters referred to in article III (b); (2) the corollary exemption of "rights which may now exist" on the Gila from any charge under article III (a); and (3) the devaluation of the charge for beneficial consumptive uses from the quantity which is in fact consumed on the Gila (alleged by California to be about 2 million acre-feet per annum) to the lesser quantity represented by the resulting depletion in the virgin flow of the main stream (alleged by Arizona to be about 1 million acre-feet per annum).

California

Are the contracts between the United States and the defendant public agencies of California for the storage and delivery of water valid and enforceable? Inasmuch as these contracts are, in terms, for permanent service but subject to the Colorado River compact, the Boulder Canyon Project Act, and the California Limitation Act, the issue is whether these enactments, considered together as a statutory compact established by reciprocal legislation, authorize and permit the Secretary of the Interior to presently contract for the storage and delivery for permanent beneficial consumptive use in California, of 4,400,000 acre-feet per annum of the waters apportioned by article III (a) of the Colorado River compact plus one-half of the excess or surplus waters unapportioned by the compact, including in such excess or surplus the "increase of use" permitted to the lower basin by article III (b) of the compact. The aggregate of these contracted quantities, subject to physical availability of the amounts of excess or surplus waters, which vary from year to year, is 5,362,000 acre-feet per annum.

The determination of California's claims involves: the questions of fact, later referred to; the extent to which rights have vested in both the United States and California under the statutory compact; whether Arizona is estopped by her previous conduct from asserting her present position; whether the limitation is net of reservoir losses; how California's uses shall be measured; whether California is chargeable with the use of salvaged water; the effect of California's appropriations, in their relation to the expressions "rights which may now exist" and "present perfected rights" in the compact and project act; the definition of the project act term, "excess or surplus waters unapportioned by" the Colorado River compact; the availability of such waters for permanent service; the intent of Congress with respect to the waters referred to in article III (b); and the relation between California's contracts and the later agreements which the Secretary of the Interior has entered into with others.

Nevada

Is Nevada entitled to a decree:

(1) Quieting title to 539,100 acre-feet per annum of the beneficial consumptive uses apportioned to the lower basin by article III (a) of the Colorado River compact?

(2) Reserving for a future agreement the disposition of the use of the 1 million acre-feet referred to in article III (b) of the Colorado River compact, and preserving to Nevada an equitable share thereof?

(3) Assuring Nevada the ultimate beneficial consumptive use of not less than 900,000 acre-feet per annum, from all classes of water?

The determination of Nevada's claims requires the consideration and resolution of: the questions of fact later referred to; the questions of interpretation previously mentioned; the question of whether Nevada's share of III (a) waters has been determined or limited to 300,000 acre-feet per annum; whether, as to stored waters, Nevada may claim any quantity in excess of her contracts with the United States; and the source of title to her claims to 539,100 acre-feet per annum of III (a) water and not less than 900,000 acre-feet per annum from all sources.

Interests of other States

There remains the question whether the claims of the United States, Arizona, California, and Nevada can be effectively determined without concurrently deter-

mining the rights and obligations of Utah and New Mexico with respect to the waters of the lower basin, and the rights and obligations of those States and Colorado and Wyoming with respect to other waters of the Colorado River system, to the extent that they are affected by the issues in controversy here.

In more detail, these ultimate issues depend upon the resolution of the following questions of fact and of the interpretation of the Colorado River compact, the Boulder Canyon Project Act, the statutory compact between the United States and California, and the Mexican Water Treaty.

III. Factual issues

There are substantial issues of fact, raised by the pleadings to date. These include, but are not limited to, determination of—

(1) the investments and obligations undertaken by the parties in the construction of works and in the performance of their contracts with the United States, and the investments and obligations undertaken by the United States in reliance upon such contracts;

(2) the location, magnitude, and priorities of the water rights necessary to enable the United States to perform its obligations to Indians and Indian tribes pursuant to article VII of the compact;

(3) the requirements of the United States for (*a*) flood control, (*b*) navigation, (*c*) fish and wildlife, and (*d*) the other claims which it makes;

(4) the quantities of water physically available for beneficial consumptive use in the lower basin, assuming full use by the upper basin of its compact apportionment, full regulation of the supply available to the lower basin, and full performance of the Mexican Water Treaty;

(5) the uses, present and potential, on the main stream and on each tributary, determined as of the place of use, as California contends is the proper method, and the effect of those uses in terms of manmade depletion of the virgin flow of the main stream, as Arizona contends is the proper method;

(6) the quentities of water "salvaged" by the activities of man, on the main stream and on the tributaries;

(7) reservoir losses, present and potential, gross and net;

(8) appropriative rights, priorities, and uses thereunder, on the main stream and tributaries;

(9) the extent and place of use of "rights which may now exist" and which, under article III (a) of the compact, are to be charged as uses of water apportioned by article III (a), and of "rights which may now exist" in California, within the meaning of section 4 (a) of the Project Act; and

(10) the extent and place of use of present perfected rights protected by article VIII of the compact and directed by the Boulder Canyon Project Act to be satisfied in the operation and management of the project.

IV. The issues of interpretation of the Colorado River compact, the Boulder Canyon Project Act, the statutory compact, and the Mexican Water Treaty

Questions relating primarily to article III (a) of the Colorado River compact include the following: Whether the Colorado River compact deals only with the main stream or treats with Colorado River system waters wherever they may be found; whether the uses apportioned by article III (a) to the lower basin are to be taken only from "water present in the main stream and flowing at Lee Ferry," as Arizona contends, or from the tributaries as well, as California and Nevada contend; whether the 7,500,000 acre-feet referred to in article III (a) is related to the 75 million acre-feet referred to in article III (d), as Arizona contends, or whether the latter figure includes excess or surplus waters unapportioned by the compact, as California contends; by what process Arizona claims to have acquired an apportionment of 2,800,000 acre-feet of III (a) water, to be taken from the main stream; whether the apportionment of 7,500,000 acre-feet per annum is a statement of a maximum, or of an average, and, if the latter, over what period of years; the definition and measurement of "beneficial consumptive use"; the accounting for water added to and withdrawn from storage on the main stream and tributaries; whether the use of water salvaged by man on the main stream and tributaries is to be charged under the compact; the definition of "rights which may now exist," which are to be included in charges to water apportioned by article III (a) and their magnitude on the main stream and tributaries; the date to which this last expression refers; whether, in the absence of a compact among the lower-basin States, the

division of water among them is to be affected by appropriative rights, i. e., rights which may now exist; whether Indian rights, and other Federal claims to consumptive use, are included within that expression and are to be charged under the compact; whether reservoir losses are chargeable as beneficial consumptive uses, and if so, their classification under the compact and their relation to other uses.

Questions relating primarily to article III (b) of the Colorado River compact include the following: The questions relating to the definition of "beneficial consumptive use" and "per annum" previously stated in connection with article III (a); whether the "increase of use" permitted to the lower basin by article III (b) is an approtionment in perpetuity as in article III (a), as Arizona contends, or a license to acquire rights by appropriation and contracts under the Project Act in excess or surplus waters unapportioned by the compact, as California contends; whether this right to increased use is identified solely with the water found flowing in the Gila River, as Arizona contends, or is identified with the first 1 million acre-feet of increased use (above 7,500,000) per annum throughout the lower basin, as California and Nevada contend; whether this right is available to all five States of the lower basin, or to Arizona alone, as she contends (notwithstanding the decision of this Court in *Arizona* v. *California et al.*, 292 U. S. 341 (1934)); the status of uses in New Mexico on the Gila; the status of uses on other tributaries; and to what degree reservoir losses are chargeable to this increase of use. Reference to the relation of the Mexican Treaty burden to the uses under article III (b) appears below in connection with article III (c).

Questions relating primarily to article III (c) of the Colorado River compact include the following: Whether the waters to be supplied Mexico are apportioned thereby (this bears upon the determination of the meaning of the expression "excess or surplus waters unapportioned by" the Colorado River compact, appearing in the Boulder Canyon Project Act, infra); whether, if the quantities in excess of those specified in articles III (a) and III (b) are insufficient to supply the deliveries to Mexico, the burden, with respect to the lower basin, falls first upon the uses referred to in article III (b), as California contends, or upon those referred to in article III (a), as Arizona contends; and the relation of the escape clause in article 10 of the treaty, which permits reduction in deliveries to Mexico in case of extraordinary drought in proportion to the reduction in consumptive uses in the United States. The relation of article III (c) to articles III (d) and III (a), with respect to the obligations of the upper division States, is referred to below in connection with article III (d).

Questions relating primarily to article III (d) of the Colorado River Compact include the following: As a corollary to one of the questions stated with reference to article III (a), whether the 75 million acre-feet referred to in article III (d) is related to the 7,500,000 acre-feet apportioned by article III (a) to the lower basin, or whether the 75 million acre-feet include excess or surplus waters available for delivery to Mexico or use in the lower basin; the resulting effect on the obligation of the States of the upper division stated in article III (c) to furnish additional water to meet the deficiency if surplus above the quantities specified in articles III (a) and III (b) is insufficient to supply Mexico; and whether the lower basin is entitled to demand release of this 75 million acre-feet notwithstanding the consequent inability of the upper basin to make beneficial consumptive use of 7,500,000 acre-feet per annum.

Questions relating primarily to article III (e) of the Colorado River compact include the following: Whether, if excess or surplus waters are appropriated (or contracted for) in the lower basin, their release from storage in the upper basin may be required; whether, if Indian uses are not subject to the Colorado River compact, the United States may require release of water from reservoirs in the upper basin to satisfy them, in addition to the water which the States of the upper division are required to release in performance of articles III (c) and III (d) of the compact; so also with respect to the other Federal claims asserted by the United States as against the parties to this cause, for use of water in the lower basin.

Questions relating primarily to articles III (f) and III (g) of the Colorado River compact include the following: Whether the provisions in these articles with reference to a compact to be made after October 1, 1963, are permissive or mandatory; whether, in the light of the statutory compact, these provisions preclude the acquisition of rights in excess or surplus waters by appropriation and by contract with the United States in the interim, subject only to further apportionment as between basins by such a future compact; and whether, in the

event of competing interstate claims to such excess or surplus waters, in the absence of a compact apportioning them, priority of appropriation, including contracts with the United States, controls.

Questions relating to article VII of the Colorado River compact include the following: Whether uses by Indians are subject to the Colorado River compact: whether Indian uses are chargeable under the compact to the basin and the State in which they are situate; if not, whether they are prior and superior to the apportionments made by the compact, or are in competition with appropriations of others which are subject to the compact; the location, magnitude, and asserted priority of Indian claims; their effect upon the quantities available to non-Indian users under articles III (a), III (b), etc.; their effect on the distribution of the Mexican Treaty burden; and their effect on the obligations of the States of the upper division under articles III (c) and III (d).

Questions relating primarily to article VIII of the Colorado River compact include the following: The date to which the expression "present perfected rights" relates, i. e., 1922, 1929, or some other date; the definition of said term; whether such definition is to be determined under the law of the State under which the right arose; whether the assurance against impairment extends to quality as well as quantity; the extent of these rights in each State; their relation to the expression "rights which may now exist," as used in article III (a) of the compact and section 4 (a) of the project act; and the impact of reservoir losses when present "perfected rights" attach to, and are satisfied from stored waters, pursuant to the direction in article VIII.

Questions relating primarily to the Boulder Canyon Project Act and the resulting statutory compact between the United States and California include the following: Whether the alternative consent given in the project act to a 7-State or 6-State compact became final on June 25, 1929, in establishing the latter; whether Arizona could or did, effectively ratify a 7-State compact thereafter; if so, whether the statutory compact authorized by the project act as a corollary to a 6-State compact remains in effect; if it does, whether Arizona can claim the benefits of both; whether the statutory compact authorized contracts to be made with the California defendants for the permanent service (in addition to 4,400,000 acre-feet of III (a) waters) of one-half of the excess or surplus waters unapportioned by the compact for use in California; whether it included therein the waters referred to in article III (b), or precluded California from use of such waters; whether the "excess or surplus," of which California may use one-half, is to be reckoned before or after deduction of the quantity required to be delivered to Mexico; the effect on California's right to excess or surplus of a future compact apportioning such waters; whether the limitation "for use in California" is net of reservoir losses, or is subject to further reduction in consequence of such losses; whether the definition of consumptive uses applicable to California is applicable to Arizona, and vice versa; whether California is free to make use of salvaged waters without charge under the compact or the limitation act; the effect of California's appropriations; the meaning and effect of the reference to "rights which may now exist" in section 4 (a) of the project act; the extent of California's present perfected rights as referred to in section 6 of the project act; whether by the project act, or otherwise, the shares of Nevada or Arizona in the waters of the Colorado River system have been determined; and the construction and effect of the water delivery contracts held by those States.

Interpretations of the Compact Involved in the Court Case and in the Pending Upper Basin Legislation

(1) Method of Measurement of Consumptive Use

Article III (a) allocated "beneficial consumptive use" to both basins, so in each basin it should mean the same thing. Yet there is a sharp controversy as to whether it means:

1. The quantity in fact used, measured at place of use, or
2. The effect of that use measured in terms of stream depletion at Lee Ferry.

The same question arises under the Mexican Water Treaty's so-called escape clause.

This definition is at issue in the Supreme Court case.

According to engineer's estimates, it means a difference of 300,000 to 500,000 acre-feet in planning the upper basin storage project. The Bureau of Reclamation in its planning uses definition No. 2, whereas the Project Act and Mexican

Treaty use definition No. 1, which corresponds to California's definition. It is apparent that chaos will result unless definition No. 2 is adopted because the Mexico Treaty applies to both basins.

Another problem arises from definition No. 2: One of its postulates is that when water is stored, the stream below is depleted, thus the use takes place then and there. On that premise, to what years is the 48 million acre-feet of stored water to be charged? In future years how is the storage of more than 7.5 million acre-feet in any 1 year to be charged? Is the same principle, whatever it is, applicable to the lower basin reservoirs?

(2) MEANING OF "PER ANNUM" IN ARTICLE III

Does the III (a) apportionment of 7.5 million acre-feet per annum mean an average of that amount over a period of years, or a maximum in any one year?

Manifestly, the same interpretation must apply to both basins.

The Bureau of Reclamation in planning the upper basin storage project assumes that it means an average over an extended period, apparently 35 years or more. The effect of this theory is that upper basin may use about 9 million acre-feet or more of water in 1 year and consider it apportioned under article III (a), if it uses 6 million acre-feet or less in some other year to average out at 7.5 million acre-feet.

California says it does not mean that, but, like a speed limit on a highway, is a fixed and not an average amount, thus the upper basin cannot use more than 7.5 million acre-feet in any one year as III (a) water.

If it uses more, it is using unapportioned surplus in competition with the lower basin and the Mexican burden.

The amount involved in this particular issue is about 1,250,000 acre-feet.

So, if California is right, the Bureau of Reclamation is off this considerable amount in its planning.

It is to be noted that the Bureau of Reclamation applies the opposite definition in connection with operating the lower basin's projects. It cannot be right in both places, as the same definition must apply to both basins.

(3) "RIGHTS WHICH MAY NOW EXIST"

Article III (a) states that its apportionments "shall include all water necessary for the supply of any rights which may now exist."

This includes two uses in dispute in *Arizona* v. *California:*

(1) Uses on lower basin tributaries, particularly on the Gila River, which Arizona claims is not to be charged against III (a) water; and

(2) Indian uses in both basins.

(4) THE LOWER BASIN'S RIGHTS UNDER ARTICLE III (b)

Article III (b) permits the lower basin to increase its beneficial consumptive use by 1 million acre-feet per annum.

Arizona claims this is an apportionment, good in perpetuity against the upper basin.

California says it is not an apportionment, but a license to appropriate.

Arizona says all the III (b) water is in the Gila.

California says III (b) is applicable to the main stream and all the tributaries in the lower basin.

(5) THE GUARANTIES IN ARTICLES III (c) AND III (d)

Article III (c) provides the Mexican burden of 1.5 million acre-feet measured at the border (and more at Lee Ferry) shall be borne first out of surplus, then equally out of water subject to use under article III (a) apportionments.

Article III (d) requires the upper division States not cause the flow at Lee Ferry to be depleted below 75 million acre-feet during any period of 10 consecutive years.

The interpretation of these two clauses is at issue in the Supreme Court case as well as involved in the proposed legislation.

The Bureau of Reclamation assumes that its projects will cut the flow at Lee Ferry down to this 75 million acre-feet if it means what it says in House Document 364 of the 83d Congress. Arizona claims this is all III (a) water. California claims Arizona's water in the Gila and other tributaries and Nevada's and Utah's on the Virginia River is part of the apportioned river system,

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so some of the 75 million acre-feet must be surplus, subject to the Mexican burden.

If Arizona is right, at least enough additional to the 75 million acre-feet must be let down to satisfy the Mexican burden and any remaining III (b) appropriations not being used on the Gila and the Virgin Rivers.

California views the 75 million acre-feet as a minimum of "wet water," unclassified and unrelated to article III (a), to be met whether or not there remains enough water for III (a) uses in the amount of 7.5 million acre-feet per annum in the upper basin.

The upper basin views the 75 million acre-feet as fixing a maximum amount for the lower basin, anything over which she is entitled to keep.

Moreover, the view of some upper basin spokesmen apparently now is that article III (d) is not even a guaranty at all, and the apportionment to the upper basin in article III (a) takes precedence over it.

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Article III (e) says the upper division shall not withhold, and the lower division shall not require the delivery, of water which cannot reasonably be applied to domestic and agricultural use.

Article IV (b) provides that impounding and use of water for power generation shall be subservient to use and consumption for agricultural and domestic purposes.

Glen Canyon and other power-feature storage reservoirs will be so located physically that no water stored by them can ever be applied to domestic or agricultural uses in the upper basin. Yet all the water stored by them will be required for domestic and agricultural use in the lower basin and Mexico.

This appears to be a clear cut violation of article III (e) and article IV (b) as well as article III (b).

Governor Ed C. Johnson of Colorado agrees in his December 20, 1954, statement, to be discussed in detail later.

Yet the Bureau's planning is based on the assumption that the upper basin is entitled to deprive the lower basin of all main stream water in excess of 75 million acre-feet in each 10 year period.

This would allow the lower basin about 25 percent less water than it expected under the interpretations of the compact and the Project Act on which this same Reclamation Bureau relied in making water and power contracts in the lower basin, and in recommending Senate approval of the Mexico Treaty.

(7) APPROPRIATION OF SURPLUS

Article III (f) provides for further apportionment of water by unanimous consent after October 1, 1963. Does it mean that no State may validly appropriate surplus water until a new compact is made?

California says they may, subject to being divested by such a new compact or a court decree.

Arizona and Nevada say no State may acquire any right in surplus until the new compact is made.

If the latter are right, then upper basin cannot acquire any right in waters it may use in any year in excess of 7.5 million acre-feet.

Actually, under the compact, Project Act, and Mexican Treaty, all excess and surplus water physically in the system already has been appropriated or obligated to uses in the lower basin and Mexico.

(8) INDIAN RIGHTS

Article VII says nothing in the compact is to be construed as affecting the obligation of the United States to the Indian tribes.

The upper basin compact in its article VII provides that use by the Indians shall be charged against the State in which it is made, and California takes the same position in the Supreme Court case.

The United States has intervened in the Supreme Court case claiming 1,747,250 acre-feet for the Indians in the lower basin, of which 1,556,250 is in Arizona. The Government alleges that Indian water is "first water" and the compact covers what is left. The same is true as to about 1 million acre-feet of water in the upper basin.

Arizona goes along generally with the United States position in hopes of getting all the Indian water in addition to the 3.8 million acre-feet she demands under the compact. Just where all the water would come from is not clear.

The existence of these Indian claims, and the uncertainty as to their accounting, raises serious questions as to the water supply for both existing and future projects in either basin. Considering their magnitude, a decision in favor of the Indians would throw all seven States' water claims into wildest confusion.

The Supreme Court case must be decided before anyone will know what the situation is.

(9) PRESENT PERFECTED RIGHTS: QUALITY OF WATER

Article VIII says "present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact."

California contends in the court case that "unimpaired" refers to quality is well as quantity.

California alleges that as to quantity, her perfected rights at the effective date of the compact were not less than 4,950,000 acre-feet.

California further contends that as to quality her perfected rights at the effective date of the compact were to water of sufficient purity to continue growing the same type crops.

The river now contains about 1 ton of salts per acre-foot in the lower basin. This means that if 3.5 acre-feet of water is used in a year to irrigate an acre of land, there will be 3.5 tons of salt put on it. How much this salt content may be increased without harm is uncertain. It should be determined before going ahead with the bills.

The effect of transmountain diversions on quality is particularly uncertain and may be highly critical because they divert out the highest quality water from the basin.

There is no reliable data available on the effect of large transmountain diversion coupled with other upper basin uses on the quality of the water.

Such a study obviously is a prerequisite to determining whether or not the proposed projects would violate this claimed guaranty as to quality of water.

CALIFORNIA IS NOT DELAYING DETERMINATION OF ISSUES IN ARIZONA V. CALIFORNIA TO STALL THIS PROJECT

Charges have been made and probably will be reiterated against the good faith of California in pursuing the court case to a reasonably early decision. Our attorneys have been charged with practicing "chicanery" before congressional committees by quotation of a number of their statements, out of context, made during hearings held in 1948, 1949, and 1951. I want to set the record straight.

1. THE DOCKET SHOWS CALIFORNIA HAS NOT DELAYED PROGRESS IN ARIZONA *v.* CALIFORNIA

At the time of those hearings, of course, there was no suit in the Supreme Court. That suit was filed by Arizona in August 1952. We are charged with delaying the progress of the case. Here is the actual chronology:

Arizona filed its motion for leave to file its bill of complaint (and the bill of complaint) in August 1952. (The Court rules, in an original action, require the complainant to obtain the Court's permission to file its complaint.) The Court, upon convening in October, issued a rule to the California defendants to show cause why the bill of complaint should not be accepted for filing. In their return to the rule to show cause, filed in December 1952, the California defendants offered no objection to Arizona's motion for leave to file a bill of complaint, and, in fact, stated: "Defendants desire that the * * * action proceed to an effective judgment on the merits."

On January 19, 1953, the Court ordered the bill of complaint officially filed. California filed answer on May 19. On August 28 Arizona filed a reply.

On December 31, 1952, the United States of America filed a motion to intervene, which was granted on January 19, 1953. But not until the following December, a year later, did the United States actually file its petition in intervention, which was answered by Arizona in February of 1954 and by the California defendants in April of that year.

Meanwhile, the State of Nevada, in December 1953, filed a motion to intervene and a petition of intervention. The Court granted this motion on June 1, 1954.

On May 13, 1954, the United States filed a memorandum with the Court requesting a pretrial conference. That same month the California defendants filed a memorandum in reply, suggesting the appointment of a special master to expedite the trial of the case. By order entered June 1, 1954, the Court appoined a special master.

On July 15, 1954, California filed its motion to join as necessary parties the States of Colorado, New Mexico, Utah, and Wyoming. These States filed briefs in objection on December 28, 1954. The Court subsequently referred the motion to the special master and the parties were heard on this question in Phoenix, Ariz., on April 12. That is the situation as of now.

2. UPPER BASIN INVOLVEMENT IN THE COLORADO RIVER LITIGATION

As pointed out at the time of the hearings referenced, there was no suit in the Supreme Court. In fact, that was what some of those hearings were all about. California and Nevada were supporting resolutions which would have permitted the institution of a suit by the United States. Without the United States as a party there cannot be litigation affecting he Colorado River sysem. Arizona and the upper basin States resisted the resolutions successfully. Then Arizona reversed her field in 1952 and filed suit.

A. Parties to a Colorado River lawsuit

In his statement during the hearing on Senate Joint Resolution 145, May 1948, Jean S. Breitenstein of Denver, representing the Colorado Water Conservation Board said (p. 198):

"Colorado is one of the signatory States to the Colorado River compact. We feel that any matter which involves the interpretation or application of the Colorado River compact necessarily involves every State which is signatory to that compact. In fact, we feel that in any litigation each of the signatory States would be an indispensable party to the litigation."

And, at p. 199:

"Also, as to why the upper basin States are interested in this resolution, we have the statements of the California witnesses that the fact that we have this treaty with Mexico makes all of the basin States interested in an interpretation of the compact which would involve the question of surplus water, because, as has been pointed out many times, the Mexican share is satisfied first out of surplus, and then one-half the deficiency from each basin.

"So much for the reasons why we are interested in the proposed legislation."

In the hearings before Subcommittee No. 4 of the House Judiciary Committee, Mr. Breitenstein stated (hearings on H. J. Res. 225, May 1948, pp. 298–299):

"The State of Colorado is opposed to any congressional legislation of the type being considered by the committee. We feel that any such legislation directly affects the upper basin States. It is true that the States of Colorado and Wyoming are not named as prospective parties defendant in the resolution which is presented, but each of those States is a signatory to the Colorado River compact.

"We feel that each of them would be an indispensable party to the litigation if the litigation was brought."

There are many other statements made during the course of the referenced hearings by representatives of the States opposing joinder of all of the States of the basin which are of interest, e. g.:

1. Jesse A. Udall, Arizona, Interstate Streams Commission (before the House Interior Committee holding hearings on H. R. 1500 and H. R. 1501, 1951, at p. 156):

"Mr. ENGLE. Let us assume that the suit is thrown out on the ground that we did not have a justiciable issue; at least we would have that settled.

"Mr. UDALL. I can tell you why Arizona would be hurt, the long delay. If one State started, I think all seven States would have to come in and be joined as partners [sic]."

2. J. A. Howell, of Utah, for the Colorado River Basin States Committee (at hearings on S. J. Res. 145, at p. 183):

"Accordingly, the resolution goes beyond the recitals upon which it is based and directs the Attorney General to bring an action against the States of Arizona, California, Nevada, New Mexico, and Utah, and such other parties as may be necessary or proper which would include, although not specifically named, the other States of the basin, namely, Colorado and Wyoming, not that the meaning and effect of recited documents and other facts be determined as recited in the resoution, but that the rights to the use of the water of the Colorado system available for the lower Colorado River Basin be determined.

"In order to make that determination, it would, of course, be necessary to determine the rights of all of the basin States to the use of the water of the Colorado River, and so the necessary effect of the resolution and the contemplated

suit or action would be to throw the entire river into the litigation before the Supreme Court, and, as specifically stated in the resolution, to require all of the basin States named in the resolution, as well as those included without being named, to assert and have determined their rights to the use of the water of the river; and, indeed, even if that language had not been used, such necessarily would be the nature of the suit, in our opinion."

3. Hon. William A. Dawson, Utah (at hearing on H. J. Res. 225, at p. 333):

"We have no quarrel with either California or Arizona, and we do not want to be in the position of an innocent bystander being drawn into conflict which is eventually going to draw us into it to the same extent that these other two States are involved."

4. For further statements of the same nature see testimony of W. J. Wehrli of Wyoming at hearings on Senate Joint Resolution 145 (p. 302) and at hearings of House Joint Resolution 225 (p. 239); John Murdock, Congressman from Arizona, House Joint Resolution 225 (p. 241); Fred Wilson, New Mexico, House Joint Resolution 225 (p. 486); Jean Breitenstein, Colorado, House Joint Resolution 225 (pp. 314, 316, and 317).

B. The issues in such a lawsuit and the need for a master

The following colloquy took place between Senator Millikin and Mr. Breitenstein (hearings, S. J. Res. 145, at 206):

"Senator MILLIKIN. In your opinion, could this matter be presented so that the court could reach a decision without the appointment of a master?

"Mr. BREITENSTEIN. That is the next point that I intend to develop, Senator.

"We cannot deny that it is a possibility that the court might do so. But, in my opinion, it is not a probability because it is within the control of any party to that litigation to raise an issue of fact which would require the appointment of a master."

And Mr. Breitenstein (at p. 207):

"I say that in this proposed litigation issues of fact will be involved. It is my judgment that we cannot, by any action of Congress or by any agreement between the States, conclusively fix the pattern of litigation. It is impossible for us to forecast the shape of the issues."

And Mr. Breitenstein, further (at p. 208):

"And to my mind it is reasonable to assume that if this question as to the meaning of the term 'beneficial consumptive use' or as to the method of measurement of beneficial consumptive use is raised in any lawsuit, it is inevitable that you will have an issue of fact which will take not months, but years before you will have all the testimony before a master."

(NOTE.—The following is paragraph 5 of the prayer of Arizona's complaint (p. 30) filed in the Supreme Court in August 1952. Arizona prays that: "5. A decree be entered herein recognizing, confirming and establishing that the beneficial consumptive use of water apportioned by the Colorado River compact be measured in terms of stream depletion.")

Also at page 208 Mr. Breitenstein said:

"But certainly any consideration of the question as to how you charge reservoir evaporation losses would carry with it the probability of a factual issue."

(NOTE.—At p. 31 of her complaint Arizona prays that: "6. Losses of water in and from reservoirs located in the lower basin on the main stream of the Colorado River shall be charged against the apportionment to Arizona and California respectively in the same proportion as the consumptive use of water in the State against which the charge is made currently bears to the total consumptive use of water in the lower basin.")

The following colloquy took place between Senator Millikin and Mr. Ely, during the same hearings from which the foregoing quotes are taken (S. J. Res. 145, at p. 114):

"Senator MILLIKIN. Are you limiting the issues that you would raise before the court to those which have been mentioned here?

"Mr. ELY. Well, if we control the issues to go to the court, we would ask to have these three go.

"Senator MILLIKIN. And as to any others? Would you reserve the right to raise others?

"Mr. ELY. It would depend entirely upon what position the other States took.

"Senator MILLIKIN. Then you are reserving the right to raise any issues in your own interest, as you should.

"Mr. ELY. Yes, sir."

C. STIPULATIONS IN THE LAWSUIT

Upper basin proponents and Arizona spokesmen have charged that California has "bluntly refused to enter into any stipulations regarding the facts" without specifying any circumstances.

The facts are these: Arizona has offered only one stipulation and that was to the effect that a decree would not affect the obligations of the United States to Indian tribes. This was done in Arizona's reply (at p. 19) to California's answer. Four months later, in December 1953, the United States filed its petition in intervention claiming ultimate "diversion rights" of over 1,700,000 acre-feet each year for Indians in Arizona and California alone. The upper basin States were so concerned about the implication that these Indian claims were to be urged as required to be satisfied ahead of the compact, thus plunging the operation of the compact into serious question, that they sought a conference with the Attorney General of the United States, at which Arizona and California were represented. A stipulation was there attempted to the effect that Indian claims were to be charged under the compact against the basin and State in which the Indian uses were made. All agreed—except Arizona—and no stipulation was entered into.

On this matter of stipulations would Arizona be willing to stipulate to California's entitlement to the use of surplus waters? In *Arizona* v. *California et al* (298 U. S. 588 (1936)). Arizona conceded to California the right to use 1,100,000 acre-feet of surplus water, which is over 100,000 acre-feet more than California is defending the right to use in the present lawsuit.

I submit that the foregoing chronology of the pleadings in this case and the foregoing quotations which forecast the course of the lawsuit perhaps better than the spokesmen realized show that California has not been dragging its feet or practicing chicanery.

It must be remembered that Arizona initiated the suit, that she knew at the time she filed it that the lawsuit could not proceed unless the United States intervened, and that it was probably inevitable that the development of the issues would make it necessary for all of the States of the basin to be parties to the action. This situation developed beyond question following the claims advanced by the United States, in the opinion of the California defendants.

Our people are entitled as defendants to have every possible protection afforded them by our attorneys in this lawsuit. I can see no reason why we should have to submit to another suit sometime in the future when all of the problems can be resolved in an action already before the court. But in any event, I see no basis whatsoever from the record of this case for the charge that California is acting in bad faith now, or has in the past.

Analysis of a Statement by Gov. Edwin C. Johnson of Colorado on Legal Issues Confronting the Storage Project Proposal

On December 20, 1954, Gov. Edwin C. Johnson of Colorado issued a statement relating to legal issues intertwined in the storage project proposal by reason of the Colorado River compact. This statement shook the very foundations of the alleged legality of the project and caused consternation in the ranks of its supporters. The following is an analysis of the important Johnson statement:

There are serious misconceptions abroad concerning the terms of the Colorado River compact.

It imposes restrictions on the upper basin which must be understood, as they are basic to any plan of development in the upper basin.

The basic questions are:

(1) Does the compact deny the upper basin the right to withhold water it cannot use for domestic and agricultural purposes?

(2) Does it deny the upper basin the right to withhold water to develop power?

The answers are:

Article II (h) defines "domestic use" as for household, stock, municipal, mining and milling, industrial, and like purposes, excluding power generation.

Article III (e) says upper basin States shall not withhold water, and lower basin States shall not requires delivery of water, which cannot reasonably be applied for domestic and agricultural uses.

Herbert Hoover was chairman of the commission that drafted and signed the compact. He interpreted these provisions at the request of Representative Hayden, of Arizona, on January 27, 1923, before any State ratified the compact.

Asked if article III (d) meant that upper basin could withhold all except 75 million acre-feet within consecutive 10-year periods and thus secure not only III (a) water, but the entire unapportioned surplus, Hoover replied:

"No." Article III (a) gives the upper basin 7.5 million acre-feet per annum. Article III (e) says the upper States cannot withhold water that cannot be beneficially used. Article III (f) and III (g) specifically leave to further apportionment water now unapportioned. So there is no possibility of construing article III (d) as suggested.

Asked why article IV (b) made impounding of water for power purposes subservient to its use and consumption for agricultural and domestic purposes, Hoover said:

"(*a*) Because that conforms to established law in most semiarid States.

"(*b*) Because cultivation of land outranks in importance generation of power.

"(*c*) Because there was a general agreement by all parties appearing before the commission that such preference was proper."

Asked if such subordination of hydroelectric power to domestic and agricultural uses would destroy Arizona's claimed ability to develop 3 million horsepower if the river continued to flow undiminished into Arizona, Hoover answered:

"Since the compact states that no water is to be withheld above that cannot be used for agriculture, the lower basin will thus receive the entire flow of the river, less only the amount consumptively used in the upper basin for agricultural purposes."

Governor Johnson then quotes Delph E. Carpenter, Colorado's compact commissioner, who reported to the Governor of Colorado on December 15, 1922:

"Power claims will always be limited by the quality of water necessary for domestic and agricultural purposes * * * power is * * * subservient to the preferred and dominant uses and shall not interfere with junior preferred uses in either basin."

On March 20, 1923, Carpenter, in a letter to a Colorado Senator and Congressman, reiterated:

"All power uses in both basins are made subservient to * * * agriculture and domestic * * * and shallnot interfere with or prevent use for such dominant purposes."

In an interpretation published January 15, 1923, W. S. Norviel, Arizona's commissioner, said:

"The 5th principal (established by the compact) is that the upper State shall not withhold water that cannot be reasonably applied for agricultural uses."

In response to written questions, Senator Hayden, of Arizona, on January 20, 1923, elicited the following statement from A. P. Davis, then Director of the United States Reclamation Service:

"The Colorado River compact provides that the lower basin shall be guaranteed an average of 7.5 million acre-feet of water annually from the upper basin and all the yield of the lower basin, and that water not beneficially used for agricultural and domestic uses shall likewise be allowed to run down for use below."

The foregoing official interpretations were made before the compact was ratified and were not disputed. Most certainly we are bound hand and foot by them.

The compact foresaw a subsequent treaty with Mexico as to that country's right to Colorado River water and spelled out just how that burden should fall on the upper and lower basins. Article III (c) provided that it was to come out of surplus to the extent possible, and the balance of the burden would be shared equally by each basin.

Then Governor Johnson makes this admission:

"If the upper basin States build storage reservoirs at the Glen Canyon and Echo Park sites as is now contemplated, the water withheld thereby will of necessity, be surplus water since the upper States cannot use it for agricultural or domestic purposes, and the upper States, therefore, must deliver such water to Mexico as is allocated to her under the provision of the seven-State compact."

Senator Hayden's Question No. 15 to Hoover on this point brought the reply:

"* * * the upper States shall add their share of the Mexican burden to delivery to be made at Lee Ferry. Article III (c) requires that amount be delivered in addition to the 75 million acre-feet otherwise provided for * * * the upper basin must furnish its half of any deficiency * * *."

Carpenter's report to the then Governor of Colorado contained a similar statement.

Governor Johnson then adds, that if Carpenter had thought about it, he also would have said:

"Water held in the upper basin to generate power and which for physical reasons could not be used by the upper basin for agricultural or domestic purposes is surplus water to the upper basin."

Governor Johnson clinches it with this statement:

"Such an interpretation must be crystal clear to any student of the seven-State compact and the official interpretations of its provisions."

Then he goes on to summarize what the compact does as follows:

"The upper and lower Basins were each apportioned * * * the exclusive beneficial consumptive use of 7.5 million-acre feet of water per annum, and in addition the lower basin was given permission to increase its beneficial consumptive use of an additional 1 million acre-feet per annum of surplus water (article III (b)). However, the 7.5 million acre feet awarded the lower States had a very clear priority over the 7.5 million acre feet awarded the upper States. In reality, the compact gave the lower States 7.5 million acre-feet of water per annum and the upper States that much water if there should be any water left in the river, provided the upper States used that water only for domestic or agricultural purposes."

As to the Article III (b) entitlement of the lower basin States to make beneficial use of an addiitonal 1 million acre feet of water, Governor Johnson states this is to be met out of surplus water over and above III (a) water, provided the upper States are using their 7.5 million acre-feet for agricultural and domestic purposes. If the upper basin stores for power, at least 1 million acre-feet per annum must go to satisfy this III (b) demand.

Hayden questioned Hoover on this point and he answered that the III (b) water was not just to come out of tributary sources in Arizona, but was to come from the main river or from any of its tributaries.

So, Governor Johnson states:

"I am compelled to keep emphasizing that whatever water is stored in Glen Canyon and Echo Park Reservoirs will be surplus to the agricultural and domestic needs of the upper basin and must be delivered to the lower basin to satisfy the award of 1.5 million acre-feet to Mexico and the 1 million acre-feet to the lower basin—further, should the lower basin require an additional supply of water for agricultural and domestic purposes, the water stored in these reservoirs must be released."

Governor Johnson adds:

The upper States must deliver 75 million acre-feet during each 10-year period, plus 7½ million acre-feet to Mexico, total 82½ million acre-feet, before they can use any water beyond that used before the compact was ratified.

In the current 10-year period that would leave 3¼ million acre-feet. In the previous 10-year period it would have been 4,150,000 acre-feet. In 1902 the upper basin would not have had anything under this formula.

Eight hundred and eighty thousand acre-feet would be lost per year in evaporation. Colorado would be charged with 400,000 acre-feet of that loss, yet would not get one drop of water out of the storage dams. Colorado is too close to the bottom of the water barrel and cannot afford that loss, so must insist on storage projects in Colorado.

The Hill report indicated about 1 million acre-feet of unappropriated water in Colorado. But it did not charge Colorado with the Mexican burden of at least 375,000 acre-feet, which will jump to 750,000 acre-feet if the power dams are built for storage. This plus evaporation would leave the State without any unappropriated water at all.

Hill Report on Colorado River Deficits

Governor Johnson's statement, which has just been reviewed, was in part based upon an independent report and analysis of water supplies available in the Colorado River bought and paid for by the State of Colorado through its Colorado Water Conservation Board. The report, commonly known as the Hill report, was ordered from the firm of Leeds, Hill & Jewett, consulting engineers, on May 18, 1953, and furnished October 31, 1953.

Inasmuch as the Hill report, if accurate, contains data of extreme importance in condemning the upper Colorado River storage project, attention is called to the fact that it has been reprinted in full in Senate Document 23 of the 84th Congress. A thorough study of it is recommended before this committee takes action on the proposed project.

On December 7, 1954, Raymond A. Hill, of the engineering firm, and principal author of the report, delivered a professional paper at Sacramento, Calif., based on his studies entitled "Colorado River Deficits."

For the information of this committee, the substance of Mr. Hill's paper is as follows:

When the compact was entered in 1922, it was believed that the flow of the river was in excess of all probable uses. It did not allocate between States, but defined the upper and lower basins with a division point at Lee Ferry. Each basin was appropriated the beneficial use of 7.5 million acre-feet, plus 1 million additional for the lower basin. Mexico was to be supplied out of surplus, and the amount was later fixed at 1.5 million acre-feet by treaty.

Thus, a total of 17.5 million acre-feet has been apportioned.

In addition, Arizona claims that about 1 million acre-feet of the lower-basin allocation was included to cover her uses of the Gila River, which California disputes. If Arizona is right, the average flow of the Colorado, exclusive of the Gila, would have to be 16.5 million acre-feet to meet anticipated demands, and 15.5 million acre-feet if California is right.

In a sense, it is immaterial, because the flow of the river in the past 40 years has not even been enough to meet 15.5 million acre-feet of demands.

The State of Colorado, in ordering the Hill report, sought to find out what was available to the upper basin, and it was determined that 6.2 acre-feet is the figure, notwithstanding the 7.5 million acre-feet allocation in the compact.

He found the average flow at Lee Ferry:

	Million acre-feet
During past 10 years	11.57
During past 20 years	11.95
During past 30 years	12.14
During past 40 years	13.15

A good estimate is that upper basin uses about 2 million acre-feet per year, so the total flow of the river can be obtained by adding 2 million to the above figures.

Since article III (d) requires 7.5 million acre-feet average flow at Lee Ferry to determine quantity of water actually available to upper basin for new uses, take the amount of flow at Lee Ferry and subtract the 7.5 million lower basin requirement from it, and the figures are as follows:

During the past 10 years, 4.07 million acre-feet.
During the past 20 years, 4.45 million acre-feet.
During the past 30 years, 4.64 million acre-feet.
During the past 40 years, 5.65 million acre-feet.

Under the compact allowance of 7.5 million acre-feet, subtracting the present uses of 2 million acre-feet, leaves 5.5 million acre-feet theoretically available to the upper basin, but the foregoing figures reveal that actually there is physically less water than that available.

To have the compact amount available, the river's average historic flow would have to be at least 13 million acre-feet per year. You have to go back 38 years to obtain an average flow of that amount.

Thus upper Colorado proponents are overlay optimistic when they think they can use 7.5 million acre-feet—the most available is 6.2. The full regulation of the river that would be necessary even to supply the latter amount would cut the lower basin's supply down to an average of 7.5 million acre-feet.

What does this mean in terms of existing projects?

Between Lee Ferry and Parker Dam one-half million acre-feet is being depleted per year. This leaves 7 million acre-feet. Now take away the Mexican burden of 1 million and you have left 5.5 million acre-feet without considering any waste at all which would probably cut it down to about 5 million acre-feet.

But what is being used now by the Metropolitan Water District and Imperial Valley? In the past 15 years their uses have gone up from 3.5 to about 5.5 million acre-feet and progressively greater diversion by the Metropolitan Water District and others are contemplated to increase this to 6 million acre-feet per year.

Thus it is obvious:

If upper basin goes ahead with its storage projects, there will not be sufficient water left in the river after treaty deliveries to Mexico to supply existing uses in the lower basin, and no surplus for new or expanded uses.

The supreme Court can determine the rights of California to the waters of the Colorado River, but it cannot create a supply of water for diversion under those rights.

The specific conclusions contained in Leeds, Hill, and Jewett's letter of transmittal of their report were as follows:

1. All of the 7,500,000 acre-feet of water per annum apportioned to the upper basin by the Colorado River Compact may not actually be available for use because of the requirement that 75 million acre-feet be delivered at Lee Ferry during each consecutive 10-year period.

2. Compliance with this provision and limiting the carryover in cyclic storage to the 22 years from 1930 to 1952 would have required that reservoirs of 21 million acre-feet capacity had been available in 1927 for cyclic regulation and that the aggregate depletion in the upper basin be no more than 6,200,000 acre-feet per year.

3. The total of all depletions at sites of use in Colorado of the flow of Colorado River and its tributaries may thus be limited to 3,100,000 acre-feet per year.

4. Depletions in Colorado under present conditions aggregate practically 1,450,000 acre-feet per year.

5. Commitments for extension of existing projects and for other projects authorized would increase present depletions almost 200,000 acre-feet per year.

6. The present uncommitted surplus which can be relied upon for use in Colorado is thus 1,450,000 acre-feet per year.

7. Development of the oil-shale reserves in western Colorado should be anticipated and the consumption of water for industrial, municipal, and other purposes resulting therefrom may reach 300,000 acre-feet per year.

8. Consumptive uses by expansion of irrigation on the western slope will depend upon the degree to which new projects are subsidized. Should the subsidy be limited to $200 per acre, the resulting depletion would be no more than 100,000 acre-feet per year. Should subsidies of $400 per acre be given, the stream depletion would be a little more than 400,000 acre-feet per year. Should subsidies as great as $600 per acre be permitted, the resulting stream depletion at sites of use might reach 800,000 acre-feet per year.

9. Depletions by new transmountain diversions will likewise depend upon the degree to which irrigation agriculture may be subsidized. Some diversions could be financed by municipalities without subsidies, but these would be limited to about 200,000 acre-feet. Additional transmountain diversions for agricultural purposes in any substantial amount would require subsidies in excess of $400 per acre. Even if subsidies as great as $600 per acre were permitted, the total of all new transmountain diversions for all purposes would not be more than 300,000 acre-feet per year.

10. If subsidies to agriculture at any point in Colorado be limited to $600 per acre, future depletions caused by expanded irrigation on the western slope and by transmountain diversions would amount to 1,100,000 acre-feet per year.

11. If any greater subsidies were to be allowed, the potential depletion caused by consumptive uses in agriculture and industry and by transmountain diversions would be in excess of the supply of water available to Colorado.

12. Increased diversions of water for use by agriculture and industry on the western slope and for transmountain diversions will depend upon the provision of sufficient storage capacity in reservoirs for conservation of flood flows and some cyclic regulation; in order that Colorado may make full use of the water allocated to it by the compacts, cyclic regulation of Colorado River over periods longer than 20 years will also be necessary.

Economic Issues

PROJECT UNSOUND ECONOMICALLY

The project does not qualify under sound economic principles. The taxpayers of the Nation have a basic interest in this phase of the subject.

The some 14 participating irrigation projects are located at elevations averaging over a mile above sea level. Growing seasons are short. Only about 20 percent of the lands are listed as class 1 by the Bureau of Reclamation and the average value of the land, fully developed, will only be about $150 per acre. But construction costs chargeable to irrigation on these 14 projects will average about $730 per acre.

In addition there is the hidden subsidy of interest on the money the Government borrows to build the project, which brings the total cost to the taxpayers to about $4 billion. Per acre, this means over $5,000.

Here is the way it works:

The estimated total construction cost is around $1.6 billion, broken down as follows:

Commercial power, $750 million (repayable with interest).

Municipal and industrial, $100 million (repayable with interest).

Irrigation, $750 million (repayable without interest).

Nonreimburseable, __ million (not returned to taxpayers).

Under the proposed plan of financing, power is to be sold at 6 mills, and based on that, the power features would pay out in a 50-year period. Of the $750 million allocated to irrigation, water users can repay only 15 percent according to Bureau of Reclamation figures. The other 85 percent would be paid out of power revenues.

Under all proposed bills except one, H. R. 3383, just 85 percent would not start being repaid until the power is paid off—50 years—during which time the Nation's taxpayer will be footing the bill for interest of at least 2½ percent on at least 85 percent of the $750 million borrowed by the Treasury to build the projects. During the next 50 years interest is likewise accumulating on the slowly declining balance.

When compounded, the results in total costs of about $4 billion.

Further note that either repayment scheme depends on an ability to sell power for 6 mills for 100 years. Considering that both conventional and atomic fuels are being generated at decreasing costs, it is highly doubtful that 6-mill power will remain competitive in the area even for 20 years.

Also note that there is a question as to whether there is a market for power other than that generated at Glen Canyon. It seems that the additional power dams are put in the bill for the purpose of estimating large power revenues so that the irrigation projects, 85 percent of which must be paid out of power revenues, look feasible.

To cap the climax, $211 million of the cost of these power dams is being allocated to irrigation, which, therefore, does not bear interest. This is another gimmick to poney up the scheme's shaky finances.

Proof that the storage project is not self-liquidating as claimed is apparent. Plain arithmetic shows that simple interest at 2½ percent on $1.5 billion of original investment is $37.5 million per year. Total net yearly revenues as estimated by the Bureau, would be much less than this amount.

These foregoing figures, however, need a further qualification in order to be evaluated in proper perspective. The qualification is that they are bedrock minimums and in actual practice would probably turn out to be a great deal more. This is because of all the projects the Bureau of Reclamation has built, in only 1 or 2 instances have they cost what they were represented to involve at the time Congress was persuaded to authorize them. In many instances the final project costs were astronomical in relation to original estimates.

Two reasons underlie this:

First, the Bureau of Reclamation consistently has erred on the low side as well as failed to take into consideration ever-rising construction costs.

Second, project proponents deliberately have come to Congress initially for only a small part of what they actually wanted. Once having their foot in the door with an initial authorization, they repeatedly assaulted subsequent Congresses for enlargements on the project until they got all they were after.

The following table strikingly shows the relation between original cost estimates and actual expenditures on Bureau projects authorized between 1903 to 1944:

Project	Date of authorization	Estimated total cost at time of authorization	Estimated total cost June 30, 1952
Hondo, N. Mex	1903	[1] $359,000	$371,788
Milk River, Mont	1903	1,000,000	9,881,774
Newlands, Nev	1903	1,250,000	7,899,479
North Platte, Nebr	1903	2,516,000	27,939,501
Salt River, Ariz	1903	2,800,000	26,244,688
Uncompahgre, Colo	1903	1,300,000	8,965,959
Belle Fourche, S. Dak	1904	2,100,000	5,288,236
Buford-Trenton, N. Dak (old)	1904	(2)	223,423
Lower Yellowstone, Mont-N. Dak	1904	1,200,000	3,633,219
Minidoka, Idaho-Wyo	1904	2,600,000	43,706,054
Shoshone, Wyo-Mont	1904	[1] 7,828,000	23,673,962
Yuma, Ariz.-Calif	1904	3,000,000	5,806,743
Boise, Idaho	1905	[1] 10,852,000	66,371,938
Carlsbad, N. Mex	1905	[1] 605,000	5,800,683
Garden City, Kans	1905	[1] 419,000	334,475
Huntley, Mont	1905	900,000	1,552,159
Klamath, Oreg.-Calif	1905	[1] 4,470,000	18,871,222
Okanogan, Wash	1905	444,000	1,633,973
Rio Grande, N. Mex.-Texas	1905	2,317,113	27,337,078
Strawberry Valley, Utah	1905	1,250,000	3,498,994
Umatilla, Oreg	1905	1,000,000	5,324,457
Yakima, Wash	1905	10,000,000	60,359,928
Sun River, Mont	1906	7,372,000	10,059,013
Williston, N. Dak	1906	(2)	409,095
Orland, Calif	1907	[1] 607,000	2,564,519
Grand Valley, Colo	1911	[1] 3,621,663	6,765,733
King Hill, Idaho	1917	527,230	1,987,854
Yuma auxiliary, Arizona	1917	(3)	2,266,487
Riverton, Wyo	1920	9,465,000	26,626,000
Owyhee, Oreg.-Idaho	1926	17,715,000	18,998,744
Vale, Oreg	1926	3,590,000	4,962,697
Weber River, Utah	1927	3,000,000	2,725,885
All American Canal, Ariz.-Calif	1928	38,500,000	67,614,755
Boulder Canyon, Ariz.-Nev., (Hoover Dam and power plant)	1928	126,500,000	172,070,000
Bitter Root, Mont	1930	750,000	1,037,087
Baker, Oreg	1931	200,000	281,589
Burnt River, Oreg	1935	550,000	601,026
Central Valley, Calif	1935	170,000,000	737,774,000
Colorado Basin, Wash	1935	487,030,228	754,476,000
Frenchtown, Mont	1935	220,000	290,797
Humboldt, Nev	1935	2,000,000	1,214,321
Hyrum, Utah	1935	930,000	953,854
Kendrick, Wyo	1935	20,004,000	37,738,385
Moon Lake, Utah	1935	1,500,000	1,509,359
Ogden River, Utah	1935	3,500,000	4,735,284
Parker Dam, Ariz.-Calif. (power)	1935	21,767,000	24,201,808
Provo River, Utah	1935	9,974,000	33,452,199
Sanpete, Utah	1935	375,000	374,540
Truckee storage, Nevada-California	1935	1,000,000	1,092,423
Buffalo Rapids, Mont	1937	3,055,000	5,669,336
Colorado-Big Thompson, Colo	1937	31,702,772	164,131,000
Colorado River, Tex	1937	20,000,000	23,961,794
Deschutes, Oreg	1937	8,000,000	12,943,000
Gila, Ariz	1937	19,474,000	[4] 50,083,860
Pine River, Colo	1937	3,240,000	3,471,437
Tucumcari, N. Mex	1937	8,278,000	[5] 15,540,011
Austin, W. C., Okla	1938	5,600,000	12,295,102
Fort Peck, Mont.-N. Dak., (exclusive of powerplant and dam)	1938	----------	25,400,000
Fruitgrowers Dam, Colo	1938	200,000	200,309
Buford-Trenton, N. Dak., (WCU)	1939	1,500,000	1,238,546
Paonia, Colo	1939	3,030,000	6,723,308
Rapid Valley, S. Dak	1939	1,118,000	927,412
Colorado River, Ariz.-Calif.-Nev., (front work-levees)	1940	(6)	[6] 12,190,000
Eden, Wyo	1940	2,445,000	6,152,000
Mancos, Colo	1940	1,475,000	3,926,000
Mirage Flats, Nebr	1940	2,560,000	3,282,588
Newton, Utah	1940	595,000	712,591
San Luis Valley, Colo., (1st unit)	1940	17,465,000	56,230,577
Davis Dam, Nev.-Ariz.-Calif	1941	41,200,000	118,902,056
Palisades, Idaho-Wyo	1941	24,092,000	76,601,000
Scofield, Utah	1943	640,000	943,889
Balmorhea, Tex	1944	347,000	429,554
Hungry Horse, Mont. (power)	1944	48,319,000	102,900,000
Intake, Mont	1944	62,000	90,530
Missoula Valley, Mont	1944	250,000	278,762

See footnotes at end of table.

Project	Date of authorization	Estimated total cost at time of authorization	Estimated total cost June 30, 1952
Rathdrum Prairie, Idaho	1944	300,000	482,360
Lewiston Orchards, Idaho	1946	1,466,000	2,488,000
Arnold, Oreg	1947	220,000	205,535
Cachuma, Calif	1948	32,310,000	36,967,000
Ochoco, Oreg	1948	1,500,000	849,830
Preston Bench, Idaho	1948	453,000	449,554
Solano, Calif	1948	45,577,000	47,111,000
Fort Sumner, N. Mex	1949	1,798,000	2,434,257
Grants Pass, Oreg	1949	100,000	100,000
Weber Basin, Utah	1949	69,534,000	70,385,000
Canadian River, Tex	1950		96,079,100
Eklutna, Alaska	1950	20,365,400	33,800,000
Middle Rio Grande, N. Mex	1950	30,179,000	29,606,000
Vermejo, N. Mex	1950	2,679,000	2,919,000
Collbran, Colo	1952		17,236,000
MISSOURI RIVER BASIN			
Bostwick division, Nebraska-Kansas	1944	$8,104,000	[7] $52,795,000
Canyon Ferry unit, Montana	1944	11,025,000	28,844,000
Crow Creek pump unit, Montana	1944	1,525,000	1,766,000
Frenchman-Cambridge division, Nebraska	1944	26,894,500	[8] 73,943,000
Kirwin, Kans	1944	10,000,000	20,474,000
Marias, Mont. (lower unit)	1944	19,700,000	67,878,000
Rapid Valley unit, South Dakota	1944	2,470,000	9,630,000
Webster unit, Kansas	1944	7,800,000	24,636,000
Angostura unit, South Dakota	1944	3,300,000	14,163,000
Boysen unit, Wyoming	1944	8,202,000	34,254,000
Dickinson unit, North Dakota	1944	354,630	1,824,000
Fort Clark unit, North Dakota	1944		774,000
Keyhole unit, Wyoming-South Dakota	1944	750,000	4,820,000
Savage unit, Montana	1944		564,000
Cedar Bluff unit, Kansas	1944	7,611,000	18,286,000
Heart Butte unit, North Dakota	1944	2,497,280	6,223,000
Shadehill unit, South Dakota	1944	2,327,000	11,445,000
St. Francis unit, Colorado-Kansas	1944	13,311,600	15,589,000
Missouri diversion unit, Montana	1944	23,831,000	61,993,000
Jamestown unit, North Dakota	1944	6,984,000	8,576,000

[1] Estimated in H. Doc. 1262, 61st Cong., 3d sess., Fund for Reclamation of Arid Lands, 1911.
[2] Combined cost of Williston and Buford-Trenton estimated in 1911 at $1,195,000.
[3] Included in estimate of Yuma project.
[4] Exclusive of contemplated allocation of $1,553,565 of cost of Imperial Dam herein included in All American Canal project.
[5] Exclusive of cost of storage works (Conchas Dam) constructed by Corps of Engineers.
[6] $100,000 per year.
[7] Except for total estimated cost, figures include $3,467,000 of the cost of Corps of Engineers Harlan County Dam allocated to irrigation.
[8] Except for total estimated cost, figures include $6 million of the cost of Corps of Engineers Red Willow Dam allocated to irrigation.

PROJECT DEPARTS MATERIALLY FROM EXISTING RECLAMATION LAW

The storage project appears basically to be a hydroelectric power project and the Bureau report basis economic justification solely on power revenues.

Repayment of reimbursable construction costs within the periods and at the power rates proposed depends on—

(1) Allocation of a large portion of the cost to irrigation on an interest-free basis.

(2) Postponement of start of repayment of this irrigation allocation for about 50 years.

(3) Subsidization of the most costly power units like Echo Park with surplus power revenues earned by the least costly Glen Canyon unit.

No present justification has been shown for the large allocations of the cost of power dams to irrigation—justification can only be based on projects to be authorized in the future which would make the storage necessary to permit further beneficial consumptive uses.

The reason given for allocating irrigation costs to power projects is that some of them would provide holdover capacity so the upper basin can proceed with its use of water without violating the compact.

However, information in the Bureau's report shows that at the present and anticipated future rate of upper basin development, Glen Canyon alone would suffice for this purpose for 40 to 50 years to come.

Further, it is believed that the participating projects proposed by the Bureau for initial authorization could make their beneficial uses without even the necessity of Glen Canyon storage to meet compact requirements.

None of the initially proposed power dams would be used to supply water for the participating projects proposed. They are downstream and would store water not used for irrigation. Their only function for many years would be power generation. Assuming, without admitting, there would be a market for such power, this market could be served as cheaply from other sources at the proposed 6-mill selling price, possibly more cheaply. Thus there is no assurance that the 6-mill price would stand against competition.

The Bureau's cost estimates indicate that Glen Canyon is the only unit that can stand on its own feet financially, and, as a matter of fact, it is being used as a crutch for the rest of the units, both power and irrigation ones.

Thus the other power projects appear questionable and, since they involve large evaporation losses, actually detrimental.

Justification for Federal power projects generally has been that they will bring low-cost power to people. This proposal violates that because power would be sold at a high cost to subsidize infeasible irrigation projects.

Glen Canyon power could be delivered to load centers for 3.75 mills and still repay the power allocation of its cost; and for 4 mills and pay off the irrigation allocation, too; all within 50 years, including the interest on power costs. Yet it is proposed to sell it for 6 mills.

It is believed that there are great coal, oil shale, and uranium deposits in this part of the country. Thus it is a low-cost area for conventional power. Also there is the matter of possible lower cost nuclear-electric power to consider. Either of these might pull down the proposed 6-mill rate and thus wreck the project's proposed financial structure, which depends on keeping the 6-mill rate for almost 100 years.

In this proposal, as pointed out, the water users would be able to pay only about 15 percent of the irrigation investment ranging from $200 to $1500 per acre in the participating projects. Power revenues are being depended on to pay for the rest. If the irrigation costs allocated to the power projects are added to the costs of participating irrigation projects, then irrigators are only repaying 12 percent or an investment averaging $1,000 per acre to put water on lands having an average value of $150 per acre.

Further, the Bureau proposes to pay off the interest reimbursable power investment first, then the noninterest reimbursable irrigation investment, starting 40 to 50 years later.

During this first 40 to 50 years, the Federal Treasury would be bearing the nonreimbursable interest cost of the money it borrowed to put in the irrigation projects, so this would amount to an additional costly subsidy of about $268 million for the projects recommended by the Bureau and about $608 million for the projects included in the bill before the Senate. When these figures are compounded, as they must be to determine the final cost, it works out to $2,500 per irrigated acre for the Bureau's proposal and about $5,000 per acre for the Senate proposal.

All of this is a material departure from existing reclamation law, is not in accord with sound standards and policies for reclamation development, and is not in the national public interest.

DETERIORATION OF QUALITY OF WATER SUPPLY; LOWER BASIN'S ECONOMY THREATENED

Engineering studies of water supply and use presented in the project planning report involve what are considered to be erroneous interpretations of the compact. They inadequately show what the effect of the developments will be on the lower basin's quantity of water supply, and they totally disregard the threat to the lower basin's economy by deteriorating the quality of its water supply.

The project planning report contains nothing on the question of water quality and it is a matter of utmost importance to the lower basin. Bureau testimony indicated the projects in its recommendations would increase salinity at Lee Ferry 12 percent. Based on a preliminary study, full use of article III (a) water in the upper basin would increase it 54 percent to about 1.2 tons per acre-foot (880 parts per million).

Considering that lower on the river the salinity would be 25 to 30 percent greater, it would approach a salt content that would make it of questionable quality for irrigation.

Certainly article VIII's reference to rights existing at its effective date being unimpaired refers to quality as well as quantity of water.

DAMAGE TO DOWNSTREAM POWER USERS

The Boulder Canyon project authorized Hoover Dam and other lower basin developments on a self-liquidating basis. Section 4 (b) of the act required the revenues to repay the investment including operating costs, within 50 years, should be contracted for by the Secretary of the Interior before any of the work was started.

To make these contracts, the Secretary had to determine how much power would be available.

He determined that 4,330 million kilowatt hours of firm energy annually would be available at the start, and by reason of increasing upstream diversion, this would decrease at an annular rate of 8,760,000 kilowatt-hours.

In addition to firm power, the studies showed there would be water for generating substantial quantities of secondary power throughout the 50-year period. For example, in the year 1988, when it was estimated that upper basin would be making maximum use of its article III (a) apportionments, it still appeared there would be about 2,100,000 acre-feet of water for generation of such secondary power in the amount of 900 million kilowatt-hours.

These estimates by the Government were the basis of the California power contracts signed in 1930 as a condition of building the project.

The contracts required the contractors to pay for the power even though they could not use it. The Metropolitan Water District, one of the major contractors, has paid out approximately $4 million for power it was unable to take.

In 1938 the United States and the city of Los Angeles entered a supplemental contract by which the city bound itself to "take and/or pay for "secondary energy on the same basis. Under it $90,000 has been paid so far for power the city has been unable to take.

In 1941 the Government's estimates as to firm and secondary power formed the basis of new contracts with power users including the city of Los Angeles. As to firm power the formula of 4,330,000 kilowatt-hours, subject to annual diminution of 8,760,000 kilowatt hours, was reaffirmed and it was assumed that 40 billion kilowatt-hours of secondary power would be available during the 50 years ending May 31, 1987.

The rates of firm and secondary power are interdependent and the city as well as other contractors in California, Arizona, and Nevada, signed the contract with that in mind—i. e., they could afford the firm rate if they got their specified share of the 40 billion secondary energy at the price fixed in the contract.

Upon the faith of these contracts, Los Angeles alone invested over $30 million for transmission lines large enough to carry both the firm and the secondary power.

The foregoing estimates did not, of course, constitute guarantees, as they are subject to the actual runoff of the river and the progress of allowable upstream diversions. But it is clear that the United States has no right to divert in violation of the compact, water which would otherwise be available for generation of firm and secondary energy at Hoover Dam.

The upstream power storage units would do just that for they are not required to develop irrigation or domestic water uses in the upper basin either existing or proposed in the bills. They will waste 613,000 acre-feet of water annually in evaporation, as compared with the total estimated beneficial uses by the 11 recommended participating projects of 401,000 acre-feet.

Thus, their only use is for power revenues and it is in this light that their effect on downstream power production and rights must be judged.

It is a matter of developing 6-mill power to be sold to 10 public utilities on one hand, or, on the other, continuing to sell low-cost power under contract, largely to public agencies.

It is not a clash between water for irrigation in the upper basin versus water for power in the lower basin. It is a power versus power matter and the lower basin has already established its prior appropriative rights to enough water for this purpose to supply the Hoover contracts.

There is available in the upper basin for consumptive use without storage 4.3 million acre-feet. Existing and authorized project (2.5 million acre-feet) plus 500 participating projects (0.99 million acre-feet) take 3.49 million acre-feet of water, still leaving a balance of 0.81 million acre-feet available for consumptive use without storage.

Whatever Hoover power is lost by the proposals makes a direct charge on the 800,000 consumers of the city of Los Angeles power system which can only be met by raising rates. The same is true for all other lower basin consumers.

Los Angeles' contract contemplates taking 55 percent of the 800 million kilowatt-hours per year on the average generation of firm power at Hoover, or 440 million kilowatt-hours in all. The upper basin proposals would take away all secondary power which would have to be replaced by burning 760,000 barrels of fuel oil in a conventional plant. At a cost of $1.80 a barrel, that is $1,365,000, and the net increase in cost to Los Angeles users would be $1,185,000. Comparable figures apply to other lower basin users in California, Arizona, and Nevada.

This is without considering the losses in amortizing the transmission line investments.

If you consider all the secondary power contractors, the total net extra cost for replacement fuel would be about $2,152,000 per year.

Now, as to cutting out of capacity for firm energy, as distinguished from surplus energy, there is even a more obvious breach of obligation by the United States, since by contract it has agreed to deliver it. Also, each kilowatt-hour of firm energy withheld would be even more costly to the consumers.

To take care of this, any bill passed must contain these minimum provisions:

(1) Delivery at Hoover for firm and secondary generation the full run of the river, less only legal upstream uses for domestic and agricultural purposes;

(2) During filling period of the storage units, delivery to Hoover replacement power; or

(3) During the filling period make financial reparation to Hoover power contractors for their increased operating costs and capital costs where appropriate.

Even if the obligation of the United States to these downstream power users is entirely ignored, there is another factor that must not be so ignored in the deliberations on these proposals. That is, the actual loss of $187 million in revenues to the Government itself which are involved, and which should be charged against the cost of the upper basin storage project.

The filling of the 10 reservoirs having a 48.5 million acre-feet capacity would have a material effect on the lower basin's facilities and operations. During the 20-year filling period, evaporation losses would be 9.7 million acre-feet for a total of 58.2 million acre-feet not available to the lower basin for irrigation, power, and the Mexican burden.

This 58.2 million acre-feet would amount to an average of 2.9 acre-feet a year for 20 years.

On the basis of average effective heads at the lower basin power projects, and assuming overall efficiencies of 80 percent, it is estimated that the lower basin's power loss would be 62.4 billion kilowatt-hours, which at 3 mills would mean a loss in revenues to the Government of about $187 million. This loss should be taken into account in appraising the costs and financial aspects of the proposals.

If the Lee Ferry flow were reduced to an annual average of 7.5 million acre-feet, the firm power output at Hoover would be cut 25 percent and there would be no secondary power. Output of downstream plants would likewise be reduced.

This reduction in output involves contract obligation with power users throughout the lower basin States. They depend on full power output to meet their power demands and financial obligations. It also involves a substantial $187 million direct loss to United States taxpayers.

Industry—The Mountain Wests's Mirror of the Future

Future prosperity in the intermountain West is dependent not upon the enlargement of agricultural production but upon the development of industry.

This region * * * the States of Colorado, Utah, Wyoming, and parts of New Mexico and Arizona * * * is essentially a water-short area.

Conversely, this region is unbelievably rich in other natural resources. Within it lie the largest coal deposits in the country—perhaps in the world. There are great reservoirs of oil and natural gas, mountains of oil shale, and deposits of uranium whose size has not yet been determined. There are large amounts of nonferrous metals and there are gold, silver, copper, lead, zinc, molybdenum, vanadium, phosphate, gilsonite, limestone, and many other minerals.

These are the measure of its future potential.[1]

The water resources of this area are of measurable quantity and their potential benefits to agriculture can be defined. On the other hand, the benefits which these limited water supplies can bring to a program of industrial expansion are immeasurable. It can only be said that they would be of unlimited value.

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[1] David D. Moffatt, Jr., vice president, Utah Power & Light Co., Senate hearings on S. 500, March 1955.

An unbiased examination of the comparative benefits of agricultural and industrial expansion in the intermountain States leaves no question as to which course should be followed in the interests of both the local and national economy.

Irrigation is a very uneconomic user of water.[2]

The value of crops grown under western irrigation is equal to about 10 cents for each 1,000 gallons of water withdrawn. The value of manufactured products amounts to about $5 for each 1,000 gallons withdrawn.[3]

Manufacturing produces about 50 times as many dollars of products with the same amount of water used by irrigation.

Furthermore, the consumptive use of water by irrigation is 5 or 10 times as great as for manufacturing.

Suppose, then, that water needs of western cities and industries should become more urgent. In such case a great part of the crops now irrigated could be produced from lands in the East reclaimed by clearing and drainage in areas of adequate rainfall.[3]

What proponents of more and bigger reclamation projects do not admit is that by using the comparatively small water resources of the intermountain area for costly irrigation projects they are placing an impenetrable ceiling on the development of the area.

There cannot be both agricultural and industrial expansion to any great degree in this arid mountainous part of the United States.

The question to be answered is: What do the people of the intermountain West want?

(*a*) A comparatively small and expensive agricultural expansion?

(*b*) A virtually unlimited industrial expansion?

An obvious disservice is being done the people of the intermountain States by the Reclamation Bureau, which advocates the unlimited use of available water for agricultural development. The Reclamation Bureau's plans do not take into consideration the possibilities of industrial expansion, yet it is upon industrial expansion that the hope of this region rests.

The fact that the Reclamation Bureau is not concerned with creating new industries may be understandable, but there is no justification for a branch of the Federal Government to promote a program within its own field to the detriment and possible destruction of better and more profitable programs in other fields.

If we are to be realistic as well as honest, we must face the fact that the Reclamation Bureau's program is selfish. It would, if followed, serve to perpetuate jobs with the Bureau and create a few new farms at enormous cost, while wiping out the chance to create large-scale employment in industrial developments.

The outstanding example of what the Reclamation Bureau proposes for the intermountain region is found in the plans of the proposed $1.6 billion upper Colorado River project. This project has the support of groups in Wyoming, Colorado, Utah, and New Mexico whose philosophy is based upon getting all possible out of the Federal Treasury "now" without regard for cost, justification, or long-range benefits. It also has the support of the "reclamation-at-any-price" school, as well as the national and regional officeholders considering political advantages.

The upper Colorado River project as approved recently by the Senate Interior Committee calls for the construction of six immense storage reservoirs. If these reservoirs were built, six great lakes would be created. The evporation losses of these great lakes would be enormous, conservatively more than 1 million acre-feet of water a year from the Colorado River system.

That is valuable water lost forever. It is not water lost after being used. It is water lost through a wasteful and unnecessary program.

This is the reason. The great reservoirs in the upper Colorado River project are not storage lakes from which water would be drawn for beneficial consumptive use in irrigation. With a single exception, these immense artificial lakes, filling deep canyons for hundreds of miles, would be built to produce hydroelectric power.

The power produced would be sold at a high rate to pay for the participating irrigation projects of the upper Colorado scheme—more than 30 in all.

The Reclamation Bureau has told Congress that the proposed irrigation projects could not pay for themselves and must be subsidized by power revenues.[4]

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[2] President's Materials Policy Commission, vol. 5, p. 85.

[3] Ibid.

[4] Hearings, S. 500, Senate Interior Committee, March 1955.

These revenues otherwise would be returned to the Treasury of the United States, thereby helping to decrease the national debt. But under the upper Colorado project proposal they would be spent to pay for totally impractical and infeasible irrigation projects.

As presently planned, the upper Colorado River project would mean a loss to the Nation's taxpayers of more than $4 billion.[5]

This great loss of valuable water and money need not occur. It could be avoided by the use of fossil fuels to produce electric power as required to meet the demands of this area. Steam plants could be built for a small part of the cost of the immense hydropower dams. In most cases, the steam plants could be built immediately upon, or adjacent to, adequate coalfields.

It is difficult to discover any justification for the building of new irrigation projects in the upper basin of the Colorado River. An analysis of the factors involved produces no convincing evidence in defense of the upper Colorado River project plan, unless it be political expediency.

Here are the factors:

1. The subsidy for the irrigation projects would amount to about $5,000 an acre.[6]

2. With a full water supply the land would be forth $150 to $200 per acre.[7]

3. More agricultural production, especially at this enormous expense, is not justified in the face of the immense food and fiber surpluses in this country which the taxpayers have already subsidized at great cost.[8]

4. The land to be irrigated lies at high altitudes with an extremely short growing season. Some of it has frost most of the year.[9]

5. The farmers benefiting would be required to repay only a very small percent of the costs allocated to irrigation units of the project.[9]

There is little industry and manufacturing in the States in which the upper Colorado River project would be located. In Colorado, Wyoming, Utah, and New Mexico there are a total of approximately 115,000 persons engaged in manufacturing activities.[10] This amounts to about one twenty-eighth of the total population.

The political leaders of these States who are living only for the present recognize the significance of these figures. Translating them into terms of votes, they understand the value of proposals like the upper Colorado project. Such a project means enormous gifts of money and water; it means some brief boom time for a few towns; it means an influx of craftsmen and laborers; it means some more farms in the desert; it means a temporary era of wild spending; it means a successful raid on the Treasury of the United States.

Considering such a proposition in the light of cold analysis, it must be realized that the final results would be drastically different.

The enormous gifts of money and water would be made at the expense of the taxpayers of all States, and the generosity of these taxpayers is swiftly reaching a breaking point.

In the past, costly and infeasible reclamation projects got through Congress largely because the people of the East did not understand them, were unaware of their immense hidden costs, and did not take the trouble to investigate or study them. That situation no longer prevails, as reclamation State Members of Congress are finding out.

No economy is improved by boom and bust. The boom that would ensue with the construction work of the proposed upper Colorado project would one day vanish into the clear mountain air. Only ruins built upon false standards would remain.

The craftsmen and laborers, the auxiliary itinerants, the peddlers, poets, and prostitutes, who would pour into the construction areas would suddenly fold

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[5] Raymond Moley, What Price Irrigation? American Enterprise Association, Washington, D. C., 1955; Samuel B. Morris, general manager, Los Angeles Department of Water and Power, hearings, S. 500, March 1955.

[6] Samuel B. Morris, hearings, H. R. 270, House Interior Committee, March 1955; Raymond Matthew, chief engineer, Colorado River Board hearings, S. 500 and H. R. 270, March 1955, Senate and House Interior Committees; Raymond Moley, supra; Oklahoma Expenditures Council, The Last Drop, March 1955.

[7] Hearings, S. 500 and H. R. 270, supra.

[8] Raymond Moley supra; Representative John P. Saylor, How Can America Best Provide Food and Fiber for Its Future Population? Washington, 1955; Leslie A. Miller, member, Hoover Commission, hearings, H. R. 270, House Interior Committee, March 1955; Evan T. Hewes, president, Imperial Irrigation District, hearings, S. 500, Senate Interior Committee, March 1955; Samuel B. Morris, supra.

[9] earings, S. 500 and H. R. 270, supra; Bureau of Reclamation reports, hearings, S. 500, supra.

[10] Bureau of the Census, 1953 Annual Survey of Manufactures, Washington, D. C.

their tents and fade away into another desert, leaving nothing good. They would not have been in one place long enough to vote.

The new farms would not be beneficial additions to the national economy. Most of what they would produce would be more surplus for the taxpayers to buy. There would be nobody to eat it. The farmers themselves would be living only at the mercy of the Bureau of Reclamation. The Bureau would be, in turn, eating on the financial structure of the Nation. It would not be a pretty picture of rural prosperity and plenitude, for over it all would hang the depressing cloud of insecurity, and underneath it would be a crumbling foundation of false economy.

The temporary era of wild spending would bring just that and nothing more, except a lingering hangover during which the pain of foolish dreams would throb in the heads of the deluded people.

The raid on the Treasury would be both successful and real, and throughout the country the taxpayers would bend under an increased burden, paying tribute to a fiscal monster they had in their blindness permitted to grow, and paying penance for a crime they did not intend to commit.

The potential thermal power resources of the intermountain area are beyond comprehension. In the heart of such a land, the Bureau of Reclamation—and the States themselves—want to adopt a philosophy and a practice that would undermine their road ahead and cripple, perhaps forever, their opportunities to create an industrial economy that has no foreseeable limit.

The proponents of this misguided philosophy which is based solely on the utilization of water resources and ignores the greater potentialities of other resources, maintain that a point will be reached after which Federal assistance may be reduced. There is no indication now that such a thing will happen, unless it is forced by aroused taxpayers. Federal agencies have spent about $5 billion for interior water projects in the past, contemplate at least 10 times that amount for the future, with about one-half already definitely planned.[11]

For instance, a glance at some projects now before the Congress indicates the enormity of the Bureau of Reclamation's planned program. The proposed upper Colorado River project would cost about $1,600,000,000 to construct; the central Arizona project would cost more than $780 million, and the Missouri River project will cost between $5 and $6 billion. In these three projects alone there is an estimated construction cost of at least $7.3 billion, about one and one-half times as much as has been spent on all interior Federal water development in the past century.

No longer is Federal participation only a stimulus for regional development; in many respects, it is also a gigantic relief program in which funds obtained from all citizens directly benefit only a few.[11]

On the very top of the largest coal fields in the world, variously estimated to contain between 400 and 800 billion tons, the advocates of waterpower development at any cost want to build gigantic projects that inflict enormous new loads on the taxpayers of the Nation and rob the United States Treasury of immense amounts of income that by all sound fiscal standards is due it.

On this subject, the Engineers Joint Council states:[12]

"Every diversion of power revenues to amortize part of the cost of other works is in effect a subsidy. Waiver of interest on money expended in the construction of Federal irrigation projects is also a subsidy. It is inevitable that even greater subsidies to irrigation will be required in the future if agricultural production in *the western half of the United States* is to be increased materially.

"As each Federal subsidy must be offset by taxes levied on all the people of the United States, it follows that *the benefits to be derived from subsidizing irrigation agriculture should be compared with the benefits which would accrue from the expenditure of like sums to increase agricultural production by any other means or at any other location in the United States.*

"It is essential to the carrying out of a sound national water policy that each subsidy, regardless of the source of its payment, be recognized and authorized by Congress. *Hidden subsidies for the benefit of particular regions or classes of beneficiaries cannot be in the best interest of the Nation.*"[13]

Steam plants to provide electrical energy in the intermountain States could be built by private capital, with no Federal tax money or subsidy involved.

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[11] President's Materials Policy Commission, supra, p. 91.
[12] Principles of a Sound National Water Policy, July 1951.
[13] Italics supplied.

These would create new employment in the coal fields and in the industries that would build to take advantage of the power available. A sound stone would be placed in the foundation of the area's economy by each plant and each new job. And the steam plants, the new industries, and those employed by them all would pay taxes to the local, State, and Federal Governments.

But what would the irrigation units proposed as part of the upper Colorado River project, for instance, contribute to the local or national economy? To begin with they would have to be built at Federal expense and subsidized by the taxpayers of all States.

As an example, the comparatively small Seedskadee project in Wyoming may be cited. Here is the Bureau of Reclamation's own report on it:

Acres to be irrigated	60,720
Estimated construction cost	$23,272,000
Repayment by water users	$4,785,000
Subsidized by power revenues from upper Colorado River project dams	$18,487,000

The irigated lands in this project would be utilized primarily for the support of livestock enterprises, particularly dairy cows and sheep—grasses for hay and pasture, small grain, alfalfa, and some garden crops would be produced.

The Bureau says that 9,030 acres would be suitable chiefly for pasture and that of the remaining 51,690 acres only a small proportion is first-class land—most of it is third- to fifth-class land.[14]

The value of the irrigated land would be about $70 per acre.[15]

Increase in the national debt per acre (taxpayers' subsidy) would amount to approximately $2,200.

Total subsidy would be about $133,500,000.

The Seedskadee project is an average participating irrigation unit of the proposed upper Colorado River project. The subsidy for other units would run from a high of $4,700 per acre for the central Utah project to $1,250 per acre for the La Barge project.

Thus, it may be seen that the Reclamation Bureau is proposing to build the Seedskadee project, with a subsidy of $133,500,000 to produce more butter, milk, cheese, and garden truck a few months of the year on land that is largely third to fifth class in quality.

On some of the other participating irrigation projects the Bureau frankly admits that the water users can pay nothing, but get the entire project as a gift from the Federal taxpayers. On other units the beneficiaries would repay 1, 2, perhaps 3 percent. On a few they would repay 10 percent.

The Lyman project, with a subsidy of $58 million would be able to produce only hay and pasture because it lies at an altitude of 7,000 feet and suffers from untimely summer frosts.[16]

Pointing out that the intermountain area was extremely rich in fuels and minerals, Miller told Congress:[17]

"There are many, and I am one of the group, who believe the ultimate destiny of the region is involved in the development of those minerals. Haste in tying down the water to irrigation of marginal agricultural land could seriously impede industrial development which would depend upon the use of large amounts of water.

"It is interesting to consider the difference between industry and irrigation farming in the matter of capital requirements to provide a family with a living. * * * an average investment of $13,300 in an industrial manufacturing plant will provide one man with a job. * * * an experiment farm on one of the Missouri Basin irrigation units in Nebraska indicates that a capital investment by the Government and the farmer of $99,200 is required for 160 acres in that area to provide the farm family with a net income of $3,600 per annum.

"In the upper Colorado area the required farm investment would average more than double that figure.

"Thus, if Federal subsidy is required for the development of the Colorado River Basin, it would appear to be much wiser to consider all types of resource development, and not put all of our money on marginal agriculture."[18]

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[14] Leslie A. Miller, chairman, Hoover task-force on reclamation, hearings, H. R. 270, House Interior Committee, March 1955.
[15] Highest value of general farm land as shown in USBR reports.
[16] Bureau of Reclamation report.
[17] Leslie A. Miller, supra, March 1955.
[18] Miller is a former Governor of Wyoming.

The United States Geological Survey estimates that coal reserves in the States of Colorado, Wyoming, New Mexico, and Utah amount to 374,641 million tons.[19]

This is a conservative estimate of identifiable reserves. Actual reserves are probably much greater. For instance, with regard to Colorado, the survey states:[20]

"No estimates were made for parts of the State where coal is perhaps present but specific information was lacking. As more mapping and exploratory drilling is carried on in the coal-bearing areas of Colorado, the estimate of reserves should be substantially increased."

The spread of the coalfields in these States is tremendous. Coal lies beneath 25,400 square miles of Colorado, or 24 percent of the State's area. New Mexico has coal beneath 14,650 square miles, or 12 percent of its area. In Utah there is coal beneath 15,000 square miles, or 18 percent of the State. In Wyoming there is coal under 40,055 square miles, or 41 percent of the State's area.[21]

Another indication as to how conservative is the report of the Geological Survey is found in this statement:[20]

"Of the 25,400 square miles of coal-bearing land believed to be present in the State (Colorado) only 5,277 square miles or 20 percent was included in the estimate. Although the coal probably almost completely underlies several large basin areas, such as the Denver Basin and the Uinta Basin, the data used to compile the estimates were restricted for the most part to areas within 6 miles or less of the coal outcrops."

At recent hearings before the Senate and in the current House hearings on the proposed upper Colorado River project several witnesses testified to the advantages of supplying needed power in the area with coal steam power instead of water power.

Conservationist David R. Brower addressed himself in this regard to Echo Park and Split Moutain Dams, two storage units of the proposed project. He said:[22]

"It seems well worth considering, for example, what would happen if power from coal were substituted for Echo Park and Split Mountain Dams' hydropower in the course of the Bureau's proposed payout period. There would be a saving of $147 million over the 44 years, and a market would have been provided for some 35 million tons of upper-basin coal, which could conceivably be pumped to the powerplants through a pipeline.

"There might be similar savings in substituting coal and coal mining elsewhere in the Bureau's project. This could be a boon to upper-basin mining economy 2 years from now, not 20 years or so."

Brower further stated:[23]

"Senator MILLIKIN. Make it clear to me how burning coal for power will provide any revenue for building participating areas.

"Mr. BROWER. What it provides is a differential in the resource of the basin as a whole. You would be using coal, yes, instead of falling water. The coal is there in predictable amounts. It employs people in obtaining it and in transporting it. Even allowing for that in the course of the 44 years of the proposed pay out for Echo Park, you would be $149 million better off in the total economy."

Brower also testified:[24]

"Steam plants take far less time to build, are not involved in the controversy as to whether the dams could provide power in dry years. Furthermore, they could help the unemployed upper-basin coal miners.

"Estimates on steam-plant costs are more reliable than dam-cost estimates and the water power may actually cost more than estimated.

"It appears that Federal hydropower from Echo and Split Mountain Dams would cost both the taxpayers and the power users substantially more than Federal steam power. Private utility steam power would cost the power users a little more than the proposed hydropower, but would cost the taxpayers a great deal less.

"The 1.4 mill difference between a 7.4 mill private-utility price and a 6-mill kilowatt-hour Federal hydroplant price would cost the power users an extra $2,320,000 per year, which is hardly enough to cause the users financial distress

[19] Circular 293, Coal Resources of United States, October 1953.
[20] Ibid., p. 19.
[21] Ibid., p. 14.
[22] Hearings, Senate Interior Committee, S. 500, March 1955, p. 653.
[23] Ibid., p. 654.
[24] Ibid., p. 656.

and is less than private steam plants would pay in income and property taxes. In order to save the upper-basin power users this small extra power bill the United States taxpayers as a whole are being asked to provide the following subsidies:

"1. Pay $2,565,000 per year of additional income and property taxes otherwise paid by the steam-plant utility companies.

"2. Sacrifice one of the most scenic canyon parks in the world to become just another reservoir.

"3. Increase the national debt unnecessarily by $282 million minus the cost of the same water storage at other sites.

"4. Run the risk of an enormous investment which FPC data indicate may not have enough water to run the turbines.

"5. Wait for a 6-year, or longer, construction job when steam plants can be built in less than half the time, and as needed, instead of being based on uncertain long-range predictions.

"6. Run the risk that the dams may cost far more than estimated. It was stated in the recent upper-basin hearings in the House that the Bureau's past projects costs have averaged twice their original estimates. If the cost went up only 30 percent the Bureau's power price would have to go to about 8 mills, or the public would have to increase the subsidy another $80 million.

"7. The Bureau's proposed 6-mill price is 0.2 mill below their admitted cost, or about $330,000 per year loss. They plan to offset this with cheaper Glen Canyon Dam power, but it is still an admitted loss for the Split Mountain increment of power generation.

"8. Potential relief for unemployed upper-basin coal miners is ignored.

"Mr. BROWER. This is the table which shows the total saving in 44 years (p. 662):

"(1) Echo Park, Split Mountain hydro, per kilowatt-hour at market ____ mills	6.2
(2) Equivalent, steam-generated ____ do	4.9
(3) Saving, with steam alternative, per kilowatt-hour ____ do	1.3
(4) Echo-Split annual generation, billion kilowatt-hour ____ do	1.66
(5) Annual savings in operating and investment costs, steam over hydro	$2,158,000
(6) For 44 years, rounded	$95,000,000
(7) Interest subsidy saved taxpayers by earlier retirement of irrigation allocation to participating projects, at 2½ percent	$52,000,000
(8) Total saving, 44 years	$147,000,000"

Former Governor Miller of Wyoming spoke to the Wyoming State Legislature in March 1955, on the subject of the proposed upper Colorado River project, and used Echo Park Dam, a key unit of that project, to illustrate the disparity between costs of steam and hydro power.

Pointing out that the plan for the dam called for the production of 200,000 kilowatts of hydroelectric power, Miller said:

"This dam is estimated to cost $176,426,000. As it is strictly a power producer, the said cost would be at the rate of $883 per kilowatt.

"At Denver, Colo., there is a steam-electric plant at present being enlarged to a capacity of 232,000 kilowatts and the cost is $168 per kilowatt. At Salt Lake City, Utah, there is also a steam-electric plant under enlargement to a total capacity of 241,000 kilowatts at a cost of $166 per kilowatt. By which you will see that to secure hydroelectric power from Echo Park would involve the payment of over $700 per kilowatt more than is necessary.

"In the general area of Echo Park there are hundreds of millions of tons of coal which could readily be mined for around 75 cents per ton by stripping methods and under $3 per ton by underground mining. It is a proven fact that a steam plant located at or near the source of fuel, thus avoiding high transportation costs, and equipped with modern high-pressure generating machinery can manufacture energy at very close to the cost of hydroelectric power. In this particular case you will recognize that the use of coal would provide considerable employment in an industry which is woefully depressed.

* * * * * * *

"Under current procedures, the sale rate on power at a Federal dam must include 3 percent interest on the construction cost. The interest on Echo Park would be then $5,295,000 annually. The interest on the $35 million it would cost to build a steam plant would be $1,050,000 per annum, a difference over 50 years

of $212,250,000. A 200,000-kilowatt steam plant would consume 500,000 tons of coal per year. If it cost $2 per ton to mine, average, that would be $50 million over 50 years. Add that cost to the interest, if you wish, and you still have a figure of $110 million in favor of the steam plant."

Testifying on the upper Colorado River project, Samuel B. Morris stated:[25]

"It appears most unfortunate that the Congress should be asked to approve a billion-and-a-half-dollar project involving hidden costs to the taxpayer of the order of $4 billion through accumulated interest costs under the Collbran formula. This at a time when Congress is awaiting the recommendations of the Hoover Commission, which it itself created, and the report of the Cabinet Water Policy Committee named by the President. Both of these are expected to make specific recommendations regarding methods of determining feasibility, financing, and repayment of Federal water projects.

* * * * * * *

"As one directing the management of a large city-owned public-power enterprise serving more than 2 million people, I cannot refrain from recording my objection to the setting up of these large water-storage power projects on the main stems of the Colorado River, not for the purpose of furnishing power at low rates but for the primary purpose of serving as cash registers for the collection of excessive rates for a hidden subsidy for the so-called participating projects. This is an assortment of irrigation projects in which the irrigators are able to repay little more than 10 percent of their cost in 50 years without interest."

Morris pointed out to the committee that the Bureau of Reclamation proposed to charge an "artificially high rate of 6 mills" to consumers for power from the upper Colorado River project and to continue this charge for decades after the power investment had been returned with interest in order that a subsidy may be provided for at least 100 years to pay for irrigation projects which otherwise could not be built.

He asked the question: Why should power users be called upon to pay this high rate for a century in an area that is one of the greatest sources of thermal energy production to be found anywhere in the world?

Said Morris:

"Steam-produced power is being furnished to the Atomic Energy Commission at around 4 mills. Why should the people in the Mountain States, sitting on this enormous potential energy, be called upon to pay a 50-percent higher rate for the next 100 years?"

In no other section of the United States as in the intermountain area are fuel reserves so large and developments so small.

Obviously the time will come when these fuel reserves must be tapped. When that time arrives, the location of the reserves will be of secondary consideration. Now we look upon them as far removed from the centers of population and industry, but when they are needed, geography will be merely a problem in logistics. It will be swiftly and efficiently solved.

The Intermountain States would do well to consider this problem now. When the resources they possess are needed by other sections of the country, then those resources will be transported to the points where they will be consumed. In a very large measure, that need not happen. The Intermountain States could very well launch a program of using their full resources at home, and transporting manufactured products to points of consumption.

In such a program lies the hope of these States for an expanding and profitable economy.

CONCLUDING SUMMARY

The engineering studies presented in the original 1950 report and the related special reports on participating projects and the supplemental report of the Secretary of the Interior are vague and uncertain with respect to the effects of proposed upper basin developments on the water supply available to the lower basin, the rights of California and the lower basin thereto and the operation of facilities in the lower basin. The plans for construction and operation of the proposed developments, insofar as revealed in these reports, give no proper or adequate consideration to the interests of the lower basin States. Further-

[25] Hearings, Senate Interior Committee, S. 500, March 1955. Morris is a former president of American Society of Civil Engineers, former dean of engineering at Stanford University, member of President's Water Resources Policy Commission, and at present general manager and chief engineer of Los Angeles Department of Water and Power.

more, the studies involve or imply what California considers to be erroneous interpretations of the Colorado River compact.

The erroneous interpretations of the compact include: (1) That article III (a) apportions to the upper basin a water use of 7,500,000 acre-feet a year in terms of depletion of the virgin flow at Lee Ferry instead of a beneficial consumptive use of 7,500,000 acre-feet a year at places of use; (2) that the upper basin would be entitled to the consumptive use of an average annual amount of 7,500,000 acre-feet instead of a maximum of 7,500,000 acre-feet in any 1 year. Because of these erroneous interpretations, the report is invalid as regards the showing of how soon and how much holdover storage will be needed and as regards the ultimate quantity and pattern of residual flow into the lower basin at Lee Ferry.

There are at least 10 serious questions of interpretation of the compact which would be involved in and affect the proposed storage project and related reclamation developments. All of these questions are at issue in the pending case of *Arizona* v. *California, et al.;* United States Supreme Court, October term, 1953, No. 10 original.

California's basic position is that this State is conforming to the Colorado River compact and must insist that the Bureau of Reclamation and the States of the upper basin do so in the planning and administration of the Colorado River storage project and participating projects.

As to annual variation in consumptive use requirements, there appears to be no justification for the assumption in the report that under full development, with a regulated water supply and with practically all the irrigated land receiving a full supply each year, the water requirement and use would be highest in wet years and lowest in dry years. This assumption cannot be reconciled with the results of the latest scientific investigations of the subject, and therefore is a probable source of further error in the findings in the reports on the storage project and participating projects.

It is evident that the building, filling, and operation of the proposed main-stream reservoirs, with an ultimate total capacity of about 48 million acre-feet plus evaporation of about 10 million acre-feet, would have substantial effect upon lower basin facilities and operations. Even the filling of the 2 reservoirs, Glen Canyon and Echo Park, now proposed for initial authorization with combined capacity of 32 million acre-feet, would have a material effect and would present serious problems.

Who is to have the final decision and control as to the operation of these holdover reservoirs, including storage and release of water? Article III (e) of the Colorado River compact provides that the States of the upper division shall not withhold water and the States of the lower division shall not require the delivery of water which cannot reasonably be applied to domestic and agricultural use. Glen Canyon Reservoir and certain other proposed upper basin main-stream reservoirs will be so located physically that no water stored therein can ever be applied to domestic or agricultural uses in the upper basin. All of the water stored in such reservoirs will be required for domestic and agricultural use in the lower basin and Mexico. Furthermore, consideration must be given to the Government's obligations to maintain the contracted firm power output at Hoover Dam.

No discussion of such problems, including the inevitable reduction in power output at lower basin plants and its economic effect from a national standpoint, is presented in the reports. Insofar as the original basic report or the 1953 supplement indicate, there is no evidence that the effects on operation of lower basin storage and power facilities have been given due consideration in planning the schedules of constructing, filling, and operating the proposed upper basin storage and power facilities.

Of equal concern to the problems of quantity and fluctuation of flow into the lower basin at Lee Ferry is the problem of quality of water. This problem concerns water users throughout the basin, but especially those in the lower basin States. Increased consumptive use of the waters of the Colorado River and its tributaries in the upper basin, particularly the relatively pure water of the headwater streams, will result in higher concentrations of mineral salts in the residual flow downstream.

The provisions in the Colorado River compact of water for the lower basin would be largely nullified if the supply were unsuited in quality for all beneficial purposes. Furthermore, article VIII of the compact provides: "Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact." Certainly this means unimpaired in quality as well as quantity.

The reports are completely lacking of information that would provide answers to the questions concerning quality of water. It is California's position that before development proceeds on any additional large-scale consumptive use projects in the upper basin, the entire problem of quality of water should be fully explored; that determination should be made as to the effects of increased upper basin uses up to full development, upon the quality of the flow at Lee Ferry; and that authorization of such additional projects, particularly transmountain diversion projects, in the upper basin should be deferred until satisfactory evidence is presented that such projects, in combination with existing projects and other projects contemplated under full development, would not have harmful effects on the quality of water remaining for use in the lower basin.

It is evident from the foregoing that there are a number of unknowns remaining to be determined as to water supply and use in the upper basin, and as to the amount of water that would be expected to be available to the lower basin passing Lee Ferry under conditions of ultimate development in the upper basin with full practicable utilization of the water supply apportioned to the upper basin under the Colorado River compact. This points up the need for a comprehensive system of gaging and sampling stations to measure both quantity and quality of water throughout the basin in order to determine the water supply available and the actual use of water. It is considered essential that more adequate measurements and records of water supply and use be obtained which will permit reliable studies to be made of the operation of existing and proposed developments in the upper basin and of the resulting available water supply, both as to quantity and quality, passing Lee Ferry for the lower basin.

The laws governing Federal reclamation development are embodied in the original Reclamation Project Act of 1902 and the Reclamation Project Act of 1939, as amended. Therein are set forth the criteria, policies and procedures of general application which may be collectively designated as existing reclamation law. For the purposes of this concluding summary only certain features of the law will be referred to.

Existing reclamation law provides that the reimbursable construction costs of irrigation reclamation projects shall be repaid within a period of 40 years, without interest, in 40 equal annual installments. In the case of a project for irrigation of new lands it permits a development period not to exceed 10 years, during which no repayment may be required.

Where a project includes facilities for municipal water supplies, the law provides that the reimbursable cost chargeable thereto shall be repaid in 40 years, with interest if deemed proper by the Secretary of the Interior.

Where a reclamation project includes hydroelectric power features, the law provides for reimbursable cost to be repaid with interest within a period of 40 to 50 years.

Present law permits nonreimbursable allocations of reclamation project costs for flood control, navigation and fish and wildlife in the case of projects which include features to perform these purposes.

The repayment program recommended by the Secretary in the supplemental report constitutes a material departure from established criteria, policies and procedures of general application in existing reclamation law.

It appears to be similar to that authorized by the Congress specifically for the Collbran project, Colorado (Public Law 445, 82d Cong., approved July 3, 1952). The special repayment provisions in that act are set forth as exceptions to existing reclamation law. It was stated at recent hearings before the House Interior and Insular Affairs Committee that at the time the committee passed upon the Collbran project bill, approval of the repayment formula therein was specifically for that project alone and was not to be considered as establishing a precedent for other reclamation projects.

The proposed repayment program, if adopted, would involve the postponement of the repayment of the costs allocated to irrigation on the storage units and on a major portion of the irrigation costs of the participating projects, for a period of about 50 years. These irrigation costs for which repayment would be deferred would comprise, according to the report, a minimum of about $268 million.

Studies of the original reports on the participating projects indicate that about 85 percent of the irrigation costs would be repaid without interest by power revenues. Considering the time value of money, the postponement for about 50 years of repayment of a large part of the construction cost of the proposed development would obviously require a subsidy from the Federal Treasury that would have to be paid out of Federal taxes. The interest charges on the funds borrowed by the Federal Government to defray the irrigation costs of the project would

never be repaid from project revenues and would have to be paid out of taxes even if the capital investments were eventually repaid.

It is recognized that the provision, under existing law, of interest-free money for irrigation reclamation projects involves a substantial subsidy from the Federal Treasury which must be borne out of taxes, comprising the cost of interest on funds advanced, which in a period of 40 years would aggregate an amount almost equal to the original capital investment even though the principal be fully repaid in equal annual installments during the 40-year period.

It would appear that the Secretary's proposal in the report under review for repayment would in effect extend the development period, during which no repayment would be made on a major portion of the investment, to about 50 years for both new land and old lands receiving a supplemental water supply. Such a postponement in repayment obviously would greatly multiply the amount of the Federal subsidy involved.

Owing to the lack of detailed information on the revised costs, no exact figure for the amount of the subsidy that would be involved in the proposed repayment program can be given. However, it could be readily calculated if detailed information on costs were available. In any case, the accumulated debt or total subsidy would amount to several times the original investment. It is believed to amount to a minimum of $4 billion. Whether this would be in the national interest is for the Executive and the Congress to determine. However, it is believed that a report should be made as to the true cost of the Federal subsidy involved under the proposed repayment program, so that the Executive and the Congress will be fully informed before making a decision with respect thereto.

Under the proposed program and method of financing, it appears that justification of the initially proposed participating irrigation projects and future decisions to build additional participating irrigation projects would depend not so much upon the merits of the individual projects as upon the availability of revenue, 50 or more years in the future, from power projects generally unrelated thereto physically. None of the participating projects recommended for initial construction would be in themselves financially sound according to information in the basic storage project report and the reports of 1950 and 1951 on the individual participating projects.

On the average the water users would be able to pay only about 15 percent of the irrigation investment on the participating projects. The balance of the cost would have to be subsidized—the capital investment by power revenue and the interest charges in even greater amount for an indefinite period by the Federal Treasury through taxes.

To the extent that high power rates could and would be maintained for the next 75 to 100 years or more to subsidize additional participating irrigation projects, authorization of the overall plan of upper basin development as proposed in the report, with such program and procedure would constitute an advance appropriation of funds for the construction of future projects of unknown engineering and financial feasibility.

The Colorado River storage project appears to be basically a hydroelectric power project. The only showing of economic justification in the report is based solely on power revenues. Considered in this light, the financial feasibility of the storage project appears open to question for several reasons. Repayment of the reimbursable construction costs within the periods and at the power rates proposed would depend entirely upon: (1) Allocation of a large portion of the construction cost to irrigation on an interest-free basis; (2) postponement of the starting of repayment of the irrigation allocation for about 50 years; and (3) subsidization of the more costly units with surplus power revenues earned by the less costly units.

No clear and adequate justification is shown in support of the allocation of a large part of the cost of the storage project to irrigation. Justification for the allocation to irrigation of several hundred million dollars (over $98 million for the initial 2 units) depends upon the future authorization of projects for consumptive use of water in the upper basin. Only minor use could be made of the regulatory reservoirs of the storage project directly for water-consuming projects. Future irrigation projects as a rule would require individual storage facilities.

The one reason given for the proposed allocation to irrigation on the storage project is that the storage units would provide holdover capacity so that the upper basin can proceed with the development and use of water without violating the Colorado River compact. Information in the basic report shows that at the present and anticipated future rate of upper basin development Glen

Canyon alone would suffice for this purpose for 40 to 50 years hence. Furthermore, it appears that the additional consumptive use estimated for the participating reclamation projects proposed for initial authorization in the Secretary's report could be made even without Glen Canyon Reservoir.

Analyses indicate that the cost of power from most of the proposed units of the storage project, other than Glen Canyon, considered individually and on the basis of either the total cost or the power allocations alone, would be greater than the proposed selling price of power; and that, in fact, power revenues from the Glen Canyon unit would have to subsidize most, if not all, of the other storage units in addition to subsidizing participating irrigation projects. It appears questionable, therefore, whether certain of the storage units would be justified or needed from the standpoint of either the holdover storage requirements or the value of the power produced.

The original 1950 report indicates an intent to market the power output of the upper basin storage and power units in the upper basin States, with little regard to potential market and needs for electric power in the lower basin States. This question of power disposal is referred to in the supplemental report as a matter of policy to be determined.

There appears to be some question in the report as to the ability of the power market in the upper basin States to absorb all of the power output, even of the initial two storage and power units, for a number of years in the future. Glen Canyon power probably could be disposed of in the lower basin where there is a great need for additional power. It is believed that the question of policy on disposal of power, particularly from Glen Canyon, merits the special consideration of the Executive and the Congress.

CONCLUDING COMMENTS

1. California agencies have established rights in and to the waters of the Colorado River system under the Colorado River compact and related documents. The State of California and its representatives have the duty of protecting and preserving those rights. Obviously, construction and operation of the proposed Colorado River storage project and participating projects would have substantial effect upon the quantity and quality of the available water supply and the operation of facilities in the lower basin and in California. Such developments should be carried on so as not to impair the established rights of California and its agencies in and to Colorado River water.

2. There are at least 10 major questions of interpretation of the compact which would be involved in and affect the proposed storage project and related reclamation developments. With respect to several of these questions, the proposed project is based upon what are believed to be erroneous and dangerous interpretations of the compact. All of the questions are at issue in the pending case of *Arizona* v. *California et al.* in the United States Supreme Court. California's basic position is that this State is conforming to the Colorado River compact and must insist that the Bureau of Reclamation and the States of the upper basin do so in the planning and administration of the Colorado River storage project and participating projects.

3. Revised analyses should be made and reported upon, based upon proper interpretation of the Colorado River compact, as to the need for holdover storage and as to the probable effects of its construction, filling, and operation upon the quantity and pattern of flow into the lower basin at Lee Ferry and upon the operation of lower basin facilities.

4. Before development proceeds on any additional large scale consumptive use projects in the upper basin, a determination should be made as to the effects of increased upper basin uses up to full development, upon the quality of the flow at Lee Ferry; and authorization of such additional projects, particularly transmountain diversion projects, in the upper basin should be deferred until satisfactory evidence is presented that such projects, in combination with existing projects and other projects contemplated under full development, would not have harmful effects on the quality of water remaining for use in the lower basin.

5. The plans for construction and operation of the upper basin storage project and related reclamation projects, insofar as revealed in the original 1950 report and the Secretary's supplemental report under review, give no proper or adequate consideration to the effect of the proposals on the lower basin developments, and evidence little if any regard to the interests of the lower basin. Moreover, the engineering studies are vague and uncertain with respect to the effect of proposed upper basin developments on the lower basin and additional studies are

essential with respect thereto. Full information should be available as to what the effect of the proposed plan will be on existing and future developments below Lee Ferry and particularly on the quality and quantity of water available for use in California before it is seriously considered by Congress.

6. There are many other problems that should and must be carefully studied and solved before authorizing or proceeding with any overall plan of development in the upper basin. In the meantime, some additional development could proceed if found justified for authorization by the Congress. However, the interests of the lower basin, and of California in particular, must be fully protected with proper safeguards in connection with any legislation for authorizing of any additional development in the upper basin, to the end that the construction and operation of the proposed projects shall fully conform with the Colorado River compact and related laws and documents.

7. The plan of financial operation of the project recommended by the Secretary departs materially from existing reclamation law and is not in accord with sound standards and policies. The proposed postponement for about 50 years of the repayment of a large part of the cost would result in a substantial increase in the national debt, constituting a subsidy to irrigation on the part of the Nation's taxpayers far beyond the subsidy contemplated under existing law. The magnitude of such subsidy should be clearly stated and explained in the report.

8. None of the participating reclamation projects recommended for initial authorization would be in themselves financially feasible. The water users could repay only small proportions of the reimbursable construction costs. The balance of the cost would have to be subsidized—the capital investment by power revenue and the interest charges in even greater amount for an indefinite period by the Federal Treasury through taxes.

9. No clear and adequate justification is shown in support of the allocation of a large part of the storage project cost to irrigation on an interest-free basis. Only minor use could be made of the regulatory reservoirs of the storage project directly for water consuming projects. The report indicates that the proposed allocation to irrigation on the storage project is based upon the need of holdover capacity to permit the upper basin to develop and use the water without violating the compact. However, it appears from the report that the additional consumptive use estimated for the reclamation projects proposed for initial authorization could be made without holdover storage; and that at the anticipated rate of development, Glen Canyon Reservoir alone would suffice for this purpose for 40 to 50 years hence. Therefore, the justification for immediate construction of initial units of the storage project would be based upon other considerations and purposes to be served.

10. The cost of power for most of the proposed major storage and power units, other than Glen Canyon, would be greater than the proposed selling price for power, and interunit subsidies would be required principally from Glen Canyon power revenues to support the other units. It appears questionable, therefore, whether certain of the storage units would be justified or needed, from the standpoint of either the holdover storage requirements or the value of the power produced.

11. The proposal recommended by the Secretary for the Colorado River storage project and participating projects raises basic questions as to the proper criteria to determine the financial feasibility and economic justification of new reclamation developments, and particularly the criteria, policies, and procedures for repayment, and the amount of Federal subsidy that is justified. These basic questions are a matter of national policy which must and should be decided by the Executive and the Congress.

12. Federal reclamation projects should be based on sound financial and economic standards and the proposed developments are no exception. The proposed projects should qualify under sound criteria of feasibility and repayment, as a matter of national policy in the best public interest. They also should so qualify for another reason, namely, if Congress make a practice of authorizing projects which do not so qualify, it will build up public opposition to such an extent that even needed reclamation projects which do so qualify will not be able to get through Congress and reclamation in the United States will disappear, a possibility we cannot as a Nation afford.

13. In analyzing the economic feasibility of the project, if past experience is to be considered, due weight must be given to the most affirmative possibility that its ultimate cost will greatly exceed the estimates now before Congress, and that so-called "hidden costs" will rise accordingly.

14. Any proposal which may be authorized must make full provision for the United States to meet its full contract commitments at Hoover Dam and elsewhere in the lower basin, or failing that, speedy and adequate financial reparation.

15. Until further information is available respecting production of electricity from atomic fuels, there should be no action on this proposal which requires, even for repayment of admitted costs without considering hidden costs, the continuation of a market for power at 6 mills per kilowatt-hour for up to 100 years. Research now going on, the results of which will be determined in the near future, may show that nuclear electricity will be sold in the upper basin area for much less. If so, Federal taxpayers will have on their hands history's most gigantic white elephant.

16. Full consideration and analysis must be given to the possibility that much of the proposed upper basin storage will be solely for purposes of power production. If it is established that water may be stored in the upper basin for power generation, then that authority exists in what amounts to the "law of the river" exclusive of the compact. Such upper basin storage for power would then be subject to prior appropriations for the same purpose by the lower basin amounting to at least 10 million acre-feet annually of wet water. In short, it is not impossible that in proceeding to store for power purpose, the upper basin will net themselves much less actual water for any purposes than they now claim. This subject may be likened to Pandora's box—once opened, examination of all the contents cannot be escaped, however repugnant.

17. Due regard should be given to the contention that the ultimate highest destiny of the upper basin lies not upon the foundation of an agricultural economy, but upon the foundation of an industrial economy.

Therefore, it is respectfully but vigorously urged that the proposed upper Colorado storage project as reflected in the bills now before the committee, be rejected at this time.

STATEMENT OF RAYMOND MATTHEW, CHIEF ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA

Mr. MATTHEW. My name is Raymond Matthew, I am chief engineer of the Colorado River Board of California. I appear here on behalf of the Colorado River Board of California, which is a State agency charged with the duty and responsibility of protecting the interests of California in the waters of the Colorado River.

California agencies have rights established by prior appropriation and by contract with the Secretary of the Interior under the authority of the Boulder Canyon Project Act, providing for the use in California of 5,362,000 acre-feet annually of water from the Colorado River System.

California, in the protection of its investment of over three-quarters of a billion dollars in water-development projects which it has made in reliance upon the Colorado River Compact and the Boulder Canyon Project Act, and the economy and welfare of about 6 million people dependent upon these works, must resist legislation which would encroach upon the rights of its citizens.

The Colorado River Board of California opposes the enactment of H. R. 270 and other pending bills to authorize the Colorado River storage project and participating projects, for the following reasons:

1. The plans for construction and operation of the projects as proposed in the bill and set forth in the reports of the Bureau of Reclamation would adversely affect to a material extent the rights of California agencies to Colorado River water, which have been established by prior appropriation and by contract with the Secretary of the Interior under the Boulder Canyon Project Act.

2. The feasibility standards and the financial plan proposed for the developments depart materially from existing reclamation law of general application, and are unsound from the standpoint of national public interest.

3. The authorization of the projects proposed in the bill is premature at this time, because the investigations and studies with respect to engineering feasibility, economic justification, and financial soundness of the proposed devolpments are inadequate and incomplete in many important particulars, and moreover, the administration and operation of the projects proposed for authorization involve fundamental legal questions as to water rights that are now at issue before the United States Supreme Court in *Arizona* v. *California et al.*, and should be governed by the decision in that case.

EFFECT OF UPPER BASIN PROJECT OPERATIONS ON LOW BASIN

The Bureau's project planning report of December 1950 (H. Doc. 364, 83d Cong., 2d sess.), contains only brief and vague allusions to the lower basin, and to the possible effects of the plan of operation of the proposed upper basin reservoirs upon the available water supply and the operations of the reservoirs and powerplants in the lower basin. It appears that the proposed developments have been planned with little if any regard for the rights and interests of the lower basin.

The engineering studies of water supply and use presented in the project planning report involve or imply what are considered to be erroneous interpretations of the Colorado River compact and related documents, with respect to consumptive use of water and administration of the river in the upper basin. The Bureau appears to assume that the primary, if not the only obligation of the upper basin to the lower basin under the compact is a delivery at Lee Ferry of 75 million acre-feet in any consecutive 10 years. In contrast, previous estimates by the Bureau of available water supply for the lower basin have indicated an expectation of an average annual water supply at Lee Ferry of 9 million acre-feet, after full use of apportioned water in the upper basin.

The questions of legal interpretation of the compact and related documents will be covered by legal counsel at these hearings.

From the standpoint of the effect of upper basin consumptive use on the available water supply in the lower basin, the indicated combined effect of assumptions predicated upon erroneous interpretations of the compact, on which the Bureau's engineering studies of water supply and use and reservoir operations are based, would be ultimately to reduce the water supply which the lower basin States expect and are entitled to receive at Lee Ferry under the compact, by about 1,500,000 acre-feet as a long time average.

Quite apart from the consumptive use of water in the upper basin by irrigation and water supply projects, the filling of the 10 reservoirs as proposed in the Bureau's report, with an ultimate capacity of about 48 million acre-feet, would have a material effect upon the lower basin water supply, facilities, and operations. Even the filling of the 6 reservoirs proposed in the bill H. R. 270 for initial authorization with a combined capacity of about 44 million acre-feet would present serious problems.

During the assumed 20-year reservoir filling period, at least 48,555,000 square feet of water in addition to reservoir evaporation losses estimated at 9,730,000 acre-feet, or a total of about 58,290,000 acre-feet, would not be available during that period for the production of power at lower basin installations or to meet consumptive use requirements and the Mexican treaty obligation.

The 58,290,000 acre-feet retained or lost in upper basin reservoirs would amount to an average of more than 2,900,000 acre-feet a year for 20 years. On the basis of the average effective heads at the lower basin power projects and assuming overall efficiencies of 80 percent, it is estimated that the reduction in electrical-energy production at the lower basin plants, that would be caused by retention of that volume of water in the upper basin, would aggregate 62.4 billion kilowatt-hours. Assuming that such a potential loss of output would be valued at only 3 mills a kilowatt-hour, the total loss involved to the Government would be about $187 million.

This potential loss in lower basin power output and revenues is significant and should be evaluated and taken into account in any appraisal of benefits and costs and financial aspects of the upper basin project. That has not been done.

In addition, the lower basin would be materially affected by the apparent assumption in the Bureau's studies of upper basin operations that the only obligation required to be met at Lee Ferry would be the delivery of 75 million acre-feet in any consecutive 10-year period. If during the filling period of upper basin reservoirs or during subsequent operations, the flow were to be reduced at Lee Ferry to an average of 7,500,000 acre-feet annually for several years, the firm power output at Hoover Dam would be reduced about 25 percent, and there would be no secondary power. The output of other downstream powerplants would also be reduced similarly.

It does not appear that proper consideration has been given to this situation which involves contractual obligations with power users throughout the lower basin States, who are depending on obtaining full power output from these lower basin plants to meet their power demands and financial obligations. Nor has consideration been given to the resulting financial loss to the Federal Government and local agencies concerned.

HOLDOVER STORAGE RESERVOIRS

According to estimates presented by the Bureau, the total consumptive use in terms of stream depletion in the upper basin with all participating projects proposed for authorization in the bill would amount to about 3.5 million acre-feet annually, as follows:

	Acre-feet
Existing and authorized projects	2,500,000
11 participating projects recommended by Secretary	401,000
Additional participating projects proposed in bill	589,000
Total	3,490,000

It is also stated by the Bureau that 58 percent of the water apportioned to the upper basin could be used without main-stream holdover storage. This is equivalent to 4,330,000 acre-feet annually. The record is clear, therefore, that the consumptive use requirements of all 14 participating projects proposed for authorization in the bill could be met without main-stream holdover storage reservoirs.

Despite the foregoing evidence, Bureau witnesses and certain others at the hearings have indicated that the main-stream holdover storage reservoirs would, nevertheless, be needed in dry years to assure a water supply for the initial participating projects. Obviously, such reservoirs located downstream from the participating projects could not supply any water to such projects. That is physically impossible. Storage reservoirs must be provided above the areas to be served to meet any shortages of water supply in dry years.

The Bureau's plans for the participating projects proposed for authorization in the bill include necessary storage reservoirs presumably sufficient to furnish an assured water supply to each project in the amount estimated. Otherwise, those projects would not be feasible. The plans for the participating projects include provision of storage reservoirs as required for the individual projects, with a combined capacity of 2,700,000 acre-feet.

At the rate of development estimated by the Bureau, the need for holdover storage would not be reached for 25 years, at which time it might be expected that the average consumptive use would have increased to 4,300,000 acre-feet. The Bureau further estimates that a 26 million acre-foot reservoir at Glen Canyon would provide the necessary holdover storage for about 40 years, beyond the estimated time of first need.

Thus, from the standpoint of additional consumptive use of water in the upper basin, it is apparent that no main-stream holdover storage would be necessary for 25 years and that Glen Canyon would suffice for 40 years more, or a total of 65 years hence. It is argued that such major storage reservoirs should be constructed in advance of need because easier to fill before greater amounts of water are put to use in the upper basin. Although this would appear to have some merit, the filling of such reservoirs, when and if built, will be primarily dependent upon the occurrence of years with large runoff. Furthermore, in view of the effect on lower basin water supply and operations including the large evaporation losses involved which would reduce the available water supply for present economic uses downstream, storage units should not be built in the upper basin in advance of their need in connection with increased beneficial consumptive use of water.

QUALITY OF WATER

The effect of proposed developments in the upper basin on quality of water available to the lower basin is of equal concern to quantity. The project planning report contains no information concerning the present or future quality of water delivered to the lower basin at Lee Ferry.

According to testimony presented at hearings, however, the Bureau of Reclamation estimates that the average salt content of Colorado River water at Lee Ferry would be increased about 12 percent by the projects included in the pending bill; and that the average salt content at Lee Ferry, under full use of water apportioned to the upper basin, based upon a preliminary study, would be about 1.2 tons per acre-foot (880 parts per million) or 54 percent greater than the present prevailing salinity.

Considering that the corresponding salinity in the lower Colorado River might be 25 or 30 percent greater, approaching a salt concentra-

tion that would make the water supply of questionable quality for irrigation, this preliminary study points up the seriousness of this problem. It appears to have been overlooked in the Reclamation Bureau's planning in the past, but can be no longer ignored.

It is the position of the Colorado River Board of California that the Colorado River compact intends that water available for use in the lower basin shall be suitable in quality for all necessary purposes. This is required by article VIII of the compact, which provides:

Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact.

Certainly this means unimpaired as to quality as well as quantity.

It is evident that increased consumptive use of the waters of the Colorado River and its tributaries in the upper basin, particularly the relatively pure water flowing in the headwater streams, will result in a higher concentration of mineral salts in the residual flow in the lower reaches of the river downstream. This would be particularly true of transmountain diversion projects, such as the central Utah and the San Juan-Chama projects proposed at higher altitudes where the stream flow is much better in quality than that in the lower parts of the system.

Therefore, it is further the Board's position that no additional transmountain diversion projects should be authorized in the upper basin until an authoritative determination is made regarding the entire matter of quality of water and satisfactory evidence is furnished that there will be no harmful effect on the water supply available for use in the lower basin. Thus far, such a determination has not been made.

ECONOMIC AND FINANCIAL ASPECTS

The Colorado River storage project, apart from the participating projects, appears to be basically a hydroelectric power project. The only showing of economic justification in the Bureau's planning report is based solely on power revenues. Considered in this light, the financial feasibility of the storage project appears open to question for several reasons.

Repayment of the reimbursable construction costs within the periods and at the power rates proposed would depend entirely upon: (1) allocation of a large portion of the construction cost to irrigation on an interest-free basis; (2) postponement of the starting of repayment of the irrigation allocation for about 50 years; and (3) subsidation of the more costly power units with surplus power revenues earned by the least costly Glen Canyon power unit.

No clear and adequate justification is shown in support of the allocation of a large part of the cost of the dams included in the storage project to irrigation. Justification for such allocation to irrigation would apparently depend upon the future authorization of projects for consumptive use of water in the upper basin, in addition to those proposed for initial authorization.

The one reason given for the proposed allocation to irrigation on the storage project is that the storage units would provide holdover capacity so that the upper basin can proceed with the development and use of water without violating the Colorado River compact.

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As previously pointed out, none of the power dams proposed for initial authorization in the bill H. R. 270 would be needed or used to supply water for the 14 new participating projects proposed. Their only function for many years to come would be the generation of hydroelectric power. Although it appears there would be a market for the power produced, the market demands could be served from other sources as cheaply as the proposed selling price of 6 mills per kilowatt-hours, and there would be no special incentive to purchase the power at this price. Hence, there is no assurance that the hydropower produced could or would be sold at 6 mills, as estimated by the Bureau, particularly over a period of 75 to 100 years.

Of all the proposed units of the storage project, the Bureau's cost estimates indicate that the Glen Canyon Reservoir and power development is the only one that can clearly stand on its own feet as a financially sound project unit.

Analyses indicate that the cost of power from the other proposed units of the storage project, possibly excepting Cross Mountain, considered individually and on the basis of either the total cost or the power allocations alone, would be greater than the proposed selling price, and that, in fact, power revenues from the Glen Canyon unit would have to subsidize most, if not all, of the other storage units in addition to subsidizing participating irrigation projects. It appears questionable, therefore, whether other storage units would be justified or needed, from the standpoint of either the holdover storage requirements or the value of the power produced, now or for many years in the future.

Justification for Federal power projects has usually been made on the ground that they will bring low-cost power to large numbers of people. Power could be developed at Glen Canyon and delivered to load centers for 3.75 mills per kilowatt-hour, and still retire with interest in 50 years all the Government investment in that structure charged to power; for 4 mills per kilowatt-hour, and also repay the irrigation allocation; and for 4.3 mills per kilowatt-hour, and retire the entire cost of the dam and powerplant with interest in 50 years, based on an interest rate of 2½ percent. Yet that power is proposed to be sold for 6 mills or more in order, first, to subsidize the other proposed high-cost power projects, and, second, infeasible irrigation projects.

This means that the power users in the Glen Canyon market area would be required to subsidize the power users in the market areas of other power units by about 2 mills per kilowatt-hour. Based upon the firm energy output estimated by the Bureau in its financial operation study included in the Secretary's supplemental report, the total subsidy from Glen Canyon power to other power units would be over $300 million over a period of 44 years.

Six-mill power from a Federal project can hardly be classed as low-cost power. It is closely equivalent to the cost of steam-electric power.

It is well known that the region in which the power dams would be constructed has a vast mineral potential. Here are located what are believed to be the greatest coal, oil shale, and uranium deposits in the country.

This combination, considering the fact that atomic electric power is already being generated at decreasing costs, raises the question of whether the competitive market value of power would remain as high

as 6 mills in that region for even the next several decades, let alone the next 75 years to 100 years or more. Yet what questionable financial prop there is to this project is dependent upon 6-mill power being sold for at least that period—an expectation that is highly speculative to say the least.

It is evident that the primary purpose of the storage units proposed for initial authorization would be to provide a source of revenue (which, however, would not be available for 45 to 50 years) to finance a major portion of the cost of the participating irrigation reclamation projects. None of the participating projects recommended for initial construction would be themselves financially sound. On the average the water users would be able to pay only about 15 percent of the irrigation investment ranging from $200 to $1,500 an acre on the participating projects proposed in H. R. 270.

Including the cost allocated to irrigation on the storage units, the total irrigation investment would average over $900 per acre to irrigate lands having an average value of $150 per acre.

It is proposed by the Secretary and provided in the bill that the portion—about 85 percent—of the irrigation costs of participating reclamation projects beyond the ability of the water users to repay would be repaid from net power revenues of the storage units, after repayment was completed on the power investment and the irrigation allocation of the storage units.

Such financial operation studies as have been furnished by the Bureau of Reclamation indicate that a period of 40 to 50 years or more would be required to repay the power investment with interest at 2½ percent, at the proposed power rate of 6 mills per kilowatt-hour. Thereafter, under the proposed repayment program, net power revenues would be devoted to repaying without interest, the costs of the storage projects allocated to irrigation and the major portion of the irrigation investment of participating projects. However, no financial operation study of the projects proposed in H. R. 270 has been furnished as yet.

Thus, the proposed repayment program, if adopted, would involve the postponement of starting the repayment of the costs allocated to irrigation on the storage units and on a major portion of the irrigation costs of the participating projects, for a period of about 50 years. These irrigation costs for which repayment would be deferred would comprise, according to Bureau estimates, a minimum of about $268 million for the projects recommended for initial authorization by the Secretary and about $600 million for all of the projects and units proposed for authorization in H. R. 270.

The postponement for about 50 years of starting repayment of such a large part of the construction cost of the proposed development would obviously greatly increase the subsidy from the Federal Treasury in interest costs on the funds advanced, that would have to be paid out of Federal taxes. The accumulated interest charges on the funds borrowed by the Federal Government to defray the costs of the project allocated to irrigation could and would never be repaid from project revenues and would have to be paid out of general taxes even though the capital investments were eventually repaid. The resulting national debt would keep on increasing indefinitely unless or until paid off by general taxes.

The increase in the national debt resulting from the Federal subsidy in accumulated interest charges would be several times the original irrigation investment. Based upon the projects recommended for initial authorization by the Secretary of the Interior, the Federal subsidy in these accumulated interest costs at the end of the overall repayment period set forth by the Bureau of Reclamation (p. 192, House committee hearings, H. R. 4449, 83d Cong., 2d sess.) would amount to over $2,500 per acre on the area to be irrigated of 366,000 acres. With the inclusion of the additional storage and power units and participating irrigation projects proposed in H. R. 270, the subsidy would be $4,000 to $5,000 per acre.

One of the pending bills, H. R. 3383, sets up a different repayment plan than that provided in H. R. 270. It would provide that the cost allocated to irrigation be repaid in equal annual installments in 50 years, and that the power investment be repaid with interest over the useful life of the project but not to exceed 100 years. It is understood that Bureau witnesses at the current hearings testified in effect that their studies of the proposed plan indicated that the 11 participating projects and the 2 storage units, Glen and Echo, as recommended for initial authorization by the Secretary, could be repaid within a period of 100 years, but that the plan would not lend itself to the addition of other participating projects and storage units.

The Bureau's analysis has not yet been presented to the committee. It appears probable, however, that the Federal subsidy in accumulated interest charges resulting from this plan of financing would still be several billion dollars at the end of the overall repayment period. The plan has the further objection of anticipating the continued operation of hydroelectric plants and the security of the estimated power revenues therefrom, over a period of 100 years or more. Such an expectation appears to be highly speculative and unrealistic.

Bureau spokesmen and proponents of the upper basin project place great weight upon the benefit-cost ratio as a criterion for determination of economic justification of the various projects. As is well known, such a criterion is not sanctioned by existing reclamation law which requires a showing of financial reimbursability as the only basis for economic justification of reclamation projects.

Moreover, the methods used by the Bureau in the analysis of benefits and costs are unrealistic in several respects. Large indirect benefits are usually included which involve a large element of judgment in evaluation. Furthermore, the analysis of benefits is made on the basis of 100 years which is highly speculative. It has been the general consensus of other agencies of the Government that 50 years is the maximum time for which benefits should be estimated.

As a result, the favorable benefit-cost ratios as indicated by the Bureau in the case of most, if not all, of the projects are exaggerated. In most cases, the estimated benefits per acre of irrigated land are several times greater than the estimated repayment ability of the irrigators. For example, even the direct annual benefits for the Hammond project are estimated at about $40 per acre as compared to an estimated annual repayment ability of about $2 per acre.

Furthermore, in none of the benefit-cost analyses of either the storage units or the participating projects does it appear that the cost of the storage units allocated to irrigation has been taken into account;

nor have offsetting detriments such as loss in power revenues in the lower basin been considered.

The hard fact must be faced that the proposed irrigation projects in the upper basin are so costly as related to the irrigators' ability to repay that extraordinary subsidies are required to finance these projects.

The Director of the Bureau of the Budget, in a letter to a member of this committee last year, stated that the study of the Budget Bureau indicated that the required Federal subsidy for the proposed participating projects then recommended would average about two-thirds of the construction cost.

The proposed financial plan and repayment program for the Colorado River storage project and participating projects constitutes a material departure from existing reclamation law. It is not in accord with sound standards and policies for reclamation development, and in the light of the greatly increased Federal subsidy involved, is not in the national public interest.

AUTHORIZATION AT THIS TIME PREMATURE

It is evident from a review of the official reports of the Bureau of Reclamation on the Colorado River storage project and the participating irrigation projects, and the testimony of Bureau witnesses at the hearings on proposed legislation, that the investigations, surveys, and studies with respect to engineering and the economic and financial aspects of the proposed developments are inadequate and far from complete. The Bureau's 1950 Project Planning Report on the storage project and individual reports on the participating irrigation projects reveal the need for more thorough investigations and surveys.

Even for the Glen Canyon storage unit, which has evidently been investigated and explored most thoroughly of all the proposed storage units, the Secretary of the Interior in a recent communication has expressed concern over the adequacy of the foundations and the feasibility of building a dam of the height proposed, and states that decisions as to final plans would not be made until further studies are completed after authorization.

The United States Geological Survey, in its report, House Document 364, raises several important questions that need to be investigated, including the geologic formations in the proposed Echo Park and Glen Canyon Reservoirs that might result in serious leakage from the reservoirs, and the ground water hydrology of the proposed reservoir basins and adjacent areas.

The provisions of the bill H. R. 270 itself, which require further studies and reports by the Secretary of the Interior on economic feasibility and financial reimbursability of the proposed participating irrigation projects previously recommended by the Secretary, and complete project planning and feasibility reports with review by affected States and specific subsequent action by Congress as to authorization for the Navaho and San Juan-Chama projects, point up the fact that reliable information is not now available regarding engineering, economic, and financial aspects of the projects sought to be authorized by the bill.

In addition, proposals have been made for inclusion of projects in the bill on which thus far only the barest reconnaissance surveys have been made by the Bureau. It would seem that Congress might well await the completion and submission of all of these necessary reports before considering the justification and merit of authorizing the Colorado River storage project and participating projects as proposed in the bill.

The bill, H. R. 270, seeks to establish feasibility and repayment standards for reclamation projects which materially depart from existing general reclamation law. Involved are fundamental questions of national policy with respect to reclamation development which are presently under study and soon to be reported upon by the Hoover Commission and the President's Cabinet Committee. It would seem that Congress should await the reports of these agencies and then determine a general policy before acting upon this bill which, if adopted, would set up new policy by special legislation.

Furthermore, considering the magnitude of this proposed upper basin development, involving an initial cost of about $1.5 billion, and the many unresolved questions regarding engineering, economics and finance, a properly qualified Engineering Board should be appointed to review the entire proposal as to engineering, economic and financial feasibility, and make a report to the Congress before action is taken on this proposed legislation by the Congress.

This was done in connection with the Boulder Canyon project when it was under consideration by the Congress in the twenties. Although there had been some 10 years of previous study, an engineering board (the Sibert Board) was appointed to review that project, involving a cost of only about one-tenth of the estimated initial cost of the developments proposed by H. R. 270. Surely, if it was deemed necessary for the Boulder Canyon project, it is far more essential in this case.

Finally, the plans for the construction and operation of the upper basin storage project and participating projects are predicated upon interpretations of the Colorado River compact governing the rights to the use of Colorado River water that are now at issue before the United States Supreme Court in the case *Arizona* v. *California, et al.* The decisions made on the issues raised in that suit should govern and could substantially affect the plans and operations of upper basin developments, and the availability of water for use in the upper basin.

In view of the several foregoing considerations, it is submitted that the authorization of the upper Colorado River Basin projects as proposed in H. R. 270 and companion bills would be premature at this time.

Thank you very much, Mr. Chairman. I don't know how near I came to my time.

Mr. ASPINALL. You did very well. You were 2 minutes under the time that we had talked about. We thank you very much. And I am sure you lost no effectiveness by hurrying as you did.

Mr. MATTHEW. Thank you, Mr. Chairman.

Mr. ASPINALL. The Chair will call to the witness table now Mr. Gilmore Tillman, assistant city attorney of the city of Los Angeles. Mr. Tillman has asked for permission to read his statement in full, and we would appreciate it if he would read it as rapidly as possible.

STATEMENT OF GILMORE TILLMAN, ASSISTANT CITY ATTORNEY OF THE CITY OF LOS ANGELES, APPEARING AS ATTORNEY FOR THE DEPARTMENT OF WATER AND POWER OF THE CITY OF LOS ANGELES, CALIF.

Mr. TILLMAN. I will try to expedite it, Mr. Chairman. Thank you.

My name is Gilmore Tillman. I am assistant city attorney of the city of Los Angeles and I appear here as attorney for the Department of Water and Power of the City of Los Angeles.

My testimony will be restricted to a discussion of the proposed storage units and their effect upon those having contracts for power from downstream projects; particularly their effect upon the contracts held by the publicly owned utility which I represent, for delivery of power from Hoover Dam.

Upon this matter we have a very definite position. We believe that the construction of these units and their operation in the manner suggested at these hearings and at the hearings last year concerning the Colorado River storage project would constitute a deliberate violation, by the United States, of obligations due to the holders of contracts for the energy generated at Hoover Dam.

HISTORY OF POWER CONTRACTS

As the members of the committee undoubtedly know, the Boulder Canyon project was authorized upon a self-liquidating basis. Section 4 (b) of the Boulder Canyon Project Act required that—

> **Before any money is appropriated for the construction of said dam or power-plant, or any construction work done or contracted for, the Secretary of the Interior shall make provision for revenues by contract, in accordance with the provisions of this Act, adequate in his judgment to insure payment of all expenses of operation and maintenance of said works incurred by the United States and the repayment, within fifty years from the date of the completion of said works, of all amounts advanced to the fund under subdivision (b) of section 2 for such works, together with interest thereon made reimbursable under this Act.**

In order to comply with this section, it was obviously necessary for the Secretary to make a determination as to the amount of power which would be available from the project for sale during the 50-year period specified.

Studies and estimates were made by the Government, from which it appeared that there would be available at the inception of the project 4,330 million kilowatt-hours of firm energy annually, and that by reason of increasing upstream diversions this quantity would decrease at an annual rate of 8,760,000 kilowatt-hours. From these studies and estimates of the Government, it appeared that, in addition to this firm energy, there would be water available for the generation of very substantial quantities of secondary energy throughout the 50-year period. As an extreme illustration, even in the year 1988, the year in which uses in the upper basin were assumed to be at the maximum for the period involved, it appeared that, assuming the year to be one of average runoff, there would be approximately 2,100,000 acre-feet of water available for the generation of such secondary energy; sufficient for the generation of approximately 900 million kilowatt-hours.

It was upon the basis of these studies and estimates of the Government that the California power contracts were made in 1930 and it was, of course, these contracts which made possible the construction of the Boulder Canyon project.

From the standpoint of the contractors who agreed to take power these agreements were very firm indeed. Under them, the contractors agreed to take and/or pay for specified quantities of power. More simply stated, this meant that they were bound to pay for the power whether they had any use for it or not. I ask that the committee note carefully that one of the major contractors, Metropolitan Water District of Southern California, suffered a net loss of approximately $6 million in payments to the United States for power which it was unable to take or use.

In 1938 the United States and the city of Los Angeles entered into a supplemental contract by the terms of which the city bound itself to take and/or pay for specified quantities of secondary energy, the taking of which had theretofore been entirely optional. Under this contract the city had some $90,000 for power which it was unable to take or use.

In the preamble to this 1938 agreement, the understanding of the parties in 1930 as to firm and secondary energy is explained in the following language:

> * * * recognition was given to the fact that secondary energy cannot be relied upon as being at all times available, but is subject to diminution or temporary exhaustion, while firm energy is the amount of energy agreed upon as being available continuously as required during each year of the contract period. * * *

In 1941 the Government's estimates as to the firm and secondary energy expected to be available at the Boulder Canyon project formed the basis for new contracts with the California power contractors, including the city of Los Angeles. At this time the estimates of the Government were even more explicit than in earlier years.

As to firm energy, the formula of 4,330 million kilowatt-hours available during the year of the commencement of operations, which proved to be 1937–38, subject to annual diminution of 8,760,000 kilowatt-hours, was reaffirmed.

As to secondary energy, it was assumed that 40 billion kilowatt-hours would be available during the 50-year period ending May 31, 1987.

It was upon the basis of these estimates and assumptions that the city of Los Angeles entered into a new contract for energy from this project; a contract which fixed rates for firm and secondary energy which were, quite obviously, mutually interdependent. That is, the city's agreement to pay a particular price for the specified quantity of firm energy was based upon the assumption of the parties that, over the period of the contract, it would receive a specified share of 40 billion kilowatt-hours of secondary energy at a much lower rate.

Upon the faith of these contracts, and the studies and estimates and assumptions of the Government which underlie them, the people of Los Angeles have invested more than $30 million in 3 transmission lines from the Boulder Canyon project to Los Angeles. The committee should realize that the economic justification for the third of these lines, involving some $10 million of public funds of the people of Los

Angeles, was absolutely dependent upon the availability of secondary energy.

OBLIGATIONS OF THE UNITED STATES

I wish first to emphasize that I do not contend or even suggest that any of these estimates or assumptions by the Government constitute guaranties. They were necessarily based on two factors which could not be anticipated with certainty—the actual runoff of the Colorado River and the time of the development of upstream diversions authorized by the Colorado River compact. If, in experience, either of these factors deviates from the original estimate or assumption, and this deviation results in a diminution of secondary, or even firm power, as estimated, we have no ground for complaint.

On the other hand, it is equally clear that the United States has no right willfully and voluntarily to divert to some other purpose of its own, water which would otherwise be available for the generation of firm and secondary energy at Hoover Dam.

Upon this ground, as a representative of a public agency threatened with serious injury, I object to the construction of the storage units proposed in the bills now pending before this committee and their operation in the manner contemplated by the Department of the Interior as evidenced by House Document 364 and by testimony introduced at hearings concernig the Colorado River storage project.

CHARACTER AND PURPOSE OF STORAGE UNITS

As a preliminary, I wish to state directly and bluntly that these storage units are not required for the development of any irrigation or domestic water supply project now existing, now authorized, or now proposed for authorization in any bill before this committee.

Nor may they be shielded by the mantle of water conservation. The committee will observe that the two storage units recommended by the Secretary of the Interior will evaporate some 613,000 acre-feet annually. Compare this with the estimated stream depletion of the 11 recommended participating projects in the total amount of 401,000 acre-feet annually.

The simple truth is that at present and for the indefinite future, the sole and only useful function of these storage units will be the production of power to be sold, as a revenue-producing commodity, by the United States. In other words, it is a purely commercial matter.

It is in this light, and this light alone, that their relationship to downstream power production and power rights must be judged.

In other words, it is the relationship between the United States with some potential 6-mill power to be sold to 10 public utility companies for revenue, on the one hand, and the United States with some already developed low-cost power which is already under contract, largely to public agencies, on the other.

It is in no degree whatever a clash between water for irrigation in the upper basin as against water for power generation in the lower basin.

As to the possibility that these storage units are essential for the development of the participating projects proposed in the bills pending

before the committee, I believe that the following table fairly states the existing situation:

	Acre-feet
1. Consumptive use available without storage	4,350,000
2. Existing and authorized projects	2,500,000
3. Participating projects	1,000,000
	3,500,000
4. Consumptive use available without storage, balance	850,000

From that table you will observe that there are consumptive uses available to the extent of 4,350,000 acre-feet in the upper basin without storage; that the existing and authorized projects total 2½ million acre-feet; that the participating projects, the ones most often referred to, involve 1 million acre-feet, for a total of 3.5 million acre-feet, leaving a margin available for further consumptive use projects in the upper basin of 850,000 acre-feet without storage.

In connection with the participating projects, I might suggest that the million acre-feet will cover the 11 originally described participating projects, plus the Navaho project and the San Juan-Chama. Now, since this table was prepared—or since I first prepared it, rather—Governor Johnson has suggested the addition of further projects in Colorado, and they are mentioned in the bills—in some of the bills. Those would add another 400,000 acre-feet a year and have no material effect upon the result of this table, even if they were all authorized at this time.

Item 2 of the table does not represent present use. On the contrary, it includes the ultimate use, after all development, covering all projects either existing or authorized. Necessarily, this full development will not be reached for some years.

The margin of safety demonstrated by the tabulation speaks for itself, and I shall not labor the point.

DAMAGE TO DOWNSTREAM POWER CONTRACTORS

I have spoken of damage to the holders of contracts for power at Hoover Dam. Actually, the damage and the attendant expense is imposed upon the retail electric consumers who are served with energy generated at Hoover Dam. In the case of the city of Los Angeles this means a direct charge upon more than 800,000 electric customers of the city.

The city department which I represent is, of course, a nonprofit organization and has no source of revenue other than payments by its customers for service rendered. Therefore, every increase in cost of power purchased by the city must be passed along in the form of increased rates to its customers.

Unfortunately, the figures involved in any analysis of the electric-generation costs of a public utility are usually either so large—billions of kilowatt-hours; tens of millions of acre-feet of water—or so small—mills or fractions of mills per kilowatt-hour—as to seem to have no actual relationship to real individual people. In the course of operation, however, all these figures, large and small, are ultimately reduced to simple, direct, and readily understandable figures in dollars and cents on the individual customer's bill.

It is in this light that I wish to explain the stake that our customers, the people of Los Angeles, have in secondary energy from Hoover Dam.

Our contract contemplates that a total of 800 million kilowatt-hours of such energy will be available at Hoover Dam in a year of average runoff. Of this, the city of Los Angeles is by contract entitled to 55 percent, or 440 million kilowatt-hours. H. Doc. 364, as well as testimony at various hearings concerning upper basin storage, makes it abundantly clear that if the storage units proposed in the bills before the committee are built, the Department of the Interior intends to divert to this storage, during the "filling period," all water which would otherwise be available for secondary generation.

In an average year, the water thus diverted to storage necessarily will be replaced by 760,000 barrels of fuel oil. At a price of $1.80 per barrel, the oil thus substituted for falling water would cost $1,365,000.

On this basis, the net increase in cost to our customers for the production of power for this item alone—cost of fuel oil versus falling water charge—would be approximately $1,185,000.

In addition, of course, there would be a substantial labor expense for the operation of our fuel-burning plants; an expense greatly in excess of the generation charges otherwise payable at Hoover Dam.

Again, our three transmission lines, involving an investment of more than $30 million would be reduced in load factor far below the level contemplated when the investment was made in good faith. Since, in a normal year secondary energy constitutes more than one-fourth of the total energy taken by our system from Hoover Dam, the magnitude of the drop in load on these lines is apparent.

The committee must also remember that the system of the city of Los Angeles represents only a part of the customers now entitled to receive secondary energy from Hoover Dam. The total net extra cost for replacement fuel for all secondary energy would be, in a normal year, approximately $2,152,000.

I wish to emphasize that none of the figures which I have cited are theoretical or merely statistical in character. On the contrary, they represent things that are very tangible indeed. The 760,000 barrels of fuel oil is real oil to be purchased from real oil companies. The $1,185,000 of extra cost must be paid in real money by our individual customers.

In the case of firm energy, any diversion to storage of water necessary for the generation of the full amount contemplated by the contract is even more obviously a breach of obligation since, by formal contract, it has heretofore been recognized by the United States that—

> firm energy is the amount of energy agreed upon as being available continuously as required during each year of the contract period.

For each kilowatt-hour—or million kilowatt-hours—of firm energy withheld, the financial burden upon our consumers would be even greater than in the case of secondary energy, for they would not only be required to pay for fuel oil and operating labor, but also bear the capital costs of building fuel-burning plants.

In conclusion upon this subject of diversions to storage during the filling period, I point out that, in order to fulfill its obligations and maintain the integrity of its existing contracts, the United States must—

(1) Deliver at Hoover Dam, for the generation of firm and secondary energy, the full run of the river, less all upstream diversions for domestic and agricultural purposes, or

(2) During the filling period of the proposed storage units, deliver to the Hoover Dam power contractors, at the applicable contract firm or secondary rate, energy which in quantity and in time and place of delivery is equivalent to that which would have been generated at Hoover Dam had no water been diverted to this upstream storage, or

(3) During the filling period of the proposed storage units, make full financial reparation to the Hoover Dam power contractors for the costs to them (including capital costs, where appropriate) of the replacement of all firm or secondary energy which would have been generated at Hoover Dam had no water been diverted to this upstream storage.

All economic studies of these storage units have contemplated sale of the total power output at 6 mills with no provision for reparation for damage caused to the holders of downstream contracts. I believe that this is clearly erroneous and, if they are to be built, their economic value must be judged after charging them with the fulfillment, in the manner suggested as alternative (2) or (3) above, of the obligations of the United States to downstream contractors.

EVAPORATION LOSSES AT STORAGE UNITS—EFFECT ON DOWNSTREAM POWER GENERATION

In addition to losses of energy due to diversions to storage during the filling period, construction of these storage units would result in permanent and even more serious losses to existing downstream projects and to those having contracts for energy produced at these downstream plants.

Some hundreds of thousands of acre-feet of water would be evaporated annually at these proposed upstream reservoirs; water which would otherwise be available for power generation at Hoover Dam, at Davis Dam, and at Parker Dam.

These evaporation losses and the economic effects flowing therefrom are of such a magnitude as to require the most serious consideration by the Congress.

The annual losses of water under various alternative proposals, would be as follows:

Storage units constructed:	*Acre-feet*
Glen Canyon and Echo Park	613,000
Glen Canyon, Echo Park, Curecanti, and Flaming Gorge	725,000
Colorado River storage project, complete (10 dams)	846,000

You will observe that I have divided this into three possible situations. One is with only Glen Canyon and Echo Park built. That would result in the evaporation of 613,000 acre-feet annually. If the 4 dams mentioned in H. R. 3383 were built, that is, Glen Canyon, Echo Park, Curecanti and Flaming Gorge, the reservoir losses would be 725,000. And if the full Colorado River storage project were completed, with 10 dams, the losses would be 846,000.

I may say that the figure, 846,000, is, in my opinion an understatement; must be an understatement. It is derived from H. R. 364, and

in testifying this year as to various of these dams, those figures have been changed on some of the dams. I do not have them all; so I can't make a direct revision of the 846,000 and have therefore accepted the figure of last year.

As a matter of proportion, I remind the committee that the 11 participating projects recommended by the Secretary involve total stream depletions of only 401,000 acre-feet, as compared with 846,000, more than twice in amount.

These evaporation losses will have a direct adverse effect upon power production at existing downstream plants now owned and controlled by the United States; plants whose total potential output is now under commitment by contract.

The measure of this loss may be most simply stated in terms of lost kilowatt-hours as follows:

Storage units constructed	*Kilowatt-hours lost annually*
Glen Canyon and Echo Park:	
Hoover	260, 00, 000
Davis	67, 000, 000
Parker	37, 000, 000
	364, 000, 000
Glen Canyon, Echo Park, Curecanti, and Flaming Gorge:	
Hoover	307, 500, 000
Davis	79, 000, 000
Parker	43, 500, 000
	430, 000, 000
Colorado River storage project, complete (10 dams):	
Hoover	360, 000, 000
Davis	92, 000, 000
Parker	51, 000, 000
	503, 000, 000

The loss of these kilowatt-hours would, in turn, result in a direct financial loss to the United States and to those having contracts for energy at the downstream projects. The United States obviously loses the revenues which it would have received through sale of the energy had it not been lost.

As to the direct financial losses to the United States, these may be stated as follows:

Storage units constructed	*Annual revenue losses*
Glen Canyon and Echo Park:	
Hoover	$115, 000
Davis	201, 000
Parker	37, 000
	353, 000
Glen Canyon, Echo Park, Curecanti, and Flaming Gorge:	
Hoover	136, 000
Davis	238, 000
Parker	44, 000
	418, 000

Storage units constructed—Continued

	Annual revenues losses
Colorado River storage project, complete (10 dams):	
Hoover	$159,000
Davis	276,000
Parker	51,000
	486,000

I will summarize this table that with the minimum of 2 dams built, the annual revenue losses to the United States would be $353,000; with 4 dams built it would be $418,000 in lost revenues; and with the complete project, it would be $486,000 lost annually.

But these direct-revenue losses to the United States are only a part of the total loss here involved. The power contractors at the downstream projects would also suffer severe losses; losses which I believe the United States is morally and legally bound to make good. These losses are well illustrated by the situation of the city department which I represent.

Loss of water through evaporation will reduce the amounts of secondary energy and Metropolitan Water District unused energy available to the city of Los Angeles at Hoover Dam. This reduction will range from 150 million kilowatt-hours to well over 200 million kilowatt-hours annually, depending upon whether two dams—Glen Canyon and Echo Park—or 10 dams be constructed upstream. It will be necessary to replace these kilowatt-hours with energy generated at fuel burning stream plants at a cost, for fuel alone, greatly in excess of the contract charge for "falling water" at Hoover.

This net excess cost for steam generated energy would be approximately as follows:

Storage units constructed

		Annual excess cost
Glen Canyon and Echo Park:		
Hoover "secondary"	$379,500	
MWD "unused"	18,000	
		$397,500
Glen Canyon, Echo Park, Curecanti and Flaming Gorge:		
Hoover "secondary"	442,500	
MWD "unused"	21,500	
		464,000
Colorado River storage project complete, 10 dams:		
Hoover "secondary"	525,000	
MWD "unused"	25,000	
		550,000

This range from $397,500 of excess cost under minimum conditions to $550,000 with full development of the Colorado River storage project is shown in the tabulation.

But the city of Los Angeles is not the only power contractor at Hoover which would suffer financial loss. Other contractors would face the same problem of steam replacement of power otherwise available from Hoover. The aggregate of the losses to Hoover contractors would be approximately as follows:

Storage Units Constructed

		Annual excess cost
Glen Canyon and Echo Park:		
Hoover "secondary"	$690,000	
MWD "unused"	57,000	$747,000
Glen Canyon, Echo Park, Curecanti and Flaming Gorge:		
Hoover "secondary"	816,000	
MWD "unused"	67,500	883,500
Colorado River storage project complete, 10 dams:		
Hoover "secondary"	957,000	
MWD "unused"	79,000	1,036,000

And the committee will observe the range from a minimum loss of $747,000 annually to an optimum loss of $1,036,000 annually under full development.

I ask the committee to bear in mind that the losses which I have mentioned are annual losses which will continue at least until the expiration of the Hoover contracts in 1987.

I am not familiar with the provisions of the contracts covering energy from Davis Dam and Parker Dam; nor do I know the steam replacement costs of the various contractors. For this reason, I offer no comment as to the possible financial losses to the contractors at these projects. However, it is clear that a substantial amount of energy would have to be replaced through steam generation.

In estimating the economic value of the proposed storage units and their appurtenant electric generating facilities, it would seem obvious that these resultant downstream financial losses must be taken into account as a charge against the anticipated revenues. As the most elementary example, I cite the direct revenues which would be lost to the United States. Yet I know of no report or financial analysis of these storage projects in which these losses are recognized or accounted.

Should the proposed storage units be constructed, then in order to fulfill its obligations and maintain the integrity of its existing contracts the United States must make reparation to the Hoover power contractors—in the manner which I have suggested for losses during the "filling period"—for all firm and secondary energy lost to the contractors through evaporation at the proposed storage reservoirs. A specific requirement to this effect should be a part of any bill authorizing the storage units.

Thank you very much, and I am very sorry to have overrun my allotted time.

Mr. ASPINALL. You did very well, Mr. Tillman. The Chair is very appreciative.

The Chair calls to the witness stand Mr. James H. Howard, general counsel for the Metropolitan Water District of Southern California.

We are glad to have you, Mr. Howard. The Chair will be very appreciative if you will confine your remarks to 15 minutes.

STATEMENT OF JAMES H. HOWARD, GENERAL COUNSEL, FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Mr. HOWARD. I will certainly attempt to do that, Mr. Chairman. I appreciate the opportunity to be here.

I may say that in addition to my assignment as general counsel for the Metropolitan Water District, I am here on behalf of Mr. Joseph Jensen, a former resident of the State of Utah, by the way, who is now the chairman of the board of the Metropolitan Water District and also a member of the Colorado River Board. He is unable to be here because of illness.

Mr. Chairman and gentlemen of the committee, I appear before you on behalf of the Metropolitan Water District of Southern California, which is a public and municipal corporation, more limited in its powers than the ordinary city, but similar in its corporate structure.

In recent years, due to the increasing water requirements, the district has been territorially expanded to include an area of about 2,700 square miles, lying on the coastal plain of southern California, extending from the Santa Monica-Los Angeles area on the north to the San Diego area on the south. There are 66 incorporated cities within the district. Its population exceeds 6 million and its assessed valuation is approximately $8 billion.

The district was incorporated in 1928 for the express purpose of financing the construction, operation, and maintenance of works to import water from the Colorado River for use on the coastal plain of southern California. It was designed to provide an instrumentality by which the metropolitan area of southern California could avail itself of the benefits of the Boulder Canyon Project Act. That act was adopted by the Congress in December of 1928, the same month in which the Metropolitan Water District was incorporated.

In 1931 the people of the district voted a bond issue in the sum of $220 million for the construction of the Colorado River aqueduct. In the early thirties, district bonds were sold to the Reconstruction Finance Corporation, there being no public municipal bond market at that time. Later, however, the RFC sold all of its holdings of district bonds to private and institutional buyers.

Incidentally, the RFC made a profit of about $14 million on the deal.

There is no Federal money in the Colorado River aqueduct. It was constructed, and is sustained, by money derived from local taxation and from the sale of water. Other than current water and power bills, we owe nothing to the United States.

In 1931 the district entered into an agreement with other California water-using agencies, relating to the respective priorities in the use of Colorado River water. Because of long-established rights in agricultural areas, particularly the Imperial Valley and the Palo Verde area, the district, in that agreement, accepted a junior position in the priority scale. Later the district entered into a water-delivery contract under the Boulder Canyon Project Act, executed on behalf of the United States by the Secretary of the Interior and calling for the delivery of specified quantities of water from storage at Lake Mead, in accordance with the California priorities so agreed upon.

The original district contract as amended in 1931 obligated the United States to deliver to the district from storage at Lake Mead water

in the amount of 1,100,000 acre-feet per annum. San Diego held a similar contract calling for delivery of 112,000 acre-feet per annum. When the San Diego County Water Authority was annexed to the metropolitan water district in 1946, the two contracts were merged and are now held by the district. The aggregate district contract water right is 1,212,000 acre-feet per annum, delivered at Parker. This right, by the seven-party priority agreement of 1931, is subject to a prior agricultural right of 3,850,000 acre-feet per annum, and is, of course, subject to the Colorado River compact and the Boulder Canyon Project Act.

The district also holds a contract for electrical energy from the project, the use of such energy being limited to pumping water into and in the Colorado River aqueduct.

The area of the district has become an extremely important defense area. Not only are great aircraft industries centered in the Los Angeles and San Diego areas, but many other industrial developments have taken place, adding to the Nation's defense potential which must be sustained with an adequate water supply.

For these reasons the district is vitally interested in the continuity of water supply in the lower basin from the Colorado River system, both as a source of domestic and municipal water and a source of power. We now find that supply threatened by proposed legislation predicated upon a distorted interpretation of the Colorado River compact, under which the water available for use in the lower basin would be substantially reduced below the amount relied upon by the State of California and the California contractors for water storage and delivery, at the time of ratification of the compact and execution of the seven-party priority agreement and the water and power contracts.

The Boulder Canyon Project Act had been pending in various forms before the Congress for about 10 years prior to its adoption in 1928. The States in the upper reaches of the Colorado River system resisted the passage of the act in its first stages because they believed, with considerable justification, that development in the lower basin and the use of water for domestic, agricultural, and power purposes would establish priorities inconsistent with the development of the upper basin. It was about that time that the case of *Wyoming* v. *Colorado* (259 U. S. 419) was decided, in which the Federal Supreme Court held that, as between States applying the appropriation doctrine, first-in-time in the use of water would be first-in-right, regardless of State lines. As a result of this situation, the Colorado River compact was negotiated and signed in draft form by the negotiators at Santa Fe, N. M., in 1922. The compact abrogates the law of appropriation, as between the upper and lower basins of the Colorado River system, and reserves to the States of the upper basin, in perpetuity, the right to the beneficial consumptive use of 7,500,000 acre-feet per annum of the waters of the Colorado River system. This was one of the commitments which California was required to make as a condition precedent to the development of the Boulder (now known as the Hoover) Dam project.

Without going into detail as to the history of the compact, suffice it to say that ultimately 6 of the States involved, including California,

waived the requirement of 7-State ratification and ratified the compact as a 6-State compact. This was done in the light of Arizona's failure and refusal to approve and ratify the compact.

When the bill which became the Boulder Canyon Project Act was on the floor of the Senate, and because Arizona had refused ratification of the compact, an amendment was developed which called upon California to make another commitment with respect to the use of Colorado River water. It was provided in section 4 (a) of the act that in the absence of a 7-State compact, and as an alternate thereto, the Project Act might be proclaimed effective upon 6-State ratification, including California, and the adoption by the California Legislature of an act agreeing, for the benefit of the other States of the basin, to limit consumptive use of Colorado River system water in California to 4,400,000 acre-feet per annum of the water apportioned to the lower basin by article III (a) of the compact, plus one-half of the excess or surplus water unapportioned by the compact. At the end of the 6-months period prescribed by the act, the President proclaimed that there was no 7-State compact, that 6 of the States, including California, had ratified, that California had done what was required of her under the Project Act, that is, adopted the Limitation Act. Upon the basis of the facts so found, the Presidential Proclamation put the Project Act into effect as of July 25, 1929.

We now have two agreements to consider (1) The Colorado River compact; and (2) the agreement between California and the United States made for the benefit of all of the other States of the basin, limiting the California use of Colorado River water. We have dubbed the latter agreement the "statutory compact." The meaning and effect of those two agreements are now involved in litigation between Arizona and California, litigation to which the United States has become a party by intervention, as has the State of Nevada.

At the time the metropolitan water district entered into its contract with the United States for Lake Mead water, accepted a junior position in the scale of California priorities, and undertook to construct its costly works, there were certain generally accepted meanings attached to the Colorado River compact and the statutory compact. In reliance upon these interpretations the district voted a $220 million bond issue, sold its bonds and proceeded with the construction of costly works and developed an extensive economy based on the full effectiveness of its water-delivery contract.

The bills before you provide that the projects authorized shall be subject to the Colorado River compact, but the availability of water to serve the projects sought to be authorized has been computed on the basis of a reading of that document which departs radically from the meaning and intent expressed in the compact itself and stated of record by representatives of the several States at the time of ratification. These same distortions of the compact are now before the Supreme Court in *Arizona* v. *California.*

In the pending litigation there are many issues of interpretation which affect the basic meaning of the Colorado River compact and which will affect the amount of use of apportioned water of the Colorado River system available to the States of the upper basin and the correlative amount upon which the lower basin can rely. I will not go into all of these issues, but will discuss two of the major questions

which have a substantial and direct bearing upon the availability of water for beneficial consumptive use in the upper basin, and the resultant availability of water for use in the lower basin. It is because of the distortion of the meaning of the Colorado River compact, evidenced by the upper basin Colorado River compact and reports by the Bureau of Reclamation and the Department of the Interior in support of the pending legislation, that we find it necessary to appear here in opposition to the bill. In addition to the questions of compact interpretation now before the Court, we find an additional uncertainty interjected into the situation by the position of the United States in the pending litigation, particularly that relating to water uses by Indians and Indian tribes.

I will mention that point somewhat more fully later, but turn now to two basic questions of interpretation in which the States of the upper basin have departed from the meaning of the compact as it was understood and relied upon by California agencies, including the Metropolitan Water District.

The compact apportions water to the upper and lower basins, respectively, in terms of "beneficial consumptive use." That phrase is not defined in the compact. However, at the time the compact was made, Mr. Delph Carpenter, the Commissioner from the State of Colorado, and one of the authors of the document, made a report to his legislature which was reprinted in the Congressional Record, 70th Congress, 577–586, December 14, 1928. Mr. Carpenter said:

> The term "beneficial consumptive use" is to be distinguished from the amounts diverted from the river. It does not mean headgate diversions. It means the amount of water consumed and lost to the river during uses of the water diverted. Generally, speaking, it is the difference between the aggregate diverted and the aggregate return flow. It is the net loss occurring through beneficial uses.

Later, in a supplemental report, Mr. Carpenter elaborated on the point, saying:

> In my original report (printed in the Senate Journal of January 5, 1923) I discussed and defined the term "beneficial consumptive use." In addition to the discussion there contained, I might add there is a vast difference between the term "beneficial use" and the term "beneficial consumptive use." A use may be beneficial and at the same time nonconsumptive or the use may be partly or wholly consumptive. A wholly consumptive use is a use which wholly consumes the water. A nonconsumptive use is a use in which no water is consumed (lost to the stream). "Consume" means to exhaust or destroy. The use of water for irrigation is but partially consumptive for the reason that a great part of the water diverted ultimately finds its way back to the stream. All uses which are beneficial are included within the apportionments (i. e., domestic, agricultural, power, etc.). The measure of the apportionment is the amount of water lost to the river. The "beneficial consumptive use" refers to the amount of water exhausted or lost to the stream in the process of making all beneficial uses. As recently defined by Director Davis, of the United States Reclamation Service, it is the "diversion minus the return flow" (Congressional Record, January 31, 1923, p. 2815). Water diverted and carried out of the basin of the Colorado River by the Strawberry, Moffat, or other tunnels or by canal into the Imperial Valley is wholly consumed as regards the Colorado River, because no part of it ever returns to that stream system.

The same meaning was expressed in the Boulder Canyon Project Act, being condensed to the phrase "diversions less returns to the river" (sec. 4 (a)). In the Mexican Water Treaty signed in 1944 and ratified with certain reservations April 18, 1945, the same description of beneficial consumptive use occurs, stated in more detail.

Now we find in the upper Colorado River basin compact of 1949 a provision (art. VI) that consumptive use shall be determined by the "inflow-outflow method in terms of man-made depletions of the virgin flow at Lee Ferry."

By this deviation from the compact as described by Mr. Carpenter, an attempt is made to convert the Colorado River compact from a compact relating to the entire Colorado River system to a main-stream compact. The States of the upper basin do not propose to measure their consumptive use by the amount of water burned up or lost in the process of use in the manner described by Mr. Carpenter, but to determine the depletion of the river at a point on the main stream many miles from the actual places of use. The most outstanding illustration of this distortion of the compact is found in its application to transmountain diversions.

Under the definition advanced by Mr. Carpenter, water diverted out of the basin was 100 percent consumptively used, because none of it could ever return to the stream system. Under the method now advocated in the upper basin, water which would have been lost by evaporation, seepage, or otherwise, between the point of transmountain diversion and Lee Ferry would not be considered as consumptively used. If, for example, the transmountain diversion takes 1,000,000 acre-feet out of the natural basin hundreds of miles above Lee Ferry, and 200,00 acre-feet of such water would, if not diverted, have been lost by evaporation and transpiration before reaching Lee Ferry, the upper basin would charge itself with the beneficial consumptive use of only 800,000 acre-feet.

In other ways the upper basin States now propose to use salvaged and conserved water without charging themselves for its beneficial consumptive use under the compact. Only the effect at Lee Ferry is considered. The result of the change in the concept of beneficial consumptive use reflected in acre-feet per annum has been variously estimated, but is probably between 300,000 and 400,000 acre-feet per annum additional water used in the upper basin without charge.

Another illustration of the attempt on the part of the States of the upper basin to distort the compact is in the use of cumulative averages as to the measure of beneficial consumptive use instead of making that determination on an annual basis as provided in the compact. Article III (a) of the compact apportions water in terms of beneficial consumptive use per annum. Water used in any one year in excess of that amount should be classed as use of surplus. On page 152 of House Document 364, 83d Congress, which is the Interior Department's report on the Colorado River storage project, appears a table which demonstrates the point. The table contains a column entitled "Virgin flow of the Colorado River at Lee Ferry," and a second column entitled "Ultimate use of upper basin apportionment." The latter, accepting the erroneous upper basin compact meaning of "beneficial consumptive use," is explained in a note to refer to "use apportioned by Colorado River compact measured in terms of man-made depletions at Lee Ferry." The table covers a period from 1914 to 1947 and shows depletions exceeding 9,000,000 acre-feet in the years 1914, 1917, 1920, and 1921—lesser depletion in other years—reaching a low in the year 1934 of 4,480,000 acre-feet.

The table shows an average ultimate use in terms of depletion at Lee Ferry of 7,500,000 acre-feet per annum during the period 1914–45, and treats such average as the annual use of water apportioned to the upper basin. The authors of the report and the proponents of the upper Colorado River basin storage bill obviously are working on the theory that the apportionment made by article III (a) was made in terms of averages rather than in terms of uses per annum. They take the position that in 1 year, depletion in the amount of 9,000,000 acre-feet may properly be treated as use of apportioned water, if, in another year, 6,000,000 acre-feet is so used, with a resultant average of 7,500,000 acre-feet. Over the period covered by the table referred to, this method of computation results in an increase in the use of water treated by the upper basin States as apportioned, in the average amount of 1,300,000 acre-feet per annum during the period covered by the table referred to.

These changes in the meaning of the compact, as understood and relied upon by California at the time of its ratification and relied upon by the Metropolitan Water District at the time of execution of its water-delivery contract and the investment in its physical works, have a direct bearing upon the water available for use in the lower basin. The total difference exceeds 1,500,000 acre-feet per annum.

This situation, combined with the guaranty made to Mexico in 1945 of 1,500,000 acre-feet per annum, creates an intolerable situation in the lower basin. The Metropolitan Water District cannot acquiesce in the enactment of congressional legislation predicated upon false assumptions with respect to the availability of water for use in the upper basin, those assumptions of availability being predicated upon a compact twisted out of shape by interpretations unheard of at the time the obligations of parties to the compact were assumed.

Another disturbing element in the picture relates to the uses of water by Indians and Indian tribes. The Colorado River compact contains a provision that (article VII):

> **Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian tribes.**

In the report to which I referred earlier, Mr. Delph Carpenter of Colorado made the statement that article VII was put in for the purpose of protecting the obligations of the United States to the Indian tribes, and avoids necessity of conditional ratification of the compact by the Congress. He added that:

> *** * * the apportionment to each basin includes all such necessary diversions.**

The States of the upper basin, in their compact, have followed the principle stated by Mr. Carpenter and have agreed that the use of water by the United States for its wards is chargeable against the State wherein such water is used. However, in its petition of intervention filed in the action now pending between Arizona and California, the United States alleges that:

> *** * * the rights to the use of water of the Indians and Indian tribes are in no way subject to or affected by the Colorado River compact.**

Further, the United States denies (XXXIV):

> *** * * that section 8 and section 13 (b), (c), and (d) of the Boulder Canyon Project Act subject all of its rights to the provisions of the Colorado River compact, and in that connection refers to the Colorado River compact itself, for greater certainty and clarity, particularly article VII of the compact.**

The allegations of the pleading leaves us in serious doubt as to the position to be taken by the United States. The flat statement that the rights to the use of water for the Indians and Indian tribes are in no way subject to or affected by the Colorado River compact may be read to mean that the water apportioned by the compact is in addition to and comes after the satisfaction of all Indian claims.

In the course of a pretrial conference conducted at Phoenix, Ariz., on October 5, 1954, counsel for the Government, Mr. Rankin and Mr. Veeder, were present. The discussion centered around a statement of the issues to be determined. In the course of the discussion, Mr. Ely, representing the State of California, said:

> * * * As to some of these issues, particularly those relating to the Indians you just mentioned, I might as well say now that we want some clarification of the Government's position at an appropriate time, perhaps in this statement of issues, as to whether they claim that the Indian uses are inside or outside the Colorado River compact; not only just what and where and how big these Indian claims are but whether they are charged to the State in which they are located or whether they are outside of and ahead of the compact. We think that is one of the things that has to be determined before we get into a presentation of testimony.

Later in the proceedings the special master appointed by the court to hear the case addressed this question to Mr. Rankin, counsel for the Government:

> What do the Indians claim?

To which Mr. Rankin responded:

> That is one of the things I am going to undertake to present to you along with the issues.

Mr. Kane, one of counsel for the State of Nevada, then said, without being in any way contradicted:

> For the benefit of Government counsel, I am one of the outsiders looking in, but for some 10 years I advised the Indians and I merely state this with no point of criticism but I don't think there is any Government policy on what the rights of the Indians may be. I don't know what department or agency in the Government to go to, certainly not the Indian Service, and in your pleadings you haven't made that too clear and I think, as Mr. Ely has pointed out, that is a very important issue and that may have to be determined in advance of either California's or Nevada's answers. I wouldn't know from the pleadings and experience I have had with the Indians what is being claimed in their behalf.

Whether the claims of Indians are inside or outside the compact has a substantial bearing on the availability for use of the waters apportioned to the upper and lower basins, respectively, by the Colorado River compact. In its pleading, the United States sets up the Indian claims in Arizona on the main stream and the Gila as aggregating about 1,500,000 acre-feet per annum in terms of diversion. That would probably mean a beneficial consumptive use, as we understand the term, approaching a million acre-feet. In the States of the upper basin—Colorado, New Mexico, and Utah—the ultimate annual diversions for Indian uses were set up by the Interior Department in a comprehensive report on the Colorado River, dated March 1946, page 261.

In Colorado the ultimate acreage was set up as 20,350 acres, with a diversion duty of 72,750 acre-feet per annum. In New Mexico the ultimate acreage is set up as 113,000 acres and the ultimate diversion as 665,000 acre-feet per annum. In Utah the ultimate acreage is set up as 99,085 and the ultimate diversion duty as 298,510 acre-feet per annum. Here again, the uses are expressed in terms of diversion rather

than beneficial consumptive use. However, on the basis of the consumptive use of 1.5 acre-feet per annum, a consumptive use of three hundred and eighty-odd-thousand acre-feet per annum would result.

If such use is not to be classed as use of apportioned water, but is to be taken out of the stream ahead of apportioned water, the availability of water for use in the lower basin is reduced in approximately the amount mentioned, that is, 380,000 acre-feet per annum.

Obviously, what is true with respect to the Arizona-California controversy would be true with respect to the upper basin, that is, if the Indian claims in Arizona come ahead of the compact, the same would be true in Colorado, New Mexico, and Utah. With this uncertainty confronting us, the Metropolitan Water District of Southern California cannot acquiesce in, and must oppose, the adoption of pending congressional legislation. We agree with the position taken by the upper basin States in that particular, but so long as the United States takes, or reserves the right to take, the position that Indian uses are ahead of and outside the compact, computations as to the availability of water cannot be depended upon.

For the reasons herein outlined, and for the purpose of protecting the Metropolitan Water District of Southern California in the full use of its contract water, we urge that the enactment of this legislation be deferred at least until we find out what the Supreme Court is going to do in the case of *Arizona* v. *California* now pending.

I would like to take this opportunity, Mr. Chairman, to comment on some matters that are not in the prepared statement.

As you will notice in the statement, all of our water delivery contracts are in terms subject to the Colorado River compact. But the Colorado River compact, as we understood it, and as it was generally understood at the time these contracts were made, is not the Colorado River compact that is now being forced upon us or that an attempt is being made to force upon us by the interpretations that appear to control the reports and recommendations of the Bureau of Reclamation, and which appear in the upper basin Colorado River compact.

In that particular I refer specifically to the method of determination of beneficial consumptive use.

The compact that we ratified and the compact upon which we relied was one in which beneficial consumptive use was measured at the site of the use rather than by a depletion at Lees Ferry, as is now asserted.

It was a compact in which we dealt with average uses per annum and not with averages over a long period of time. It was a compact in which all water unused by the upper basin for domestic and agricultural purposes would be permitted to flow to the lower basin, and in reliance upon that compact, we proceeded. And we did not in any way proceed in secret in these matters.

You will recall that these contracts were made in 1931. In 1932 the Congress of the United States granted to the Metropolitan Water District a right of way across the desert in the San Bernardino-Los Angeles-Riverside County areas for the express purpose of constructing an aqueduct to convey water to the coastal area from the Colorado River.

In the committee report—I think at that time it was the Committee on Irrigation and Reclamation—and in the debates on the floor, the quantity of water that the district undertook to convey was specifi-

cally mentioned and discussed and the existence of its water delivery contracts was disclosed to the Congress and made the subject of debate.

Later, the Congress acted again with respect to the Metropolitan Water District situation.

In 1932, we made a contract with the United States by which the Metropolitan Water District undertook to finance the construction of Parker Dam. It is designated as a cooperative contract for the construction of Parker Dam and appears in the Hoover Dam documents as appendix 1201. Under that contract, the district provided the money for the construction of the Parker Dam. The dam was specifically authorized, and it appears in that contract that its purpose was to provide a diversion point and a source of energy for the district.

The district, although it paid the entire cost of the structure with the possible exception of, I think, $600,000 of PWA money that went into it, retained one-half of the power privilege and secured a point of diversion at an increased elevation. Every foot of elevation you can reduce the pump lift is a matter of extreme value over the years.

The United States undertook the construction of that dam pursuant to the contract, but met resistance from the State of Arizona. In fact, the State called out the militia and what we facetiously called the Arizona Navy to block the construction.

Thereupon, the United States sued the State of Arizona to enjoin the State and its agencies from interfering with the construction of the dam.

The United States lost that suit. It was held that the Secretary of the Interior lacked the proper statutory authority to proceed with the construction of the dam.

Thereafter, in August of 1935, an act of the Congress was adopted which specifically authorized the construction of Parker Dam. It appears in 49 Statute 1039, approved August 30, 1935.

In that act, the Parker Dam on the Colorado River was specifically authorized, and all contracts and agreements which have been executed in connection therewith are hereby validated and ratified.

Now, in that contract, which was so validated and ratified, that is, the basic cooperative construction for Parker Dam, both the water delivery contract and the power contract are specifically mentioned. So that the language is "all contracts and agreements which have been executed in connection therewith are hereby validated and ratified."

At that time, the Congress was well aware of what the Metropolitan Water District had done and was doing, and it was generally accepted that the contracts were good and represented water which the United States could lawfully deliver to the Metropolitan Water District in compliance wih the Colorado River Compact and the Boulder Canyon Project Act, as those documents were read at the time.

Again, after the San Diego area was annexed to the Metropolitan Water District, the Congress authorized the construction of an aqueduct running from the Metropolitan San Jacinto tunnel down to the San Vicente Reservoir in San Diego County.

That statute is dependent for its effectiveness upon the validity of the contract under which the Metropolitan Water District takes the water from Hoover Dam and conveys it over for use in southern California.

If that contract is not good, the United States, in authorizing the construction of the San Diego aqueduct, made a terrific blunder. And I do not think they did. I think those contracts are good. It is our function to protect them. And in doing so, we feel that we are justified and, in fact, required to use all defenses available to us. We have an enormous investment in this aqueduct. We have developed an economy dependent upon it. And we feel that we are not called upon to pull our punches in any way in defeating any action on the part of the Congress that would impair the ability of the United States to perform those contracts as we understood them, as everyone else understood them, as we relied upon them and made investments upon them. And we intend to do that both in the Congress and in the courts.

The Metropolitan Water District's board adopted a resolution at its meeting held March 8, 1955, a relatively short document. May I ask that that resolution be made a part of the record at this point, please?

Mr. ASPINALL. Unless there is an objection, the resolution of the Board of Directors of the Metropolitan Water District of Southern California, under date of March 8, 1955, shall be made a part of the record.

(The resolution referred to follows:)

RESOLUTION 4577, BOARD OF DIRECTORS, THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Whereas during and since World War II the coastal plain area of 2,691 square miles now served water from the Colorado River by the Metropolitan Water District of Southern California has been and continues to grow daily as a defense area of major importance to the military forces of the United States and allied members of the United Nations; and

Whereas not only are the great aircraft industries centered in Los Angeles and San Diego, but many other industrial developments have and are now taking place, adding to the Nation's defense potential which must be served with an adequate water supply; and

Whereas a population of about 6 million in the 66 cities located in 5 Southern California counties, served by the Metropolitan Water District of Southern California, also is dependent upon the aforementioned source of water; and

Whereas there is now pending in Congress bills which if enacted would authorize the construction of a number of large dams and irrigation works in the upper basin of the Colorado River, these bills being specifically the upper Colorado River Basin project bills, S. 500, H. R. 270 and H. R. 3383; and

Whereas the aforesaid bills threaten southern California's contracted share of Colorado River water, both as to quantity and quality; and

Whereas the Colorado Riber Board of California has placed itself on record strongly in opposition to the aforesaid bills; and

Whereas these proposals are similar to the same which failed to win congressional approval last year and are based on a distorted interpretation of the Colorado River compact of 1922. These distorted interpretations are adverse to the defense program of the Nation in general and to the future growth and industrial expansion of southern California in particular. These distorted interpretations are now under attack in the Supreme Court case of *Arizona* v. *California* now pending; and

Whereas the Metropolitan Water District of Southern California is one of the principal contractors, under the Boulder Canyon Project Act, for the storage and delivery of water from Lake Mead and for the delivery of electrical energy from the Hoover powerplant, and has a vital interest in the water available to the lower basin of the Colorado River under the Colorado River compact, both as to quality and quantity, and also has a vital interest in the continued production of electrical energy from the Hoover powerplant in accord with estimates upon which the United States and California agencies relied in financing the project: Now, therefore, be it

Resolved, That the enactment of said bills is against the interests of the Metropolitan Water District of Southern California and other California agencies, and should be opposed; be it further

Resolved, That the Metropolitan Water District of Southern California respectfully requests the representatives of the State of California in the Congress of the United States to oppose the enactment of the said bills or similar legislation, and further requests the municipalities and other agencies constituting the area of the Metropolitan Water District of Southern California to join in requesting and urging such opposition.

I hereby certify, that the foregoing is a full, true and correct copy of a resolution adopted by the board of directors of the Metropolitan Water District of Southern California, at its meeting held March 8, 1955.

[SEAL] A. L. GRAM,

Executive Secretary, the Metropolitan Water District of Southern California.

Mr. HOWARD. That is all I have at this time, Mr. Chairman.

I will be available for examination tomorrow, if that is in order.

Mr. ASPINALL. The next witness is Mr. Samuel B. Morris, member of the Colorado River Board of California, general manager and chief engineer of the Los Angeles Department of Water and Power.

STATEMENT OF SAMUEL B. MORRIS, GENERAL MANAGER AND CHIEF ENGINEER, LOS ANGELES DEPARTMENT OF WATER AND POWER, AND MEMBER, COLORADO RIVER BOARD OF CALIFORNIA

Mr. MORRIS. Mr. Chairman and members of the committee, my name is Samuel B. Morris. I am general manager and chief engineer of the Los Angeles Department of Water and Power and a member of the Colorado River Board of California.

The department of water and power furnishes water and electricity to the 2,150,000 residents of the city of Los Angeles.

The Department has contracts with the Secretary of the Interior for nearly 18 percent of the firm power production at Hoover Dam and is one of the agencies which guaranteed to purchase and pay for power if not used by the States of Nevada, Arizona, and certain other users. Prior to withdrawal of Hoover power by the States of Arizona and Nevada, the Department used as much as 53 percent of the output of Hoover Dam.

The Department, as agent for the United States, generates power for the States of Arizona and Nevada, the Metropolitan Water District of Southern California and the cities of Pasadena, Glendale, and Burbank as well as Los Angeles. Accordingly, the Los Angeles Department of Water and Power is vitally interested in maintenance of its 50-year contract for purchase of power which continues until the year 1987.

Los Angeles taxpayers have paid nearly $140 million to the Metropolitan Water District of Southern California for its Colorado River Aqueduct. The city of 2,150,000 people is dependent upon Colorado River water for a portion of its present needs and to take care of all of the continued expansion of population and industry.

I appear before you in opposition to the five bills before your subcommittee to authorize the Colorado River storage project and participating projects. They are H. R. 270, H. R. 2836, H. R. 3383, H. R. 3384, and H. R. 4488.

The substantial variation in these bills having to do with the number of projects authorized and the manner of repayment makes it difficult or, I should say, impossible to be certain that the specific reference to one of these bills will be pertinent to the provisions of a bill your subcommittee may finally consider. Accordingly, I have made certain studies of the cost to the Nation's taxpayers of various policies of the Government in authorizing water projects including some in the bills before you.

But before doing so, I should like to mention studies made last year. I did not have the opportunity of testifying before your subcommittee but in July of 1954 I had the privilege of filing a statement with the Senate Committee on Interior and Insular Affairs on S. 1555 which appears in the published transcript of those hearings which I should like to mention, but not to repeat the testimony which is available to your committee. I do wish, however, to refer to this prior presentation, which called attention to the departure from existing reclamation law by substantial use of the "one basin account," the planned repayment under the Collbran formula, and extending these payments for 100 years or longer. This is in contrast to the existing general reclamation law which provides for irrigation repayments in substantially equal installments in a 40-year period after a 10-year development period.

Under the Collbran formula the irrigators, within the limit they can pay of 10 to 25 percent of the cost allocated to irrigation, would make these payments over a 50-year period following a 10-year development period. However, repayment of the 75 to 90 percent of the cost to be returned from power revenues would not even be commenced until after a 40- or 50-year period required to return the power investment with interest. Consequently, the interest charges borne by the general taxpayer are vastly greater under the Collbran formula than under the general reclamation law.

I cited the single example of the Shiprock division of the Navaho project. The total construction cost of that project was estimated to be $178,825,000, or $1,630 for each of the 109,000 acres to be irrigated, and the construction and development period was to extend from 1958 to 1985 according to a tabulation included with testimony by the Commissioner of Reclamation at the hearings before the House Committee on Interior and Insular Affairs. Of this cost, $13,300,000 was to be repaid by the irrigators without interest during the period 1970–2035. The balance, $165,500,000 was not to be repaid until the period 2020–35. Assuming an interest rate of 2½ percent per annum, compounded semiannually on the funds advanced by the taxpayers for construction of these works, less repayments as made by irrigation and power, would result in costs accumulated to the year 2035 in the total amount of $782,393,000, or $7,200 per acre. This cost to the taxpayers is more than four times the total construction cost. Anyone who borrows money is familiar with the piling up of interest costs where repayment of capital is so long delayed.

It is difficult to obtain precise figures from the several bills before you. However, based upon the total cost allocations on the 5 storage

projects and the 15 participating projects, the Bureau of Reclamation presents these figures:

Total construction cost		$1,464,978,100
Allocated to irrigation		681,862,200
To be repaid by water users		169,816,500
Less repayments for domestic and industrial use included in above:		
Central Utah project	$45,500,000	
San Juan-Chama	26,775,000	72,275,000
To be repaid by irrigators		97,541,500
Percentage of irrigation allotment		14.3
Percentage of irrigation allotment for 12 initial projects only		12.0
Lands to be irrigated:		
New land (acres)		280,270
Supplemental irrigation (acres)		484,870
Total (acres)		765,140
(*a*) Average cost per acre new and supplemental		$891
(*b*) Average cost to new lands assuming supplemental irrigation charged at one-third rate for new lands		$1,540

Under the Collbran formula of repayment of the power costs with interest followed by power paying for the 75 percent of the cost without interest the irrigator is unable to repay, the hidden costs to the taxpayer at 2½ percent compound interest become (*a*) $3,320, and (*b*) $5,750 per acre, respectively; under simple interest, (*a*) $1,590, (*b*) $2,760 per acre, respectively.

Inaccuracy in methods in accounting interest charges are typified by the memorandum by committee staff of March 1, 1955, on "Subject: Legislation to Authorize the Colorado River Storage Project and Participating Projects." At the bottom of page 6 appears this statement:

> If this interest-free financing is considered an interest-bearing cost to the Nation, it would cost the Federal Government about $260 million over a 50-year period to pay the interest on the $342.6 million irrigation allocation. This would be the amount which it would have cost the Government at the end of the 50-year repayment period, at which time the irrigation cost would have been completely repaid and there would be no further cost to the Federal Government involved.

This statement and computation ignores $132,757,000 in 2½ percent simple interest charges if a 10-year construction period followed by 10-year development period is included. These costs under 2½ percent compound interest, as I hold they should be computed during these nonproductive periods, would amount to $162,000,000 in addition to the $260 million interest cost during the 50-year repayment period.

It is commonly stated that such reclamation projects are fully self-liquidating. By such expression, the tremendous subsidy by the general taxpayer is hidden and nowhere revealed. Another sin of concealed subsidy and lack of proper accounting is that different figures are used by opponents and proponents of such a project. Proper accounting would so define the costs of a project including interest cost and spell out the funds to be returned to the United States and the amount of subsidy involved so that opponents and proponents would use the same figures.

STUDY OF REPAYMENT POLICIES

In order to give a greater understanding of the interest costs on Federal water projects under the several existing Federal practices, I have made studies and have reduced these studies to a table and charts

indicating the cost to the taxpayer of seven separate policies of the Government, including new policies which would be adopted for the first time on a major project under the bills you have before you. In preparing these studies I have made certain assumptions in order that each of the seven studies might be directly comparable. The seven projects analyzed are: (1) power, (1.1) power under modified Collbran formula, H. R. 3383, (2) irrigation under reclamation law, (2.1) irrigation under modified reclamation law, (3) irrigation under use of interest component of power revenue to repay irrigation costs in excess of the ability of the irrigators to repay, (4) irrigation under the Collbran formula, and (5) nonreimbursable projects such as flood control and navigation.

CRITERIA USED IN PREPARING TABLE AND CHARTS

For the purpose of these studies I have assumed a million-dollar project under each of the seven studies. I have also assumed that the project would be constructed under a 10-year period with equal annual expenditures of $100,000 each year. Interest is compounded annually on these construction costs until the project is constructed and placed in service, making the total investment $1,148,346. In the case of all irrigation project studies, interest is compounded during the ensuing 10-year development period, bringing the total investment to $1,469,980. The correctness of compounding interest during the period the projects are producing no benefits nor paying any interest should be accepted by all.

The attached table No. 1 and charts 1, 1.1, 2, 2.1, 3, 4, 5, summarize the results of these studies and computations, all charts by use of 2½ percent compound interest.

To better explain the studies and charts I shall, for the moment skip over table No. 1 and chart O and chart A which are summary charts and shall proceed to charts 1 to 5.

Chart 1, power project under reclamation law, except interest at 2½ percent

Power users repay capital with 2½ percent interest in 50 years after completion of a 10-year construction period.

You will note there is no cost to the general taxpayer. The power revenues repay in full the cost of constructing works and the interest during construction so that at the end of 50 years following completion of the works the project is fully paid off by power revenue in the amount of $1,148,346 of capital and $732,068 in interest, making a total cost to the power user of $1,880,414.

Chart 1.1, power project under modified Collbran formula

This complies with provisions of H. R. 3383 under which irrigation repayments are provided in equal annual installments for 50 years following a development period (10 years under reclamation law). Repayment of power costs with interest are extended from the 50-year period under existing law and under the provisions of the other bills for the Colorado River storage project, to 100 years. This is said to permit power revenues to be applied first to repayment of irrigation costs the irrigator is unable to repay and by the use of the extended period to return the power costs at a later period. Accordingly, I have assumed that the irrigators are able to repay 25 percent of the irrigation cost in 50 years, or $5,000 per year, following a 10-

year development period, and that concurrently power will repay the other 75 percent. Then after the end of this period, power will repay its own allocation of costs in the remaining 40 years of the 100-year repayment period.

It should be noted that such application of the modified Collbran formula and extension of the repayment period with interest for power allocations increases the capital carrying charges to power from $1,880,414 to $3,315,849, or by 76 percent. The amount of interest charges alone is increased from $732,068 to $2,167,503, or by 196 percent. These are certainly dim prospects for power users in an area that seeks to industrialize.

Chart 2, irrigation project under reclamation law

Under reclamation law the irrigator at the end of 40 years following a 10-year development period would have returned the $1 million cost without interest. The interest charges, however, borne by the general taxpayer would have accumulated to $2,261,925.

Under reclamation law the original $1 million cost will be repaid in 40 equal annual installations without interest, after a 10-year development period.

Chart 2.1, irrigation under modified reclamation law

The modification in time of repayment in the Colorado River storage project bills is to extend the normal 40-year repayment period to 50 years following a development period which, under present reclamation law, shall not exceed 10 years. This study and chart then, are similar to chart 2 except that the time is extended by 10 years to a 50-year repayment period.

This extension of 10 years increases the cost to the general taxpayer from $2,261,925 to $3,102,792, or by 37 percent.

Chart 3, irrigation project under diversion of interest component of power revenues to repay irrigation costs

Under use of the interest component the taxpayer will repay 80 percent of the irrigation cost by diversion of the interest component paid on power capital, the irrigator being able to repay in equal annual installments a total of only $200,000 or 20 percent of the $1 million cost without interest in 40 years, after the end of a 10-year construction period plus a 10-year development period. Assumption in this study that the irrigators can only repay 20 percent of the irrigation cost or $5,000 per year may seem low; however, reports on the Colorado River storage project indicate the irrigators in the average will pay little more than half this percentage.

In a number of irrigation projects diversion of the interest component on electric-power capital has been used to repay the portion of the cost the irrigators are unable to repay although no specific authority so to do has been granted by the Congress. In this study it is assumed the irrigator can only repay $200,000 by the end of the 40th year while diversion of the interest component from power revenues repays $800,000, making complete paper return of the $1 million irrigation cost, without interest. It should be pointed out, however, that the interest on power revenue is a cost to the taxpayer as this sum is due as "hire" for the money. Accordingly, the cost to the general taxpayer at the end of the 40-year period is $3,061,925. If a 50-year repayment period had been used as provided in the Colorado River storage project bills, the cost at the end of the 50-year period would have been increased to $3,852,793.

Chart 4, irrigation under the Collbran formula

Under the "Collbran formula" the irrigators will repay in equal annual payments 20 percent of the $1 million cost without interest in 40 years. They will continue repayments at the same rate of $5,000 per year for ten additional years making a total repayment of $250,000 or 25 percent of the $1 million cost. During this latter 10-year period revenues from power are used to repay without interest the 75 percent of the cost the irrigators are unable to repay in 50 years following the end of the 10-year development period. This is based upon power revenues first having repaid the power costs with interest in 50 years following a 10-year construction period, after which time power revenues are available in sufficient amounts to provide for such repayments of irrigation capital in 10 years.

Summarizing, irrigators repay $250,000, power users, $750,000, of irrigation costs while the accumulation of interest cost to the general taxpayer has piled up to $3,724,805. This is in large part due to the delay in repaying 75 percent of the irrigation cost until a period 60 to 70 years after completion of construction.

Chart 5, nonreimbursable project, flood control, navigation, and recreation

These are so-called nonreimbursable expenditures by the general taxpayer. Computations are based upon a 10-year construction period followed by a 50-year period for cost comparison purposes.

This study shows the nonreimbursable project such as flood control, navigation, or recreation with compound interest accumulated for 50 years after completion of the works, and no money returned. Accordingly, at the end of the 50th year the cost to the general taxpayer becomes $3,946,998.

Return now to chart O which I have prepared for convenience. It shows the costs to the general taxpayer under each of these seven studies. This chart shows the high cost to the general taxpayer of the use of the Collbran formula embodied in most of the Colorado River storage project bills, or the "modified Collbran formula" of H. R. 3383. Some may argue that compound interest should not be used in spite of the accumulating Federal debt upon which all taxpayers will pay interest. It should be recognized that such projects add to the ever-mounting national debt and therefore compound interest is proper.

I have prepared similar studies based upon 2½ percent simple interest as suggested by some, inconsistent, I believe, with the growing national debt. To justify simple interest, it should have to be assumed that the taxpayer is retiring, with simple interest when due, the capital invested in water projects while, at the same time, borrowing more and more money for other purposes, thus accounting for the expanding national debt.

Under each of these studies I have assumed, as heretofore stated, that the Federal taxpayer, in addition to paying interest, returns to the project the portion of the capital cost, including compound interest during the construction period and during the development period, and not repaid by irrigation or power. He does this in a straight line of capital repayment so that at the end of the irrigation repayment period all capital has been returned by either power, irrigation or the general taxpayer.

While I have prepared individual charts in each of the seven cases, I am submitting only chart A which summarizes the cost to the general

taxpayer at 2½ percent simple interest under each of the seven projects in a manner similar to chart O which was computed with 2½ percent compound interest. It is interesting to note that even by simple interest under existing reclamation law with capital returned in 40 years after a 10-year development period, the simple interest cost to the taxpayer is $1,223,345 for a million-dollar project. In other words, a million-dollar project will cost the irrigator $1 million and the general taxpayer $1,223,345, a combined cost of $2,223,345. While under the 50-year Collbran formula the same million-dollar project would cost the taxpayer $1,782,092, which is almost as great as the cost by use of the interest component method, amounting to $2,023,345 under the 40-year reclamation law repayment period.

Under the modified Collbran formula the simple interest cost to the taxpayer would be $1,407,092, while capital carrying charges to power would be increased from $1,880,414 under existing reclamation law modified to 2½ percent interest, to $3,315,849. To this amount must be added 75 percent of irrigation costs, or $750,000 for the $1 million power combined with a $1 million irrigation project.

These studies indicate the importance of inclusion of the interest costs to the already heavily indebted general taxpayer. These costs should be reported on officially and publicly. They should not be covered by a hidden subsidy. It is a cost borne by the general taxpayer and, as stated earlier, opponents and proponents alike should be bound by the same figures.

It appears most unfortunate that the Congress should be asked to approve a billion to a billion and a half dollar project involving hidden costs to the taxpayer of the order of $4 billion, through accumulated interest costs under the Collbran formula. This at a time when Congress is awaiting the recommendations of the Hoover Commission which it, itself, created, and the report of the Cabinet Water Policy Committee named by the President. Both of these are expected to make specific recommendations regarding methods of determining feasibility, financing, accounting, and repayment of Federal water projects.

I, therefore urge that the Colorado River storage project and participating projects not be authorized pending analysis under such new and uniform policies for the financing, construction and repayment of Federal water projects as the Congress may adopt after receipt of these important water-policy reports.

PUBLIC POWER

As one directing the management of a large city-owned public power enterprise serving 2,150,000 people I cannot refrain from recording my objection to the setting up of these large water storage-power projects on the main stems of the Colorado River, not for the purpose of furnishing power at low rates, but for the primary purpose of serving as cash registers for the collection of excessive rates for a hidden subsidy for the so-called participating projects. This is an assortment of irrigation projects in which the irrigators are able to repay little more than 10 percent of their cost in 50 years, without interest.

Testimony of my associates in opposition to the Colorado River storage project bills clearly shows that these storages are not required

to permit the full diversion of the quantities of water required for the participating projects named in this bill without causing the flow at Lee Ferry to fall below 75,000,000 acre-feet in 10 years under any reoccurrence of drought such as has occurred in the past.

Other testimony of my associates indicates that power generated at Glen Canyon Dam will cost very much less than the 6-mill rate proposed to subsidize irrigation, and power at other more expensive sites.

Glen Canyon power cost estimate summary

	Power at bus bar, mills per kilowatt-hour	Power delivered 250 miles, mills per kilowatt-hour
1. Power allocation to be returned with 2½ percent interest in 50 years	3.10	3.78
2. Power allocation to be returned with 2½ percent interest, and irrigation allocation without interest in 50 years	3.41	4.04
3. Total cost of dam and powerplant to be repaid with 2½ percent interest in 50 years	3.67	4.30

Not only is it proposed to charge this artificially high rate of 6 mills but to continue this charge for decades after the power investment has been returned with interest in order that subsidy may be provided for a hundred years under H. R. 3383 and according to the testimony of proponents I have heard before the Senate committee 2 weeks ago.

Why should power users be called upon to pay this high 6-mill rate for a century in an area described by the 9, later changed to 10, privately owned electric utilities at page 556 of the published transcript of hearings on H. R. 4449 of 1954 in part as follows:

> * * * this basin is one of the greatest sources of thermal energy production to be found anywhere in the world. Here are located vast deposits of coal, great underground reservoirs of oil and natural gas, mountains of oil shale, and perhaps more important than all these are the deposits of uranium ores. The potential thermal power resources of this area stagger the imagination.

Steam produced power is being furnished to the Atomic Energy Commission at around 4 mills. Why should the people in the Mountain States sitting on this enormous potential energy be called upon to pay a 50 percent higher rate for the next 100 years?

Under H. R. 4488 and supported by Governor Johnson in his testimony March 1, 1955, before the Senate subcommittee, appears the astounding philosophy:

> *Provided*, That power produced pursuant to this act shall be sold at the highest practicable price to enhance the development of the upper Colorado River Basin.

How shall the potential industrial intermountain empire be developed under such a philosophy of high-cost power in comparison to the low-rate policies in the Pacific Northwest, TVA, the St. Lawrence, Niagara Falls, and elsewhere throughout the United States?

Naturally, I would be in favor of the economic development of hydroelectric power marketed under the provisions of the 1944 Flood Control Act which provides that power shall be disposed of—

> in such manner as to encourage the most widespread use thereof at the lowest possible rates for consumers consistent with sound business principles.

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This is not only sound for public power but is the recognized principle of all public regulatory bodies in fixing the rates of privately owned public utilities. The inclusion of costs not pertinent and required in the necessary production of power would not be allowed by any such regulatory body. Why should the Congress of the United States be asked to violate such a universally recognized principle of rate fixing?

Isn't it completely unrealistic that such 6-mill rate should be extended for 100 years in spite of the almost universal optimism that power production costs will be lowered by production of atomic power? Scientists have told us that the cost of uranium if it could be 100-percent converted to electric energy would be only 0.013 mill per kilowatt-hour, or about one two-hundredths of the cost of fuel consumed in conventional steam-electrical plants. During my professional experience the efficiency of fuel-steam power has increased 200 percent until we are now converting more than 35 percent of the energy of fuel into electricity. How long will it be before we can economically convert just 1, 2, or perhaps 5 percent of atomic energy into useful electricity? Many believe the time is almost at hand—certainly not more than a decade or two. Such accomplishment would make unsalable power at the 6 mills planned for the next 100 years.

It has been considered a sound policy, whenever the United States Government has acted as banker and has been repaid the dollars advanced for construction of water projects, that the local districts and public agencies shall thereafter not only cease to make further capital repayments to the United States but that such local agencies shall become the owners of the works they have paid for. Under the Collbran formula power users continue to make capital repayments to irrigation after power capital is completely repaid with interest.

CONCLUSION

We have in this series of bills to authorize the Colorado River storage project an extraordinary effort to speed the expenditure of $1½ billion in authorization of uneconomic projects, many not fully reported on, to be paid for in part by artificially high-cost power which may lose its market to lower cost competing power and thus fail to afford the subsidies to irrigation planned in the bills.

The storage projects are not required for the proposed participating irrigation projects. The proposed high charges for power for 100 years would tend to defeat the very industrial expansion sought in the upper basin of the Colorado.

To authorize these projects it is proposed to embrace a series of departures from existing general water policy without awaiting the enactment of new policies of general applicability following receipt of the Hoover Commission and Cabinet Water Policy Committee reports. I refer to:

1. The adoption of the "one basin account" idea.
2. The use of the "Collbran Formula" or "Modified Collbran Formula."
3. The fixing of artificially high power rates for a century to come in violation of the 1944 Flood Control Act, and of good sound business practice.

4. The adoption of an open and financial subsidy for projects yet unborn anywhere in the upper basin States.

Surely there is no crying shortage of foodstuffs or other agricultural need which should demand such haste in authorization and expenditure of a billion and a half dollars.

I therefore again urge that H. R. 270, H. R. 2836, H. R. 3383, H. R. 3384, H. R. 4488, and similar bills to authorize the Colorado River storage and participating projects be not adopted.

Mr. ASPINALL. Without objection, the charts appearing at the back of your statement, with the agenda of the charts will be made a part of the record.

Hearing no objection, it is so ordered.

(The material referred to follows:)

TABLE 1.—*Accumulated costs to end of period—$1 million project at 2½ percent interest*

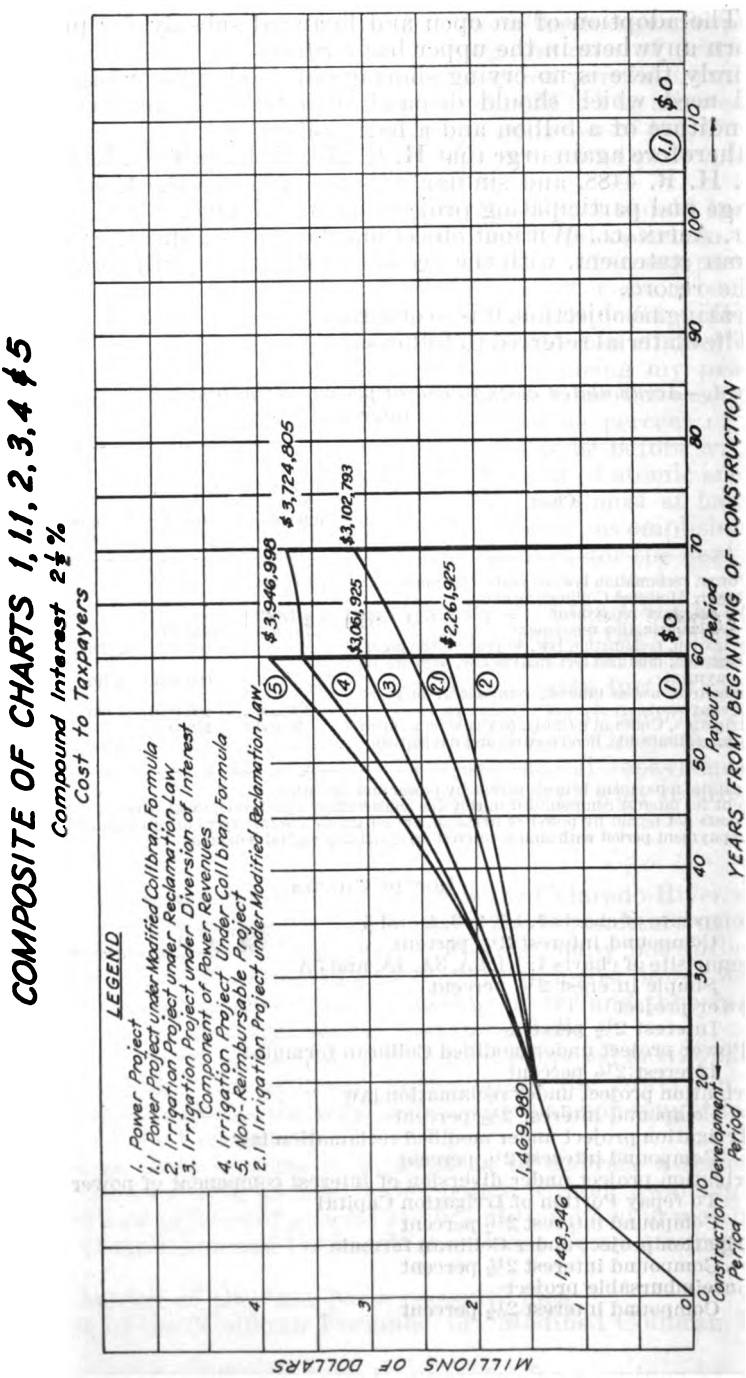
No.	Chart	Power, with interest	Irrigation, no interest	Taxpayers	
				Compound interest [1]	Simple interest [2]
1	Power, reclamation law, 50 years' repayment	$1,880,414		0	0
1.1	Power, Modified Collbran formula:				
	100 years' repayment	3,315,849		0	0
	Plus irrigation repayment	750,000	$250,000		
2	Irrigation, reclamation law, 40 years' repayment		1,000,000	$2,261,925	$1,223,345
2.1	Irrigation, modified reclamation law, 50 years' repayment		1,000,000	3,102,793	1,407,092
3	Irrigation, use of interest, component, 40 years' repayment	800,000	200,000	3,061,925	2,023,345
4	Irrigation, Collbran formula, 50 years' repayment	750,000	250,000	3,724,805	1,782,092
5	Nonreimbursable, flood control and navigation			3,946,998	2,492,916

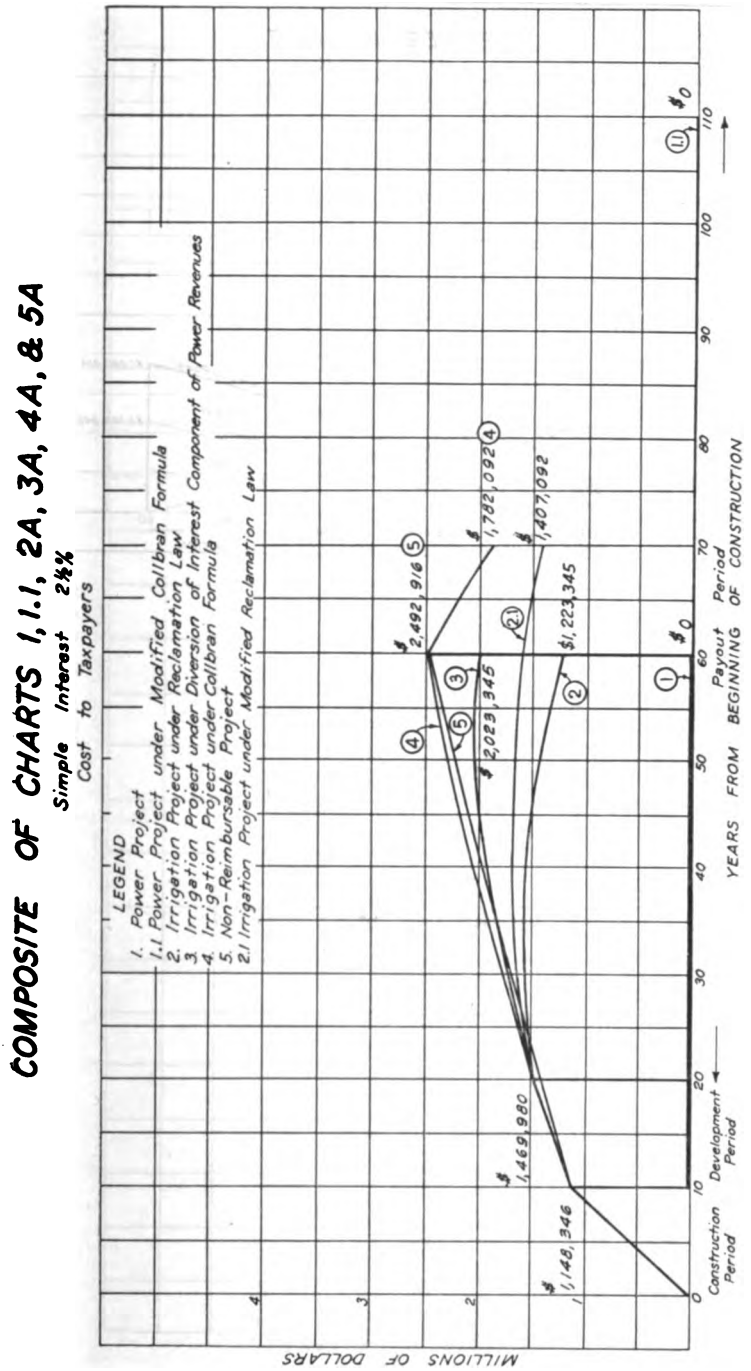
[1] No capital repayment is made except by power and irrigation.

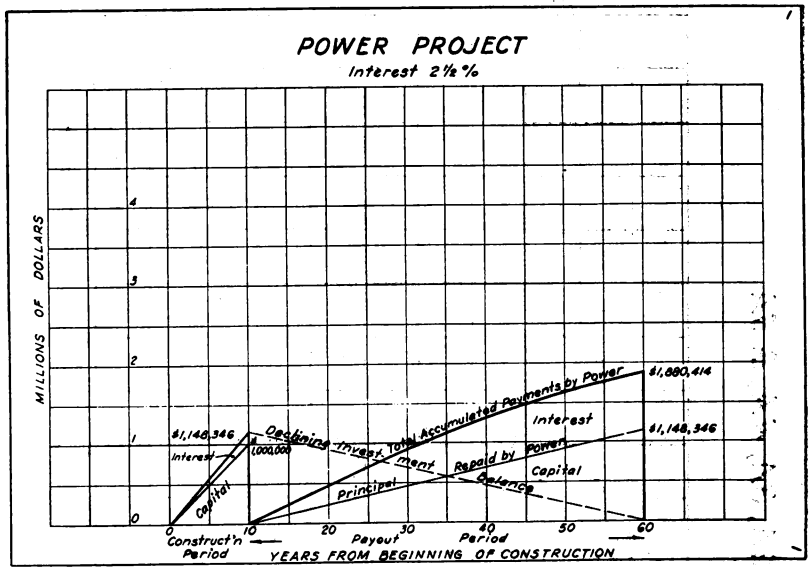
[2] Except for interest compounded during the construction and development periods, it is assumed that capital costs not repaid by power or irrigation are repaid by the taxpayers in equal annual repayments to end of repayment period with simple interest on remaining capital balances.

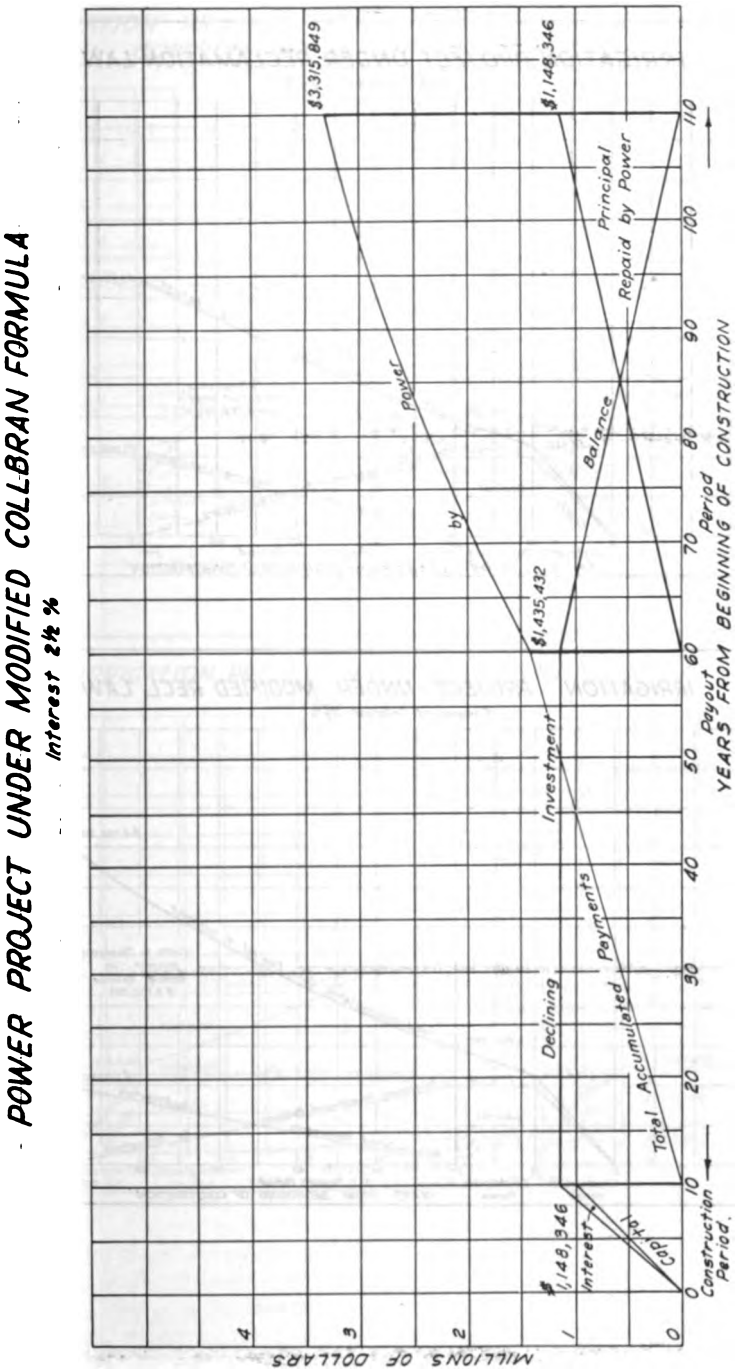
LIST OF CHARTS

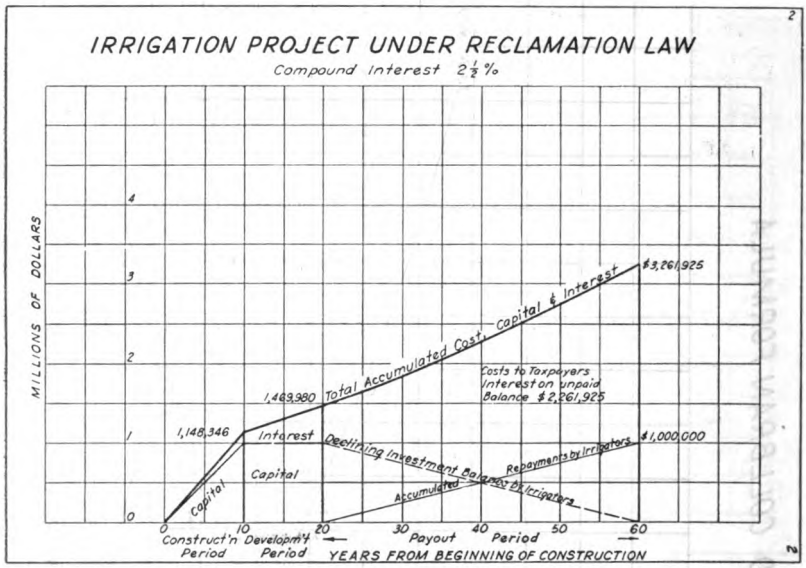
O—Composite of charts 1, 1.1, 2, 3, 4, and 5
Compound interest 2½ percent
A—Composite of charts 1, 1.1, 2A, 3A, 4A, and 5A
Simple interest 2½ percent
1—Power project
Interest 2½ percent
1.1—Power project under modified Collbran formula
Interest 2½ percent
2—Irrigation project under reclamation law
Compound interest 2½ percent
2.1—Irrigation project under modified reclamation law
Compound interest 2½ percent
3—Irrigation project under diversion of interest component of power revenues
To repay Portion of Irrigation Capital
Compound interest 2½ percent
4—Irrigation project under Collbran formula
Compound interest 2½ percent
5—Nonreimbursable project
Compound interest 2½ percent

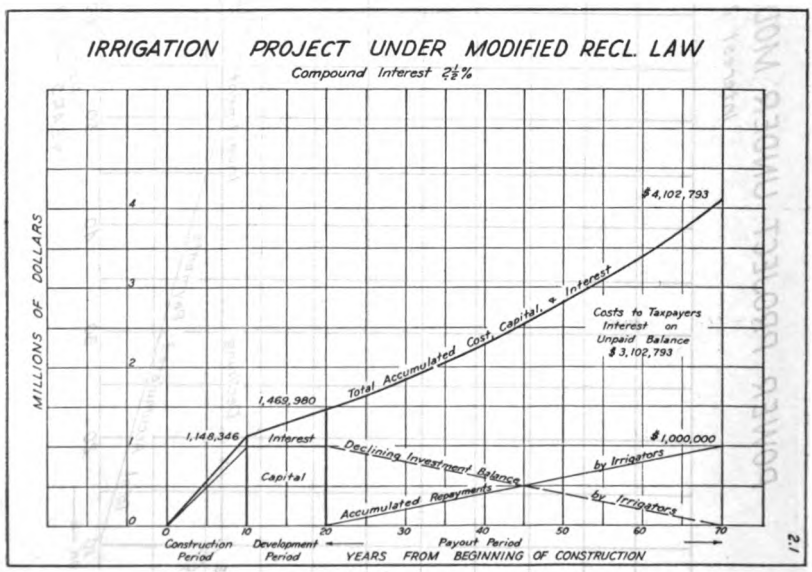


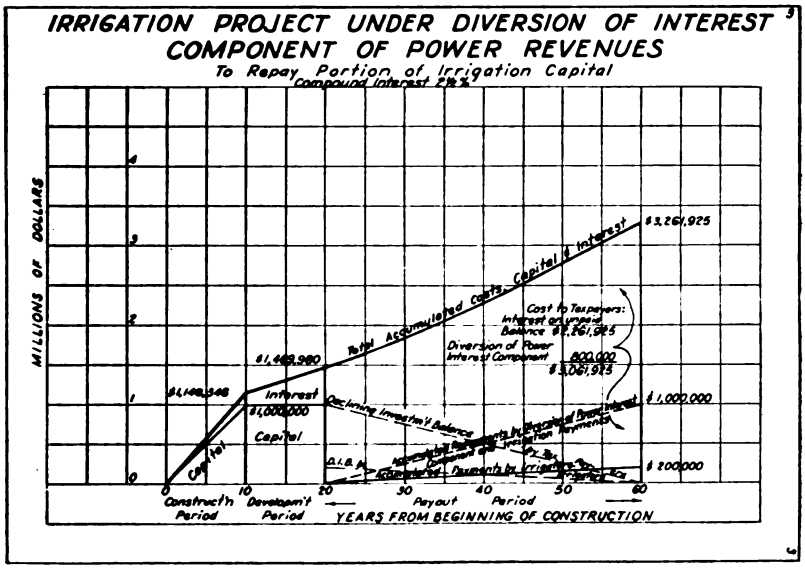


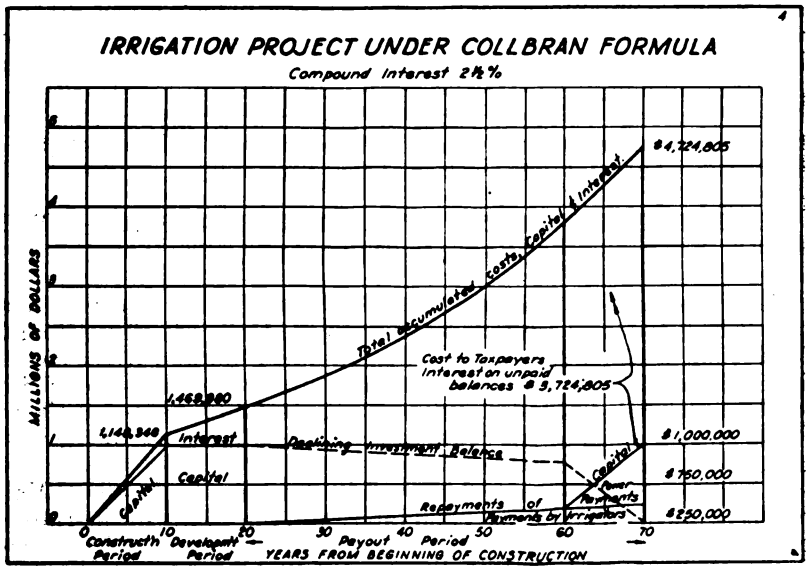


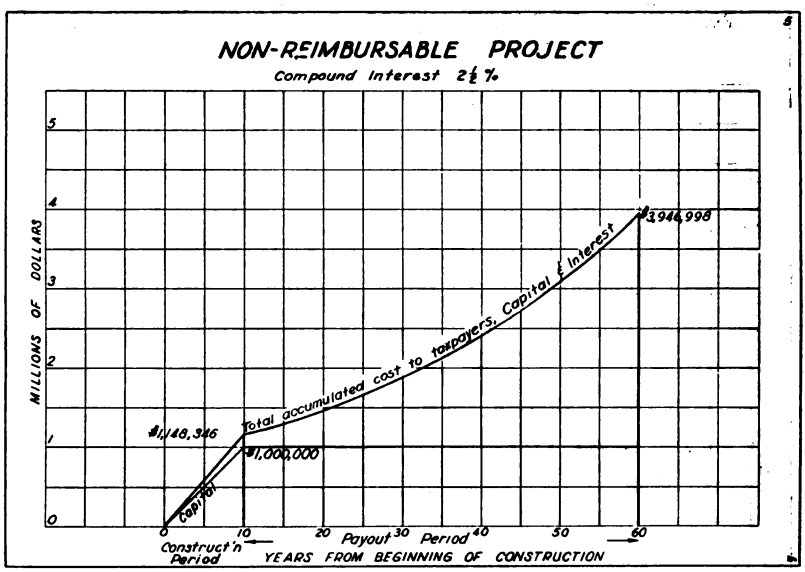












Mr. MORRIS. Mr. Ben P. Griffith, president of the Board of Water and Power Commissioners, which I serve, was to have appeared before you. He was unavoidably detained from this meeting, and we would like the privilege of filing his statement in the morning. I do not have his statement now.

Mr. ASPINALL. You may bring the statement with you in the morning, and the committee may have it to look over, and then if it is all right, we will place it in the record at that time.

STATEMENT OF EVAN T. HEWES, MEMBER, COLORADO RIVER BOARD OF CALIFORNIA

Mr. HEWES. My name is Evan T. Hewes. I am a member, and appear here today as a representative, of the Colorado River Board of California, which I served as chairman and Colorado River commissioner from 1938 to 1947. This board, under the law of our State, has been delegated the duty of and responsibility for protecting the rights and interests of the State of California in the use of the waters of the Colorado River system.

In addition, for the past 43 years, I have farmed in Imperial Valley and have taken an active part and interest in the affairs of the Imperial Irrigation District since 1916. For the past 22 years, I have served as president of the board of directors of the district and am also its executive superintendent.

Both the Colorado River Board of California and the board of directors of Imperial Irrigation District are unanimous in opposition to House bill 270 and companion bills as introduced in the House of Representatives. Our opposition to these bills includes the following points:

1. The principles upon which the bills are based are in conflict with the meaning and intent of the Colorado River compact as it became effective on June 29, 1929.

2. The provisions of the bills, if carried out as planned, would be in violation of the meaning and intent of the Boulder Canyon Project Act of December 1928.

3. This legislation is premature; it may prove detrimental to the general welfare of the area it is supposed to benefit most; and most certainly it is detrimental to the general welfare of the Nation as a whole.

CONFLICT WITH COMPACT

That the principles upon which H. R. 270 and companion bills are based are in conflict with the meaning and intent of the compact is confirmed by the debates which took place during the negotiations of the compact and in the answers given in 1923 by the Hon. Herbert Hoover, who served as Chairman of the Compact Commission, to questions asked of him concerning interpretations of the compact.

At the time the compact was negotiated, the total use of water in the upper basin States was only about 2 million acre-feet per year, as compared to perfected rights at that time in the lower basin States to over 7 million acre-feet per year.

In addition, legislation—the Swing-Johnson bill—was before the Congress providing for the use of over 2 million acre-feet of additional water in the lower basin States. The upper basin States demanded the compact as their price for not opposing the Swing-Johnson bill, insisting, for political reasons, so they stated, upon the right to claim, as, if, and when they might be able to use it, the use of a quantity of water equal to that apportioned to the lower basin States under article III (a) of the compact; that is, 7,500,000 acre-feet per annum.

California was induced to ratify the compact and accept the limitation imposed upon uses of Colorado River water in California by the Boulder Canyon Project Act on the assurance of leaders in the upper basin States that the latter, as a practical matter, would never be able to utilize more than 6 million acre-feet per year, and that included in this amount was an allowance for the ultimate possible transmountain diversion use of not to exceed 500,000 acre-feet per year. It should be noted that the present transmountain diversion use in the upper basin approximates this 500,000 acre-feet.

Furthermore, California believed then, and still believes, that by the inclusion of article VIII in the compact, all of our perfected rights, both as to quality and quantity, would be protected. We had suffered severe water shortages because of interference with the flow of the river by junior appropriators in the upper basin. Therefore, the protection of our perfected rights was of great importance to us, as a matter of fact, article VIII was known as the Imperial Valley section of the compact.

The major participating projects included in these bills would be transmountain diversion projects. These would divert water from high elevations out of the Colorado River Basin. This is water of the highest quality, and therefore the result would be a serious impairment of the quality of the water coming into the lower basin at Lee Ferry.

At the present time, water in the lower basin contains about 1 ton of salts per acre-foot. This means that if we apply, say, 4 acre-feet of water per acre of crop during the year, we put 4 tons of salt on that

acre. Whether the salt content of the water may be increased, and if so how much, without affecting the production of the types of crops we grow, has not been determined. We say that until this matter of quality has been finally determined in all respects, there should be no additional transmountain diversion projects constructed in the upper basin.

These bills would authorize the construction of six large storage reservoirs, from which there would be evaporation of large quantities of water, also increasing the salt content of the lower basin water at Lee Ferry. These reservoirs are not needed to deliver water for domestic and agricultural purposes in the upper basin and therefore, under article II (e) of the compact, this water lost through reservoir evaporation is water to which the lower basin has a right for domestic and agricultural purposes.

These bills purport to comply with the compact but are based upon interpretations of that document which are now at issue before the United States Supreme Court in the case of *Arizona* v. *California, et al.* These interpretations, which the upper basin States support for their own benefit, relate to the obligations of those States to deliver water at Lee Ferry for the lower basin. These interpretations, which the upper basin States support for their own benefit, relate to the definition and measurement of beneficial consumptive use and to the obligations of those States to deliver water at Lee Ferry for the lower basin. These interpretations of the compact on which the upper basin States rely are in conflict with the interpretations used in 1923 by the negotiators of the compact and as later restated by the Hon. Herbert Hoover.

The point I am trying to make, gentlemen, is this. The compact was supposed to band together the seven States of the Colorado River Basin, under a contract of mutual interest, for the orderly development of the Colorado River system. It is a compact of all seven States, and yet the upper basin States are resisting with all their resources their being made parties to the pending Supreme Court case, in which they are involved as much as the lower basin States.

If two private citizens enter into a contract, one of the parties cannot take action that will destroy the equities of the other party to the contract without his consent, and then escape bearing any share of the loss resulting from his own actions. The upper basin States apparently want to escape completely, if possible, the great injustice which they did to the lower basin States in their support of the Mexican Water Treaty. This is what I charge the upper basin States in trying to do with this legislation. I do not believe there should be less integrity and responsibility in contracts between souvereign States than in contracts between private parties, under our form of government. I will refer to this again at a later point in my statement.

CONFLICT WITH BOULDER CANYON PROJECT ACT

These bills purport to comply with the Boulder Canyon Project Act of December 1928 but authorize projects which can destroy a great part of the value of some of the projects constructed under the authority of that act.

The Boulder Canyon Project Act not only approved the Colorado River compact, but also was intended as a blueprint to be followed

in subsequent developments of the Colorado River Basin under the compact. The act was passed after being before the Congress of the United States from 1919 until 1928 and then only after it had been amended in all respects demanded by the upper basin States as being necessary, in their opinion, to the protection of their rights.

Among the outstanding features of the Boulder Canyon Project Act were the provisions included to prevent a raid of the Federal Treasury for the projects authorized by that act. This was accomplished by the provision that before any works could be constructed, the Secretary of the Interior had to secure firm contracts from reliable contractors for the repayment to the Federal Treasury of the cost of construction of Hoover Dam and the All-American Canal and appurtenances, with a fixed limitation of the total cost. Furthermore, the cost of the dam was required to be repaid, with compound interest on any unpaid amount of investment.

Now take a look at H. R. 270. Certainly the proposed method of financing is not in the least comparable to the method prescribed by the Boulder Canyon Project Act. This is true even if the guesses of the Bureau of Reclamation as to the cost of the projects under H. R. 270 were realistic, which I submit should be seriously questioned in view of the Bureau's long and almost consistent record of wrong guesses.

If H. R. 270 or a similar bill is passed by the Congress, it will, in my opinion, constitute one of the greatest raids on the Federal Treasury that has ever occurred. The upper basin States appear to assume that because the compact made reference to the allocation to them of the use of 7,500,000 acre-feet of water per annum, such constituted a sight draft on the Treasury of the United States to build projects for them to put the water to use, regardless of the cost to the taxpayers of the Nation.

Furthermore, this legislation blueprints nothing. It puts no price tag on anything. It protects neither the lower basin projects, which hold contracts for water and power under the terms of the Boulder Canyon Project Act and which have met the feasibility standards required by the act, nor the taxpayers of the Nation. In short, all I can make out of H. R. 270 is that it provides for a blank check on the United States Treasury for an unlimited amount of money to be charged to the Nation's taxpayers, with which the Bureau of Reclamation is to construct a vast, but undetermined, number of engineering monuments, regardless of their financial soundness.

Coming back to the Mexican Water Treaty, the Congress provided in the Boulder Canyon Project Act that Hoover Dam was to be constructed for the storage of water to be used exclusively in the United States—water which would have to be relied upon by the projects contemplated in the act.

Despite this fact, the upper basin States supported, with all their political might, the Mexican Water Treaty during its negotiation and again when it came before the United States Senate for ratification. This treaty guaranteed the delivery to Mexico each year of 1 million acre-feet more water than Mexico had received or could have received from the natural flow of the Colorado River. In other words, this million acre-feet had to come from water stored by Hoover Dam.

Moreover, the upper basin States knew that the longer record of water yield of the Colorado River system then available showed a

lesser quantity of water than was assumed to be available in 1922 when the compact was negotiated. What the upper basin States thought they were doing was giving away to Mexico water which had been committed to projects in the lower basin, but in my opinion they were giving away water which otherwise would have been available for their own use, as well as for use in the lower basin.

It is interesting to note that the quantity of water guaranteed by the treaty to Mexico in perpetuity as a first right on the river is at least three times the quantity of water the Senator Key Pittman, of Nevada, stated on the floor of the Senate, during the debates on the Boulder Canyon Project Act, he could ever conceive of the United States giving to Mexico.

H. R. 270 IS PREMATURE AND DETRIMENTAL

H. R. 270 and companion bills would authorize the construction of a large number of so-called participating irrigation projects, not one of which is justified in view of the present economic conditions in our country.

Even if these participating projects would ever be able to pay the pitifully small amount toward their construction cost which the Bureau of Reclamation guesses they can, the small value that will be created, compared to the cost, will result in 1 of 2 things happening. Either whatever equities the present farmers have in these projects will be confiscated by the charge the Government will make against their property, or the taxpayers will have to pay this part of the bill in addition to the tremendous subsidies occasioned by the type of financing proposed. The most realistic result will probably be both.

Moreover, I believe the passage of this legislation would result in destroying far greater values in the lower basin than would be created in the upper basin.

In connection with this unprecedented subsidy which would be required by these participating projects, it is interesting to note that not one of the upper basin States has come forward and offered to share, as a State obligation, $1 of the cost of such subsidies which must be shouldered by the Nation's taxpayers. Certainly if these upper basin States, which will benefit from the projects far more than the Nation as a whole, are unwilling to share in the cost of the projects, what justification is there for the whole burden to be put on the Nation's taxpayers?

As already pointed out, the large storage reservoirs which would be authorized by this legislation are not needed now; some will never be needed and should not be constructed, and a few will be needed perhaps 30 or 40 years from now.

Therefore, as a farmer in Imperial Valley, I find myself and my State facing a situation where both the quality and quantity of the water we have built our works to use are threatened, and at the same time we are confronted with a large cost in Federal taxes to help pay for the octopus that would damage us.

In conclusion, I respectfully ask this question:

In view of the fact that this legislation involves vital Colorado River compact interpretations which are at issue in the pending case of *Arizona* v. *California* in the Supreme Court of the United States: in view of the tremendous debt of our Nation and our liability to balance

our national budget, despite the fact that about 25 percent of our earnings go for Federal taxes; in view of the fact that the cost of carrying out the provisions of this legislation will greatly exceed the value created; in view of the possibility that this legislation, if approved, would destroy more value than it would create; and in view of the fact that by reason of the large surpluses of all of our major farm crops, even with reduced acreages, all reclamation projects which do not have a very low fixed charge and cost of operation and maintenance are facing a dark picture economically, I ask you—Why pass such legislation as H. R. 270?

Mr. HOSMER. Mr. Chairman, I would like to state that I think at least two of the witnesses have plane reservations out of town at noon tomorrow, and those are Mr. Morris and Mr. Griffith, and possibly if the cross-examining could be directed to them first it might help them out.

Mr. ASPINALL. We shall do our best, Mr. Hosmer, and gentlemen. I am very appreciative of the fact that you have been able to get your statements in this afternoon.

We shall meet at 9:30 in the morning, with the understanding that we shall proceed just as rapidly as possible with the cross-examination, and hoping that if there are any specific special questions that anyone has of the two men who must leave by plane tomorrow noon, you will contact the chairman, explain the situation, and the Chair will endeavor to get recognition for those sepcific questions.

Without objection, we will place in the record at this point a resolution of the board of supervisors, county of Los Angeles, dated March 15, 1955.

(The resolution referred to follows:)

COUNTY OF LOS ANGELES
BOARD OF SUPERVISORS
LOS ANGELES 12

Members of the Board: Herbert C. Legg, chairman; Kenneth Hahn, John Anson Ford, Burton W. Chace, Roger W. Jessup

RESOLUTION 25

(Introduced by Supervisor, Roger W. Jessup, Tuesday, March 15, 1955)

IN RE UPPER COLORADO RIVER BASIN PROJECTS AS PROPOSED IN S. 500 AND H. R. 270, AND THE FRYINGPAN-ARKANSAS PROJECT AS PROPOSED IN S. 300 AND H. R. 412, NOW PENDING IN CONGRESS: RESOLUTION OPPOSING SAID MEASURES

On motion of Supervisor Jessup, unanimously carried, it is ordered that the following resolution be and the same is hereby adopted:

Whereas, the county of Los Angeles in the State of California is vitally dependent on a water supply obtained from the Colorado River; and

Whereas California's rightful share of Colorado River water is threatened by the upper Colorado River Basin projects as proposed in S. 500 and H. R. 270 and the Fryingpan-Arkansas project as proposed in S. 300 and H. R. 412, now pending in Congress; and

Whereas the aforementioned projects would inflict on all taxpayers of this county and the Nation an unjustifiable burden of more than $4 billion; and

Whereas these political pump-priming schemes, if authorized, would furnish water to grow more surplus crops already heavily subsidized by the taxpayers; and

Whereas it would cost American taxpayers $5,000 an acre to subsidize the proposed irrigation project for farms located in high altitude country which has a short growing season; and

Whereas the Colorado River Board of California, official State agency charged with the responsibility of safeguarding California's existing contracts for Colorado River water, has gone on record strongly opposing these measures: Now, therefore, be it

Resolved, That the enactment of these bills is against the interest of the county of Los Angeles in particular and the State of California in general and should be opposed; be it further

Resolved, That the county of Los Angeles respectfully requests the representatives of the State of California in the Congress of the United States to actively oppose the enactment of the above-mentioned bills, or any similar proposals, and that certified copies of this resolution be air mailed to our congressional representatives, and that copies be made available to press and radio news sources.

I hereby certify that the foregoing is a full, true, and correct copy of a resolution which was adopted by the Board of Supervisors of the County of Los Angeles, State of California, on March 15, 1955, and entered in the minutes of said board.

HAROLD J. OSTLY,
County Clerk of the County of Los Angeles, State of California, and ex officio Clerk of the Board of Supervisors of said County.
[SEAL] By RAY E. LEE, *Deputy Clerk.*

Mr. ASPINALL. We will now stand adjourned until tomorrow morning at 9:30.

Thank you very much.

(Whereupon, at 5 p. m., the hearing was adjourned until 9:30 a. m., Saturday, March 19, 1955.)

COLORADO RIVER STORAGE PROJECT

SATURDAY, MARCH 19, 1955

HOUSE OF REPRESENTATIVES, SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:40 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will now be in session for the further consideration of legislation having for its purpose the authorizing of the upper Colorado River storage development program.

The first witness is Mr. Ben P. Griffith.

STATEMENT OF BEN P. GRIFFITH, PRESIDENT, BOARD OF WATER AND POWER COMMISSIONERS OF THE CITY OF LOS ANGELES

Mr. GRIFFITH. My name is Ben P. Griffith, and I am president of the Board of Water and Power Commissioners of the City of Los Angeles. This board consists of five members, appointed by the mayor, with the consent of the city council and is charged with the administration of the water and power department. This department constitutes the largest municipally owned utility in this counry. The board members themselves receive no salary, except for a fee of $25 per meeting. Under the charter of the city of Los Angeles, they are clothed with broad powers which make them nearly autonomous, and remove these vital utilities as nearly as possible from political pressures. It is not, and has not been for nearly 30 years, supported by taxes but by revenues derived from the rate payers which number some 800,000. As a result, the department has been able to plan for a prudent period ahead of its current needs and to finance and construct its distribution and storage facilities in such a manner as to insure against shortages of either power or water.

I sketch these points only to justify my presence here, testifying in opposition to these bills now before you. To be a steward of the water resources of such a city—now some 2,250,000 people, and increasing at the rate of 50,000 per year—is a sobering responsibility, particularly when a great majority of our population is wholly dependent upon imported water. Our people depend upon their representatives to be alert to and vigorous in their defense of every threat to their contractual rights to such water. We are frequently accused of being opposed to every project which would enable our fellow signators to the compact to make beneficial use of their allotted share of the Colo-

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rado. This charge we deny, and the records bear us out. You have before you now a list of many such projects which California has not only failed to resist, but has assisted to passage. One among them is the Colorado-Big Thompson project, which exceeds Hoover Dam in cost. In fact, until 1954, California had never opposed any upper basin project.

Our engineers and attorneys have spelled out the basis of our opposition to these bills. Even to a comparative layman, certain factors emerge clearly from the testimony to date. The Colorado River compact is the fundamental law of the river. It was not entered into hastily. On the contrary, it emerged as the result of years of study and debate in which each State was represented by its ablest and most experienced advocates. In its final form it represented solid advantages to every signator. It defined basin allocations and it placed each signator in a position to proceed with such works as were currently feasible. California—again after years of debate and analysis—succeeded in obtaining congressional approval of the Boulder Canyon project. But not, it must be noted, until the city of Los Angeles, through its department of water and power, and other California agencies, had underwritten the entire cost of its construction by obligating itself to purchase the energy generated at such a price as would amortize the Government's investment and pay 4—later reduced to 3—percent interest. To date the power contractors of southern California have returned over $57 million in interest alone on a project whose total cost was some $135 million. Subsequently in 1931, during the depths of the depression, our community obligated itself to the extent of $220 million in bonds, which, through the Metropolitan Water District of Southern California, they devoted to building and paying for Parker Dam and the Colorado River aqueduct. Other installations in southern California bring the total investment to over $500 million. Please note that the cost of these projects was carried by the beneficiaries. We asked for no subsidy, asked for nothing in fact but the privilege of paying for our benefits. Is it any wonder that we are sensitive to what we consider threats to an adequate use of these installations?

Why do we consider these bills a threat? Because our ablest engineering and legal consultants testify as you have heard in this committee, that it constitutes a reinterpretation of the Colorado River compact which is indefensible and which would diminish or nullify our contracts with the Government for our allotment of water. It might be added that the Governor of Colorado has demonstrated in this hearing that he himself apprehends some difficulty in refuting our interpretation of the compact.

As cosignators of a seven-party pact we differ widely as to its terms. As neighbors and fellow westerners in my opinion we should seek disinterested assistance. One such aid is readily at hand—the task group on reclamation and water—chairmanned by former Gov. Leslie A. Miller, of Wyoming—of the present Hoover Commission. This Commission was unanimously voted into being by Congress, and has been ordered to report on this field not later than May 31 of this year. That we should disregard the voluntary services of these able and busy men would seem to discourage public service of this type to an extreme degree. To reject their findings might be proper, but to ignore them

completely seems unforgivable. The last and final court of appeal is also peculiarly available at this time. If the proponents of these bills should see fit to be jointed in the case of *Arizona* v. *California* in the Supreme Court, many or all of these disputed interpretations of the compact might be resolved. Thank you very much for the privilege of appearing before you.

Mr. ASPINALL. Thank you very much.

This morning we will spend our time, as long as the committee sees fit to stay in session, in examination of those witnesses from southern California who made their direct statements yesterday. Two of our witnesses of yesterday, Mr. Morris and Mr. Howard, must leave the committee room about 11 o'clock in order to catch a plane. The Chair suggests that he will recognize the gentleman from California, Mr. Engle, who then, in turn, will recognize any of the members of the committee for questioning first of Mr. Morris or Mr. Howard, and we will endeavor to satisfy their commitments. Is there any objection to such procedure?

Hearing none, it is so ordered.

Accordingly, at this time the Chair recognizes the gentleman from California, Mr. Engle.

Mr. ENGLE. Thank you, Mr. Chairman.

As I understand, Mr. Morris and Mr. Howard are obliged to leave early because of plane reservations. If they want to take the witness stand first so that questions may be addressed to them, then they may be excused while we address our questions to other witnesses. Do you gentlemen want to come forward?

QUESTION PERIOD OF JAMES H. HOWARD, GENERAL COUNSEL FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA; AND SAMUEL B. MORRIS, GENERAL MANAGER AND CHIEF ENGINEER, LOS ANGELES DEPARTMENT OF WATER AND POWER, AND MEMBER, COLORADO RIVER BOARD OF CALIFORNIA

Mr. ENGLE. Mr. Chairman, I will reserve my questions with reference to these gentlemen and yield to any member of the committee who desires to ask questions.

Mr. Metcalf, do you desire to ask questions of these gentlemen?

Mr. METCALF. Mr. Chairman, I do not want to examine Mr. Morris very long. I do want to ask Mr. Morris two or three questions.

Mr. MORRIS. Yes, sir.

Mr. METCALF. I come from the State of Montana, Mr. Morris, and the district I represent is the source of the Columbia River and the source of the Missouri River. So you see I come from an upstream State where two great rivers rise.

We have just completed in the State of Montana Hungry Horse Dam, which is the last dam that the Bureau of Reclamation has built. In the completion of Hungry Horse Dam we felt in Montana that we were firming up power all down the Columbia River. Only about 94,000 kilowatts are generated at Hungry Horse Dam, and yet we believe that we have improved the power of the Bonneville power pool to about 600,000.

There you have brought in an entirely different concept, different to me, at least, of the effect of these upstream dams on the Colorado.

Is it not true that Glen Canyon and Echo Park and these other power dams will firm up power downstream?

Mr. MORRIS. No. This is the essential difference: We have in Lake Mead behind Hoover Dam storage capacity roughly for 2 years' flow of the river, and so the river is fully regulated and no water spills by Lake Mead without generating kilowatt-hours now. So we are getting the full kilowatt-hour output of Lake Mead and upstream storage will evaporate water and lessen the flow at Lake Mead; whereas at Bonneville there is no river regulation and the water runs by in excess of the power production abilities and upstream storage provides increased volume of flow during the lower flow period, which increases the output of each of the plants below.

I am fairly familiar with the Columbia River area. At one time I was a consultant in that field.

Mr. METCALF. I am glad to know you are familiar with the Columbia area because, as you will understand, that is the one in which I have the greatest interest.

Mr. MORRIS. Yes, sir.

Mr. METCALF. Of course, then you are familiar with the proposition that at present the States of the Columbia Basin are negotiating a compact similar to this for control of the development of the river, a compact that was not ratified by the State of Montana at the last session of the legislature.

Mr. MORRIS. I might say that my period of familiarity ran from 1936 to 1942 or 1943. I was a consultant for the Natural Resources Committee and the Natural Resources Planning Board and for the Bonneville Power Administration.

Mr. METCALF. I am glad to know that.

Now along the Columbia, we feel that instead of the downstream States being compensated for power developed upstream, as you suggest on page 15 of your testimony, that in accordance with the Federal Power Act the upstream States be compensated for the firming up of power that they give to the downstream areas.

Mr. MORRIS. But I just point out, if I may, on the Colorado it does not work that way because we have complete regulation already in the lower basin.

Mr. METCALF. It is your position that Lake Mead has adequate storage to completely take care of the flood control on the river?

Mr. MORRIS. Yes, that is correct.

Mr. METCALF. And that there is more evaporation from the storage upstream than there is storage capacity in the river on these new dams, that more water will be evaporated because of the storage at Glen Canyon and Echo Park and the other dams that will be stored to firm up power downstream?

Mr. MORRIS. Yes. As measured at Lake Mead, there is more water under present conditions for development of power than there will be after the storages are constructed upstream. It is such a different matter on the Columbia. You have such a tremendous river there, with inadequate storage to regulate it even after Hungry Horse and all the planned United States storages are provided.

Mr. METCALF. I freely grant that I am not nearly as familiar with the Colorado as I am with the Columbia, but I am rather concerned about an attitude of the downstream States or areas against an upstream State as expressed by the witnesses here, and I do not see how

upstream areas can ever develop if the people in the lower basins take the attitude that after they have achieved their flood control and their irrigation, that we have to deliver all the water to them from the upper basins.

Mr. MORRIS. What we pointed out is that the irrigation projects which are proposed in the bills which are before you could be constructed and the areas irrigated without violating the Colorado River compact, according to the testimony of the Bureau of Reclamation's engineers. There can be developed upstream for irrigation purposes consumptive uses of the order of 4,350,000 acre-feet per year before depleting the quantity of water for the lower basin, which must be at least 75 million acre-feet in any 10-year period. So we say these irrigation projects could proceed without the storage and that the building of the storages now has been provided as a means of gaining power revenues rather than a necessary means of regulating the river in order to make the irrigation projects feasible.

Mr. METCALF. I can see the difference there.

Mr. ASPINALL. Will the gentleman from Montana yield at this place?

Mr. METCALF. Yes.

Mr. ASPINALL. Now I do not have the Colorado River compact before me, but I understand that one of the statements of the purposes of the Colorado River compact was to provide for an equitable distribution of the water in the upper basin and the lower basin. Is that correct?

Mr. MORRIS. May I suggest questions of that type be leveled to Mr. Howard?

Mr. ASPINALL. That is all right; I will level them to Mr. Howard.

Mr. HOWARD. I wonder if I may have the question read.

Mr. ASPINALL. The reporter will read it.

(The pending question was read by the reporter.)

Mr. HOWARD. It does between basins, sir, that is correct. It is cited as one of the purposes of the compact.

Mr. ASPINALL. That is what I understand. That, of course, refers to the desires to provide for an equitable use of the waters which were allocated to each one of the basins; is that not correct?

Mr. HOWARD. I think that is correct.

Mr. ASPINALL. If the lower basin has the right to use the water for the production for power as well as for irrigation and domestic purposes, then should not the upper basin have that right, too?

Mr. HOWARD. You will note that——

Mr. ASPINALL. I am asking you the question. You do not need to refer——

Mr. HOWARD. Subdivision B of article 4 recites that the use of the water for the production of energy is subservient to its use for domestic and agricultural purposes, and that is applicable throughout the entire basin.

Mr. ASPINALL. I understand that. But with the philosophy behind the statement that I called to your attention, does not that give to the upper basin the right to the use of water for production of power, that is, its water at least?

Mr. HOWARD. As between agriculture and power—

Mr. ASPINALL. Can you not answer the question yes or no?

Mr. HOWARD (continuing). Power is subservient, but as between power versus power there is no treatment in the compact which would give the upper basin any priority over the lower basin in the matter of production of energy.

Mr. ENGLE. Will the gentleman yield?

Mr. HOWARD. If you look upon these as power dams.

Mr. ASPINALL. Yes, I will yield.

Mr. ENGLE. Is it a correct statement, Mr. Howard, that there could be no complaint about the use of the upper basin of water for power production provided it does not interfere with the rights of the lower basin to the delivery of water under the compact?

Mr. HOWARD. For domestic and agricultural use, that is correct, I think, if I understood your question.

Mr. ENGLE. Yes, that is exactly what I said. In other words, they can use the water for power, which is a nonconsumptive use, provided that it does not interfere with the water that the lower basin is entitled to receive under the compact.

Mr. HOWARD. May I comment on that statement?

Mr. ENGLE. Yes.

Mr. HOWARD. It is at least my concept of the meaning of the compact that the upper basin was apportioned the beneficial use of certain water. We all knew, and know now, that the use of that water for domestic and irrigation purposes ultimately will require some regulation in the upper basin in order to make the water available, and if, as an incident to that regulation, there is an opportunity to develop power, nonconsumptive use, that apparently would not interfere in any way with the operation of the compact. However, as we see this picture, the primary, if not the sole, function of Glen Canyon Dam and Echo Park Dam is the production of energy for the purpose of financing irrigation projects; and we now have in the lower basin a Hoover Dam which was set up for many purposes, including the production of power. The Federal Government has made innumerous contracts with respect to the use of that energy. Those contracts are based upon certain assumptions with respect to the delivery of water from the upper basin to the lower basin. In making those estimates there was no allowance made for the holding of water in the upper basin solely for the production of energy as distinguished from regulation of the river for domestic and agricultural purposes, and for that reason we felt that the Federal Government should not impair its ability to deliver energy in accordance with those contracts by upstream dams which are solely for power.

Mr. ENGLE. We get back to the basic proposition, do we not, that whatever the lower basin is entitled to, it is entitled to under the compact. Now if the Federal Government, in executing contracts with reference to Boulder Canyon, made a contract which was not authorized under the compact, then that contract should not thwart the aspirations of the upper basin under the compact, should it?

Let us deal with just that proposition without arguing the correctness of my assumptions. Let us just say that if the Federal Government entered into a contract in which it undertakes to do something that is not within the framework of the compact, then it is not right, is it, to permit the execution and operation of that contract in violation of the rights of the upper basin under the compact?

Mr. HOWARD. I feel that the contracts made for the production of energy at Hoover Dam are not in violation of the compact, of course.

Mr. ENGLE. I know. You are disputing my assumptions. What I am saying is, let us just assume that the Federal Government has made more contracts for power than it has any right to make under the terms of the compact. Is it not your belief that all contracts on the river must comply with the compact? Is that not right?

Mr. HOWARD. Yes, I think that is true and that the Federal Government has always subjected its operations to the Colorado River compact.

Mr. ENGLE. Then if that is true, the contract for Boulder Canyon power, to the extent that it is predicated upon flows in the river not authorized by the compact, is in violation of the compact, and, therefore ineffective; is it not?

Mr. HOWARD. I think the difficulty is that different concepts exist of just what the compact means.

Mr. ENGLE. I understand that. I understand that, and I agree that you are assuming one construction of the compact and I am assuming another.

For instance, I assume that the Federal Government had no right to contract for the production of energy at Boulder Canyon which required release into the lower basin for the purpose of producing that power which was not warranted by the provisions or required by the provisions of the compact. Now if that is true—I do not know if that is what is in those contracts or not—but if that is true, the contract falls, does it not?

Mr. HOWARD. If it is in violation of the compact, of course.

Mr. DAWSON. Will the gentleman yield?

Mr. HOSMER. Will the gentleman yield to me?

Mr. ENGLE. The gentleman from Montana has the time. I will yield back to him and if he wants to yield, it is all right. I am through with this particular line of questioning.

Mr. METCALF. I would like to return to questioning, but I will yield to the gentleman from California.

Mr. HOSMER. If it is true that the Federal Government went beyond its authority in connection with the Hoover Dam project, it did, howsoever, make the contracts; and then it certainly would be liable to those with whom it contracted for any breaches of the contract, would it not?

Mr. HOWARD. That gets into a field I would want to give some consideration to. I do not believe that the Federal Government made any guaranty with respect to the availability of water, but it did proceed upon assumptions.

You will recall that, in the first instance, when the contracts were set up, by definition there was certain energy which was classed as firm energy. That was supposed to be the firm output of the power plant. Provision was made in those estimates for the reduction of that firm energy by, I think, 8,760,000 kilowatt-hours a year to accommodate estimated upstream diversions.

Mr. HOSMER. My point was merely that if we are going to take over the function of the courts and decide in this committee that the Federal Government exceeded its authority then we should also take up the matter of damages and award such damages to the lower basin as are reasonable.

Mr. HOWARD. That is true. We have set up works to use the energy in accordance with the estimates. When those figures were worked over in 1941 after the adoption of the Adjustment Act, when the whole basis of the financing of the Hoover Dam was changed to an amortization theory, there were other estimates made as to the availability of water, and we have relied upon those estimates in making our power contracts and our investments.

Mr. HOSMER. I think we have thoroughly satisfied the point that, irrespective of what interpretation is given, the lower basin is going to be damaged.

I yield back.

Mr. ENGLE. May I have that again? I did not understand that. That was not a question, it was a statement, I believe.

Mr. HOSMER. Yes.

Mr. ENGLE. A statement of what?

Mr. HOSMER. Whether this is going to be interpreted one way or the other, the lower basin is going to be damaged.

Mr. DAWSON. Let the reporter read the statement.

(The record was read by the reporter.)

Mr. DAWSON. Now, Mr. Chairman——

Mr. ENGLE. Just a minute——

Mr. ASPINALL. Let us proceed regularly. The gentleman from California has yielded back to the gentleman from Montana.

Mr. METCALF. I yield to the gentleman from California.

Mr. ENGLE. Let me just say that the lower basin, for a number of years, has been receiving the benefit of over 13 million acre-feet of water going down that river producing power at Boulder Canyon. Now it was not contemplated that that should continue in perpetuity because it was contemplated that developments should occur in the upper basin. Is that not true, Mr. Howard?

Mr. HOWARD. An allowance was made for that in estimates of available water.

Mr. ENGLE. What I am getting to is that the continued revenue from the power production was not assured to the lower basin, and the fact that it will be lost does not mean it is wrong unless the lower basin is entitled to it under the compact. Therefore, the fact that the lower basin will make less money from Boulder Canyon is not wrong unless the lower basin is entitled to have that income.

Just to keep the record straight, if the lower basin and the power users of Boulder do suffer some detriment, they only have a right to complain of it if it is wrong, and not because it occurs. The fact that there will be less revenue from Boulder does not per se make them wrong. It is wrong only if it is something they are entitled to in perpetuity. I assert that it was never contemplated that nearly 14 million acre-feet of water should go down that river and through the powerhouses at Boulder, and since that is the fact, if loss of revenue occurs it is not necessarily wrong, but only wrong if it takes something to which the lower basin is entitled.

Now I yield back.

Mr. DAWSON. Will the gentleman yield?

Mr. METCALF. I yield to the gentleman from Utah. I would like to get a couple of questions in myself.

Mr. DAWSON. I would like to get this matter of contracts straight. Do you agree with Mr. Tillman in his statement, in which he says,

"I wish to emphasize that I do not contend or even suggest that any of these estimates or assumptions by the Government constituted any guaranties"?

Mr. HOWARD. I think Mr. Tillman is correct in that.

Mr. DAWSON. And you do not contend there is anything in those contracts which would bind the Government to continue to run excess water over those turbines for secondary power?

Mr. HOWARD. No. There were estimates made, but I wouldn't——

Mr. DAWSON. Those were estimates, and the gentleman refers to them as assumptions only. There were no commitments on the part of the Government, were there, for that secondary power?

Mr. HOWARD. No. I think that is a correct statement.

Mr. DAWSON. That is all.

Mr. HOWARD. But we did proceed——

Mr. DAWSON. You have answered my question.

Mr. HOWARD. Yes.

Mr. METCALF. Mr. Morris, as I understand your answer to the question that Mr. Engle asked, it is your contention that domestic and agricultural use downstream has a prior right to power use upstream; is that correct?

Mr. HOWARD. The compact so provides.

Mr. MORRIS. Yes, sir.

Mr. METCALF. Either one may answer.

Mr. HOWARD. I am sorry, I thought you addressed it to me.

Mr. MORRIS. That is correct.

Mr. METCALF. Now was not the purpose of this compact to protect the upstream States and the upper-basin area in the domestic, agricultural, and power uses of the water in that area?

Mr. MORRIS. Those are legal questions which I think Mr. Howard can answer better than I.

Mr. METCALF. Either may answer.

Mr. HOWARD. As to domestic and agricultural use, I think that is correct. Throughout the entire basin, power was subjected to those uses, made subservient.

Mr. METCALF. Now how do you protect yourself in an upper-basin State so that you have power uses as well as domestic and agricultural uses, against the lower basin?

Mr. HOWARD. To the extent that power development could be said to be an incident to storage and delivery of water for domestic and agricultural purposes, I do not think that the lower basin could have any objection to it. The difficulty we have here is that we are setting up power against power, and under the compact there is no specific provision which would give the upper basin any right to develop energy in a manner which would adversely affect the lower basin, if it is not an incident to domestic and agricultural use.

Mr. METCALF. As I have understood the testimony that has been submitted here, that is just exactly what the upper basin tried to do by insisting that the State of California pass a limitation act and protect the rights of the upper basin States of Utah and Wyoming and Colorado, so that they could preserve their domestic, agricultural, power, and other rights under the compact. Now what is the effect of that limitation?

Mr. HOWARD. The limitation act relates to domestic and agricultural use of the water and has no provisions in it with respect to energy and power.

Mr. METCALF. The limitation act has no effect on the use of the power above and beyond the rights of the lower basin?

Mr. HOWARD. It merely limits the State of California in the consumptive use of water in the State of California for domestic and agricultural purposes. Power is not ordinarily considered a consumptive use, and the limitation act relates only to consumptive use.

Mr. METCALF. I am, again, largely trying to find out, when you come from an upstream area, how you protect yourself when you go into these comapcts. It seems to me that when the State of California was limited to 4 million acre-feet for domestic——

Mr. HOWARD. 4,400,000 acre-feet, plus one-half of excess or surplus unapportioned by the Colorado compact.

Mr. METCALF. Is there any question but what that amount is going downstream at the present time under this proposed plan?

Mr. HOWARD. If the proopsed plan contemplates the complete development of the upper basin as I think all of these bills recite——

Mr. METCALF. That is right.

Mr. HOWARD. Upon assumptions that apparently have been made with respect to the interpretation of the Colorado River compact, there would not be enough water to fulfill the obligations of the United States to the lower basin. I am getting into the engineering field here a bit, but that is the advice that we are working on.

Mr. METCALF. Your contention, then, is that in an extreme year less than 4,400,000 acre-feet would be released to the lower basin and less than California is entitled to under the limitation act in case of the proposed development of the water?

Mr. HOWARD. Of course, you understand that 4,400,000 acre-feet is only part of the lower basin use. We have many other factors that depend upon the delivery at Lee Ferry. That is, there is the Mexican burden that has to be taken care of, and there are other uses in the lower basin than those existing in California.

Mr. METCALF. I understand. I have gathered here you have made uses above and beyond the entitlement of the lower basin to the water of the Colorado, and I am trying to find out how you protect yourself if you live in an upstream area in an upper basin against such a trespass on the water of the river.

Mr. HOWARD. I think the protection of the upper basin there is in the Colorado River compact, not in the California Limitation Act.

Mr. METCALF. The California Limitation Act must be a part of the compact. It was a condition precedent to the adoption and the ratification of the compact.

Mr. HOWARD. It is a separate agreement, but we have considered it, you might put it, a package deal as a six-State compact plus the Limitation Act.

Mr. METCALF. And binding on the State of California.

Mr. HOWARD. The Limitation Act is an agreement made by the State of California, evidenced by statute, with the United States for the benefit of the other States of the basin. The other States are not signatories to that particular agreement.

Mr. RHODES. Will the gentleman yield?

Mr. METCALF. I am going to yield back my time to the gentleman from California.

Mr. ENGLE. I will yield to the gentleman. I have the time.

Mr. RHODES. I thank the chairman of the committee.

Mr. Morris, in your statement you have gone rather deeply into what I would consider to be an attack upon one of the basic concepts of reclamation—that power produced from irrigation sources may be used to pay part of the cost of the irrigation works. Apparently from reading your statement, at least I would gather, you do not believe in that concept. Is that a correct interpretation?

Mr. MORRIS. I believe as provided in these bills and the studies by the Bureau of Reclamation that the loading of the cost of power to provide subsidy for irrigation is undesirable loading from the standpoint of industrial development of the area and is an uncertain source of revenue from the standpoint that you cannot be assured of selling 6-mill power for the decades running up to a century of time used in these studies.

Mr. RHODES. Then you are not necessarily attacking the concept, but you do not believe that this particular project is sound in its formation. Is that correct?

Mr. MORRIS. That is correct. Glen Canyon Dam power is about the only power that shows any substantial margin below the 6 mills to provide for subsidy, and some of the other storage projects with their accompanying powerplants actually produce power at more than 6 mills cost. I do not feel that such price of power is a certain source of revenue during the retirement of the obligation for irrigation in the upper basin.

Mr. RHODES. You certainly would not go so far as to say that the Central Valley project of California was not feasible for that same reason, would you?

Mr. MORRIS. No; on the Central Valley project of California, I believe the irrigators repay over 80 percent of the cost allocated to irrigation. Here the irrigators pay 10 or 12 or 13 percent of the cost of irrigation and the balance is repaid by power, completely reversing the position.

Mr. RHODES. What price for the sale of power would have to be included in the planning for this project before you might believe that the project would be feasible over such a long period of time?

Mr. MORRIS. Bear in mind that in this region, the upper basin, is one of the greatest concentrations of energy anywhere in the world, perhaps, in gas and oil and oil shale and coal and uranium. I believe that the future of that area lies in low-cost power rather than in high-cost power. I do not believe that power can stand loading in the upper basin, or should. I just wish I were not an impartial witness here so that I could just strike out for what I believe the future of that area is—an industrial future based upon low-cost power.

Mr. ENGLE. Will the gentleman yield?

Mr. RHODES. I will yield back to the gentleman if he will yield back to me again so that I can ask Mr. Howard a question.

Mr. ENGLE. Yes. I just wanted to ask Mr. Morris if it is not true that a firm application of what he says would simply mean no projects in the upper basin at all. You do not think any of them are any good; is that right?

Mr. MORRIS. These projects which are proposed are not very economic projects. I think that is true. But fundamentally, I believe that power should not support irrigation, that irrigation should be supported, where required, by a general direct appropriation by the Congress rather than by loading it on power. The West is competing with the East. In the eastern projects that have power associated with flood control or navigation, power is not asked to pay one cent beyond its cost in those cases, and why should it be in the West?

Mr. ENGLE. Do you think the people in California have a right to tell the people in the upper basin how they use their power resources? As far as I am concerned, they can run electric razors with it.

Mr. MORRIS. As I say, I wish I could be considered impartial so that I could just speak for those people in that valley. I believe that low-cost power is their destiny in that area.

Mr. ENGLE. I may agree with the gentleman. I made a statement the other day to Governor Miller in which I said, if I were planning the future of that area, I might think of it in entirely different terms. But as a Californian outside the area, I do not see how I have any right to set myself up as the statesman to run their affairs. As I say, if they want to dedicate the power to running electric razors, that is their business as far as I am concerned, and it is their water—they can put it on their land or mix it with their whisky as far as I am concerned.

It seems to me that as Californians we have a right to insist we get our water and beyond that it is none of our business particularly.

There is one other question I would like to ask, and then I will not ask any more of Mr. Morris, and then I will yield to the gentleman from Arizona.

I notice, Mr. Morris, you say on page 14 of your statement, in the next to the last paragraph:

> Testimony of my associates in opposition to the Colorado River storage project bills clearly shows that these storages are not required to permit the full diversion of the quantities of water required for the "participating projects" named in this bill without causing the flow at Lee Ferry to fall below 75 million acre-feet under any reoccurrence of drought such as has occurred in the past.

Your attention is directed to that paragraph, is it, Mr. Morris?

Mr. MORRIS. Yes.

Mr. ENGLE. If I read that paragraph correctly, it says there is no danger to California's water supply by reason of these participating projects. Is my understanding correct?

Mr. MORRIS. That statement, the participating projects without the storage projects.

Mr. ENGLE. All right. I did not say anything about that. I am worried about California's water. If I read that statement correctly, it says that all participating projects named in this bill——

Mr. MORRIS. I call your attention to the fact that the storage projects will further deplete the river by six to eight hundred thousand acre-feet per annum, by reason of evaporation, in addition to the depletions which will take place from these participating projects if built alone without the storage projects, which are not now required.

Mr. ENGLE. I am going to get to that later. As I understand this statement—if I am not correct, I wish you would correct me— it says that these participating projects, standing alone, would not cause

the flow at Lee Ferry to fall below the 75 million acre-feet under any reoccurrence of this drought such as occurred in the past. If I interpret that correctly, this means that these participating projects could be built without jeopardizing one bucketful of California's water. Is that right?

Mr. MORRIS. That is right, standing alone without the storage projects.

Mr. METCALF. Will the gentleman yield?

Mr. ENGLE. That is just as far as I want to go at this point. I agreed to yield to the gentleman from Arizona.

Mr. RHODES. I will agree that you may yield to the gentleman from Montana first, if you yield to me second.

Mr. ENGLE. All right.

Mr. ASPINALL. The Chair makes this suggestion—that we try to divide the time so that the rest of the members may ask questions.

Mr. ENGLE. Let us hurry along before we run out of time.

Mr. METCALF. I want to call Mr. Howard's attention to page 5 of his testimony where he says:

> We now have two agreements to consider (1) the Colorado River compact; and (2) the agreement between California and the United States.

Now as I understand it, it is your contention that the subsequent agreement between California and the United States for the marketing of this power produced by water to which you have no right under the compact is a paramount and overriding agreement.

Mr. HOWARD. I think the two agreements—there might be some misapprehension in your mind as to just what two agreements we are speaking of.

Mr. METCALF. I hope there is.

Mr. HOWARD. One was the Colorado River compact, which is a six-State agreement approved by the United States, to which the United States, while not a party, has agreed to subject its works. The other is an agreement between California and the United States for the benefit of all of the other States in the basin, in which California agrees to limit the consumptive use of water in California, as described in section 4 (a) of the Project Act. Those are the two agreements I am mentioning at that point.

Mr. METCALF. And it was the condition precedent to the ratification of the Colorado River compact, the six-State agreement, that California would pass this so-called Limitation Act which is an agreement between California and the United States?

Mr. HOWARD. I would not use the word "ratification" in that connection, sir.

Mr. METCALF. Well, the adoption, or whatever it is.

Mr. HOWARD. The Boulder Canyon Project Act approved the Colorado River compact either as a 7-State compact or as a 6-State compact, but in the alternative said, if there were no 7-State compact within the period of 6 months following the adoption of the Limitation Act, then the Project Act might be proclaimed effective upon 6-State ratification—upon the basis of a 6-State compact, plus the Limitation Act.

Mr. METCALF. I understand. And you say in your own testimony that the purpose of that Limitation Act was for the benefit of the other States in the basin to limit the consumptive use of the river in California to 4,400,000 acre-feet.

Mr. HOWARD. Plus one-half of excess or surplus.

Mr. METCALF. Plus one-half of excess or surplus water.

Mr. HOWARD. That was the purpose of it—to protect the States of the upper basin from too rapid development in the lower basin. They were not afraid of too rapid development in Arizona apparently.

Mr. METCALF. And it failed in its purpose, according to your statement?

Mr. HOWARD. I would not accept that statement. It has not failed in its purpose. The upper States have the right to the beneficial consumptive use of 7½ million acre-feet of water under the compact for domestic and agricultural consumptive use. We are not quarrelling with that right.

Mr. METCALF. I yield back.

Mr. ENGLE. Now the gentleman from Arizona, and then the gentleman from Utah.

Mr. RHODES. I think the gentleman from Utah is entitled to the floor, Mr. Chairman.

Mr. ENGLE. The gentleman from Utah.

Mr. DAWSON. I am going to follow a little different line with Mr. Morris, because I think we can develop this a little further with some of these other witnesses.

Mr. Morris, you have had the occasion to visit the Glen Canyon Dam site, have you not, a number of times?

Mr. MORRIS. Yes; I have—once.

Mr. DAWSON. Just once?

Mr. MORRIS. Yes, sir.

Mr. DAWSON. In what capacity were you there?

Mr. MORRIS. I was there as a guest of the Bureau of Reclamation.

Mr. DAWSON. And on that occasion, did you make some investigation?

Mr. MORRIS. No, nothing more than observation. I might say my department, the department of water and power, city of Los Angeles, gave $60,000 to the Bureau of Reclamation to assist it in the examination of the foundations for that dam site.

Mr. DAWSON. What was the interest of the city of Los Angeles in that?

Mr. MORRIS. Just looking ahead towards power.

Mr. DAWSON. They intended, then, to eventually develop the Glen Canyon Dam site?

Mr. MORRIS. Not as a city, but if the Federal Government was going to build at that site and power was marketed at a rate which was attractive to us, we would be interested in the power.

Mr. DAWSON. Does the city of Los Angeles still feel they would like to see a dam at Glen Canyon site?

Mr. MORRIS. We have no interest in that 6-mill power.

Mr. DAWSON. But you did spend your money, and I think other agencies in southern California spent money, to investigate the site with the possibility of constructing a dam?

Mr. MORRIS. We had expected the United States in marketing power would live up to the 1944 Flood Control Act and market it at the lowest possible rates, giving preference to public agencies; and on that basis we gave the $60,000 to the Bureau of Reclamation.

Mr. DAWSON. Do you have any opinion as to whether or not the site is suitable for construction of a 700-foot dam?

Mr. MORRIS. I would not care to pass on that. I have built dams, am building dams, and I know the need of care in examination of the site. I know the Bureau of Reclamation has had a number of consultants on that, and I do not know their findings, and I certainly have no independent judgment.

Mr. DAWSON. I see. Let me understand you correctly. Did I understand you to say that you have the opinion that power should not be used to support reclamation projects?

Mr. MORRIS. In a fundamental way, yes. In a fundamental way I believe that if irrigation is to be subsidized, it should be subsidized by direct appropriation and not from power. I believe that our power consumers in the West should be on the same basis as the power consumers in the East and not called upon to subsidize other projects from purchase of power.

Mr. DAWSON. You appear here as a representative of the Colorado River Board of California, and I assume that is their official stand—that power revenues should not be used to support irrigation projects.

Mr. MORRIS. I am here in a dual capacity. I am general manager and chief engineer of the Los Angeles Department of Water and Power, and I am also on the Colorado River Board of the State of California.

Mr. DAWSON. In which capacity are you speaking when you announce that principle?

Mr. MORRIS. I am speaking for the Los Angeles Department of Water and Power.

Mr. DAWSON. Have you raised any objection to California projects to use the power revenues for that purpose?

Mr. MORRIS. I have not participated in the projects built by the United States in California.

Mr. DAWSON. So this is the first project upon which you have raised that objection?

Mr. MORRIS. No. I served on the President's Water Resources Policy Commission, and I might say that the seven members of that Commission were unanimous in that view.

Mr. ENGLE. That was the Truman Commission?

Mr. MORRIS. That is correct.

Mr. SAYLOR. Will the gentleman yield?

Mr. DAWSON. Yes.

Mr. SAYLOR. I think we should find out where that report is and what report that was.

Mr. ENGLE. The gentleman has answered it was the Truman Commission.

Mr. MORRIS. The President's Water Resources Policy Commission. The report which counsel is holding in his hand is the legal volume, a published three-volume report. The Commission issued a draft of legislation. The draft of legislation was issued as a committee print by the Senate Committee on Interior and Insular Affairs. But, other than that, I believe there is no appearance anywhere of the draft of legislation which we proposed.

Mr. DAWSON. Does the Colorado River Water Board of California agree with that view?

Mr. MORRIS. I do not believe that the Colorado River board has ever passed on that point.

Mr. DAWSON. Now, Mr. Howard, did I understand you to say that you felt there was no preference of the upper States over the lower States or vice versa in the use of the power? One of you made that statement.

Mr. HOWARD. Aside from subordinating power to domestic and agricultural use, the compact, I think, is silent on that point.

Mr. DAWSON. So you would say, then, that there is nothing to Mr. Tillman's argument that the upper basin States would be obligated to pay damages to the lower basin States in the event that the secondary power was reduced?

Mr. HOWARD. I would prefer to have Mr. Tillman answer such questions. But, as I understand his testimony, he did not predicate

Mr. RHODES. I have just one question, and then I am through.

on the way in which the Federal Government has proceeded to enter into contracts to finance the Hoover project on the basis of the availability of certain water.

Mr. DAWSON. According to his statement, he figures that the Government was going to have to pay southern California damages in the event that the secondary power was interfered with. And the gentleman, Mr. Hosmer, just a moment ago made the assumption that was admitted, that damages would be in line. I am just finding out whether you agree with that.

Mr. HOWARD. I have not had occasion to study the law. We are a consumer of energy, not a retailer of energy. I am speaking for the Metropolitan Water District, and I would much prefer that Mr. Tillman answer such questions.

Mr. DAWSON. That is all.

Mr. ENGLE. Now the gentleman from Arizona. Let us not make these fellows miss their airplane.

Mr. RHODES. I have just one question, and then I am through.

Mr. Howard, in your statement on page 2 you related something which I think is the nub of a lot of the trouble in this particular situation.

As I understand it, in 1931 your district voluntarily entered into an agreement with other California water-using agencies which established the priority for the uses of water, putting domestic use behind agricultural use. Is that true?

Mr. HOWARD. Yes; that was done. Do you want an explanation of it?

Mr. RHODES. No; not at this time. Did that become part of the law of the State of California? Did the Legislature of the State of California ever pass a law announcing that principle and putting it into the laws of California?

Mr. HOWARD. No; it has never been the subject of legislative action.

Mr. RHODES. I see. Now this puts the water district, then, in the position of getting more water, if it must have more water, from either Arizona or the upper basin. You cannot get any more water from the water allowed to the State of California. Is that correct?

Mr. HOWARD. We are not seeking any more water than is covered by our water delivery contracts now.

Mr. RHODES. Not now. But do you anticipate in the future you might need more water?

Mr. HOWARD. If we need more water, I doubt very much it would be available from the Colorado River. I think we will probably have to go to some other source.

Mr. RHODES. Is it not true, though, if you did get more water from the Colorado River it could not come from California's share of the river; all that has been appropriated up to this time?

Mr. HOWARD. It is conceivable, of course, that this priority agreement could be revised, but we are not contemplating any such thing now. We believe if the compact is adhered to there will be enough to serve our water delivery contract in accordance with that priority agreement. I do not know whether the Congressman is familiar entirely with the history, but it happens that many years before there ever was any Colorado River compact, irrigation uses had been established in the lower Colorado River for the Imperial area and the Palo Verde area.

Mr. RHODES. To the tune of 3,850,000 acre-feet?

Mr. HOWARD. They had rights to that extent; yes.

Mr. RHODES. It was that much when you made this agreement?

Mr. HOWARD. If I may proceed——

Mr. RHODES. Will you answer that? At the time you made the agreement, did the existing users have the prior right to 3,850,000 acre-feet of water?

Mr. HOWARD. They had appropriative rights under the laws of the State of California and works to exercise those rights in amount somewhat exceeding that figure.

Mr. RHODES. Thank you.

Mr. HOWARD. When we made this priority agreement it was recognized that those long-established rights should have priority over the more recent municipal and domestic rights, and for that reason our uses were subordinated to the agricultural uses. Ordinarily that principle is reversed.

Mr. RHODES. Then, as I understand it, your only interest here is in making certain that the Metropolitan Water District receives 1,212,000 acre-feet for which it has a contract for delivery?

Mr. HOWARD. Yes. We are seeking to protect our position and see to it that the Federal Government retains the power and the water, too. When I say "power," I am not speaking of electricity, but retains the ability to service those contracts.

Mr. RHODES. And you have no thought of any future deliveries in excess of that amount?

Mr. HOWARD. No, we are not seeking anything more. We are not trying to increase our take from the Colorado River at all just to protect our contract rights as established in 1931.

Mr. RHODES. Did those contracts say anything about whether this water would come from surplus water or come from the allocation of water to California under the Colorado River compact?

Mr. HOWARD. The contracts do not attempt to classify water as to categories under the Colorado River compact.

Mr. RHODES. Some of it must have been surplus water due to the fact that the arithmetic shows with 3,850,000 and 1,200,000 you have somewhere in excess of 5 million acre-feet allotted which must go to California.

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Mr. HOWARD. The contracts in the aggregate add up to 5,362,000 acre-feet per annum, which obviously exceeds 4,400,000, and it was computed at the time that one-half of the excess or surplus water which is available to California would be sufficient to cover that excess.

Mr. RHODES. That is all, Mr. Chairman.

Mr. DAWSON. Mr. Chairman, may I ask one more question of Mr. Morris?

The CHAIRMAN. Go ahead.

Mr. DAWSON. Mr. Morris, you have been employed as consultant by the Bureau of Reclamation, have you not, a number of times?

Mr. MORRIS. No, I have not.

Mr. DAWSON. You have worked quite closely with their engineers, have you not?

Mr. MORRIS. Yes. I have been employed by other Federal agencies, but not by the Bureau of Reclamation.

Mr. DAWSON. My question is this: Have you found their designers to be capable and competent, their engineers?

Mr. MORRIS. Yes, their designers are capable engineers.

Mr. DAWSON. That is all.

Mr. RHODES. Mr. Chairman, I call attention to the time and suggest these witnesses are going to miss their plane if they do not leave.

Mr. SAYLOR. I would like to ask Mr. Morris a few questions.

Mr. ASPINALL. The gentleman from Pennsylvania.

Mr. SAYLOR. Mr. Morris, on the 24th day of November, 1954, the Commissioner of Reclamation wrote a letter, which is now a part of the record, in which he stated in his opinion there was a serious doubt as to whether or not the site of the Glen Canyon Dam could support a structure 700 feet in height.

Mr. DAWSON. Mr. Chairman——

Mr. SAYLOR. I refuse to yield.

Mr. DAWSON. I just want to keep the record straight.

Mr. SAYLOR. I want to keep this record straight, and I refuse to yield, and I do not like to be interrupted.

Mr. ASPINALL. The gentleman refuses to yield.

Mr. SAYLOR. Now the Commissioner of Reclamation appeared before this committee about 2 weeks ago and now bluntly states that there is no doubt that the site of Glen Canyon Dam can now support a structure of at least 700 feet. As an engineer, what would you consider necessary in the past 5-month period to resolve doubts so that you could now definitely state that the site would support a 700-foot structure?

Mr. MORRIS. Well, the engineers of the Bureau of Reclamation and their consultants have carried on extensive investigations of the foundation at Glen Canyon Dam at more than one site and have core drilled the area, dug exploratory tunnels, and right and left abutments, and have analyzed the field information, the laboratory tests which they have conducted, none of which am I familiar with other than receiving the field tests. On account of our contributions of cost we did receive the progress reports of field investigations. The laboratory reports of their consultants, I have never seen, and I do not know whether they have had new information coming in within that 5-month period or not.

Mr. SAYLOR. Mr. Morris, in view of the fact that there is such a public utterance by the Commissioner of Reclamation in November of

1954, which is a complete contradiction of what he now states, do you feel that members of this committee who are interested in the country and interested in seeing to it that, if a dam is built, it should be built at a proper place, or being unreasonable when they ask that the Bureau submit to us all of its engineering data, including the studies which have been made, and demanding a complete report of the work that has been done in the past 5 months to show this change of position?

Mr. MORRIS. I think that is quite proper. If questions have been raised, I am sure the Bureau has the information and should furnish it to you.

Mr. SAYLOR. Do you feel this committee should ask, when this evidence is submitted by the Bureau, that other engineering firms should be permitted to examine it and determine whether or not Glen Canyon Dam site can support a structure of 700 feet?

Mr. MORRIS. Yes. I presume it would be a public record for everybody to examine.

Mr. SAYLOR. That is all, Mr. Chairman.

Mr. ASPINALL. I guess that is all, gentlemen. Thank you very much.

Mr. MORRIS. Thank you. We appreciate you allowing us to testify first out of order.

Mr. HOWARD. Thank you.

Mr. ASPINALL. The Chair will call the other witnesses to the witness table.

Mr. ENGLE. Is Mr. Simpson going to testify?

Mr. SIMPSON. No, Mr. Engle, I had nothing further to say.

Mr. ASPINALL. He did not make a very long statement, but if you wish to sit at the table, you have that privilege.

Mr. SIMPSON. Thank you, sir.

Mr. ASPINALL. So if any member of the committee wishes to ask questions, he may be permitted to do so.

Under our former agreement, the Chair recognizes the gentleman from California, Mr. Engle.

QUESTION PERIOD OF NORTHCUTT ELY, SPECIAL COUNSEL, COLORADO RIVER BOARD; RAYMOND MATTHEW, CHIEF ENGINEER, COLORADO RIVER BOARD; FRED W. SIMPSON, CHAIRMAN, COLORADO RIVER BOARD OF CALIFORNIA; AND GILMORE TILLMAN, CHIEF ASSISTANT CITY ATTORNEY FOR WATER AND POWER, CITY OF LOS ANGELES, CALIF.

Mr. ENGLE. Mr. Ely, whom do you represent, whom are you authorized to represent before this committee?

Mr. ELY. I am here as special counsel for the Colorado River Board of California, Mr. Engle.

Mr. ENGLE. As I understand it then, you have no authority to speak for the attorney general?

Mr. ELY. Not with respect to this legislation. I represent the attorney general in the United States Supreme Court suit of *Arizona* v. *California et al.*, and to the degree that questions involved in that suit are asked here, I shall endeavor to give you precisely the answers we have given in the Supreme Court on behalf of the attorney general.

Mr. ENGLE. And you are not authorized then to speak for the Governor of California?

Mr. ELY. I have received no instructions from the Governor, other than the comments of the State of California submitted under the Flood Control Act of 1944 upon this legislation. The 1944 act, as you recall, directs that Reclamation Bureau reports be submitted to the affected States through their governors. That was done and a report was submitted on the authority of the Governor by the director of public works upon the projects now before you. I offered that in evidence yesterday. It was rejected on the ground that it appears in House Document 364, the report on this project.

Mr. ENGLE. To answer the question specifically, you are not authorized to speak for the Governor; the report speaks for itself?

Mr. ELY. That is correct.

Mr. ENGLE. And are you authorized to speak for the California State Legislature?

Mr. ELY. No, sir; no more than they have delegated authority to the Colorado River Board.

Mr. ENGLE. Are you authorized to speak for the California Water Project Authority?

Mr. ELY. In this proceeding, no, sir. I do represent the California Water Project Authority with reference to central valley matters, but not in the present legislation, which does not affect it.

Mr. ENGLE. But it is true you have no authorization to speak for the California Water Project Authority in this proceeding?

Mr. ELY. That is correct, sir.

Mr. ENGLE. And is it equally true that you have no authority to speak for the California Water Resources Board?

Mr. ELY. In the present proceeding, that is correct.

Mr. ENGLE. And in the present proceeding, is it equally true you have no authority to speak for the California State engineer?

Mr. ELY. I have received no instructions from him with respect to the legislation before you.

Mr. ENGLE. Is it equally true you have no authority to speak for the director of public works of the State of California?

Mr. HOSMER. A point of order, Mr. Chairman. The witness has stated whom he is appearing for. This could go on indefinitely. He is asking who he does not appear for, and he could list all of the names of the people in the State of California individually, and we have a certain amount of time.

Mr. ASPINALL. The gentleman is in order. The point of order is overruled.

Mr. ENGLE. The reason I ask you that question, Mr. Ely, is because on page 36 you say "California's basic position is" and so forth.

As I understand it then, your authorization to speak in this manner is limited to speaking for the California Colorado River Board, which is a special agency of our State?

Mr. ELY. Referring to page 36, when I say "California's basic position is that our State is conforming to the Colorado River Compact and so, I am referring to the position as stated by the Colorado River Board, which is identical with that stated by the Governor through the director of public works. Substantially the same statement appears in the State's official comments upon this project.

Mr. ENGLE. All right. But I want it clear and the record to clearly show, and I believe it does, that you have no specific authority to speak either for the Governor, the legislature, the Water Project Authority of California, the Water Resources Board of California, the State legislature, the state engineer, the attorney general, or the director of public works.

Mr. ELY. I am not aware of any of those taking the position that California is not conforming to the compact, Mr. Engle.

Mr. ENGLE. That is not precisely the question, Mr. Ely. What I am trying to determine is whether in the whole complexion of this statement—in which it might be led to appear that you are a spokesman for the water agencies of California who have the authority to make water policy for our State, you speak with an authoritative voice and under authority from them.

Let us deal a little bit with the Colorado River Board. The Colorado River Board is set up by the State legislature, is it not?

Mr. ELY. Yes, sir.

Mr. ENGLE. And on that Board are represented six southern California water agencies; is that correct?

Mr. ELY. There are six, Mr. Engle, directed by the statute to submit nominations to the Governor, and the Governor is directed by the statute to select his nominees from the slate so presented.

Mr. ENGLE. Yes. Now will you name the six agencies, please.

Mr. ELY. Yes, sir. The Metropolitan Water District of Southern California; the city of Los Angeles; the city of San Diego, now represented by the San Diego County Water Authority; the Imperial irrigation district; the Coachella County water district; and the Palo Verde irrigation district.

Mr. ENGLE. How many of those agencies are represented here in presenting this testimony? Are all of them represented here?

Mr. ELY. They are all represented through the Colorado River Board, if that is your question. Mr. Morris and Mr. Tillman and Mr. Griffith were here on behalf of the department of water and power.

Mr. ENGLE. It is true, is it not, that under the statute, when a vacancy occurs on the Colorado River Board, each one of the participating agencies nominates two names to the Governor from which he must select; is that true?

Mr. ELY. If he cares to fill the vacancy, yes. I assume that the Governor could request other names to be submitted if he did not care for those two.

Mr. ENGLE. In other words, he must select from the two that are nominated by the participating agencies?

Mr. ELY. That is correct in substance.

Mr. ENGLE. Is it true also that all members of the Colorado River Board are now officers of one of the participating agencies, one or more?

Mr. ELY. I think that is correct, and that is the purpose of the statute.

Mr. ENGLE. And the Colorado River Board, then, could be said to be a board of directors at a higher level of the six participating agencies which you have named?

Mr. ELY. No, sir. They are, as in the case of the recent statute of the State of Washington creating their power commission, a State

board, but directed to be appointed from the portion of the State and the agencies directly affected. It is a form of home rule, if you wish to call it that. The Governor is directed to appoint men from the portion of the State affected by the Colorado River controversy and nominated by the agencies, public agencies, of the State of California, all of them most directly affected by it.

Mr. ENGLE. Is there any member now of the Colorado River Board who is not a member of 1 of the 6 agencies which you mentioned?

Mr. ELY. Not a member of 1 of the 6 agencies?

Mr. ENGLE. Yes.

Mr. ELY. No. Under the statute——

Mr. ENGLE. The answer is "Yes," is it not?

Mr. ELY. Members are required to be appointed from those agencies. That is the purpose of the statute.

Mr. SAYLOR. Will the gentleman yield?

Mr. ENGLE. No. Will you tell us when the act refered to was passed?

Mr. ELY. Yes, we can give you that. 1937, I am informed.

Mr. ENGLE. Will you make a copy of the act available for the file but not available for the record?

Mr. ELY. Surely.

Mr. ENGLE. So we may have it before us.

Mr. ELY. Surely.

Mr. ENGLE. Now, Mr. Ely, in House Document 364, the 83d Congress, 2d session, at page 297, relating to the official position of the State of California, appears the following language, and I quote:

> The primary interest of the State of California in the specific projects set forth in the report of the Commissioner of Reclamation as approved by the Secretary of the Interior on January 26, 1951, is that in the construction and operation of any of these projects, California will receive its due apportionment of the waters of the Colorado River system as provided for in the Colorado River compact and related laws, instruments, and documents.

That is on page 297. I have read it as it appears.

You are familiar, I assume, with that statement, Mr. Ely?

Mr. ELY. I have it before me; yes, sir.

Mr. ENGLE. So far as you are aware, has that statement ever been modified?

Mr. ELY. It is a fragment of the report of the State of California upon this project; you are quite correct.

Mr. ENGLE. I did not propose to read the whole report, Mr. Ely. I am asking whether or not, as far as you are aware, that statement of the primary interest of the State of California in these projects has been modified.

Mr. ELY. It is explained elsewhere in the report itself.

Mr. ENGLE. I understand it has been explained.

Mr. ELY. The language immediately following, in part, explains it.

Mr. ENGLE. May I ask you this directly? Has the State engineer ever modified his statement of primary interest of the State of California as set forth in that paragraph?

Mr. ELY. There is a supplementary report of February 1954 which was offered in evidence here and——

Mr. ENGLE. Let's not quibble about it.

Mr. ELY. Just a moment please. And rejected.

Mr. ENGLE. Let's not quibble about it.

Mr. ELY. No, sir. You asked me if it had been modified, and I am seeking to get you the citation of the later report.

Mr. ENGLE. If you are familiar with the terms of the later report, will you tell me whether or not it modifies this statement?

Mr. ELY. We will have the language for you, and then it can speak for itself, Mr. Engle. May I read to you the answer to your question, sir?

Mr. ENGLE. Yes.

Mr. ELY. The supplemental report begins at page 9 of House Document 364 and is dated February 15, 1954. It says, on page 11:

California agencies have rights established by prior appropriation and by contract with the Secretary of the Interior under the authority of the Boulder Canyon Project Act, providing for the use in California of 5,362,000 acre-feet annually of water from the Colorado River system. It is the duty of the State to protect and preserve those rights of its citizens. California is, therefore, rightfully concerned in proposals for the further development of the water resources of the Colorado River Basin wherever such developments may be. For this reason it is necessary for the State to analyze thoroughly any proposals for further development and take whatever steps appear required to insure that such developments would not impair the rights of California and its agencies in and to the water of the Colorado River system.

The Colorado River storage project and participating projects as proposed in the report under review would obviously have substantial effect upon the available water supply and the operation of facilities in the lower basin and California.

Mr. ENGLE. All right. That goes directly to the point. The State of California has said that its primary interest is that it will receive its due apportionment of the waters of the Colorado River as provided for in the Colorado River compact and related documents.

Now I ask you whether or not you agree with the answer given by Mr. Morris to the question I asked him, in which I asked him if it was not a correct interpretation of his statement on page 14 that the construction of the participating projects named in the bill could occur without interfering with California's apportionment of water under the Colorado River compact.

Mr. ELY. The answer is "Yes." My testimony yesterday, Mr. Engle, which I do not think you heard in full, not only admits that, but makes that assertion—that all of the participating projects in the present bill, that is, the first 11—all of the participating projects proposed for addition in New Mexico, all of the additional participating projects proposed by the Governor of Colorado, Mr. Johnson, could be built without any storage works whatsoever, and that the total of all of those uses would be less than that which the upper basin is entitled to make and less than the quantity which would interfere with 75 million acre-feet every 10 years at Lees Ferry.

Mr. ENGLE. To spotlight that statement, it appears on page 2 of your statement, does it not?

Mr. ELY. My statement?

Mr. ENGLE. Yes, in which you said:

The aggregate consumptive use of these projects is said to range from about a half a million to about 1½ million acre-feet.

Mr. ELY. That is correct.

Mr. ENGLE (continuing):

These quantities when added to about 2½ million acre-feet, said to be required by project already constructed or authorized, would represent a total use of say 3 or 4 million acre-feet in the upper basin. The larger of these figures is still

within the quantity of 7,500,000 acre-feet per annum, the use of which is apportioned to the upper basin by article III(a) of the Colorado River compact. Moreover, the engineering studies indicate that this total could be put permanently to use without the construction of any new holdover storage whatever.

Mr. ELY. Yes, sir.

Mr. DAWSON. Will the gentleman yield?

Mr. ENGLE. Let me proceed here a minute, and then I will yield.

If I correctly interpret that statement, it means that this Congress could authorize, and the Bureau of Reclamation could build, all of these participating projects without the impairing by as much as one bucketful the water to which California is entitled under the Colorado River compact.

Mr. ELY. Subject to two qualifications: First, if they were built without the construction of storage works which would intercept our water supply; second, to the degree that they do not involve transmountain diversions which would impair the quality of water. Several of these are initial features of ultimate large transmountain diversions. If the final features were built and the effect upon our quality of water was adverse, we would object.

Mr. ENGLE. But those latter items are not authorized in this legislation?

Mr. ELY. That is correct.

Mr. ENGLE. Then, taking your statement by its four corners, you are saying, in effect, that without any additions or embellishments to the projects currently proposed in this legislation, that they could all be built and California's water supply would not either be impaired or endangered. Is that right?

Mr. ELY. No, sir. All of the consumptive-use participating projects, not the storage projects.

Mr. ENGLE. All right. Now we are going to get to that. The basic proposition that you make, then, is that with respect to the water which would be consumptively used by the upper basin under this legislation, those works to make that water usable could be put into operation without any impairment whatever of California's water rights or water apportioned to California under the Colorado River compact, but that you object to the addition of the storage facilities. Is that correct?

Mr. ELY. Not quite. What we say is that all of these works could be built and the water used by the participating projects without the necessity for any storage whatever. To the degree that storage is constructed which interferes with our rights in the lower basin, we object to it.

Mr. ENGLE. All right. It still does not alter the basic proposition on which I am now directing my attention, and that is that these projects can be built, can be put in operation, and the water can be put to use without hurting California so far as the participating projects are concerned.

Mr. ELY. Bear in mind two things, Mr. Engle: First, quality of water, which we reserve at all times under article 8 of the Colorado River compact; and, second, in all of my answers to you, you and I are both dealing in a complete ignorance of the claims of the United States for the use of Indians and as to whether they would be adjudicated to be ahead of the compact and outside of the compact. If they are, then no answer I give you can have any validity whatever because

none of us know how much water the upper basin or lower basin would have coming to them after the satisfaction of those rights.

Mr. DAWSON. Will the gentleman yield to me at that point?

Mr. ENGLE. Let me proceed here. I want to take the gentleman's statement by its four corners, and without any hedging, and without going into any legal bramble bush, I want to find out whether or not the statement you and Mr. Morris made is true, that these consumptive uses could be increased to the amount of these participating projects without impairing California's rights under the compact.

Mr. ELY. My statement is as clear as I can make it on that, Mr. Engle. It is in writing, a prepared statement, submitted yesterday, and all of it, as I said——

Mr. ENGLE. We are going to get to this business about how much water is involved in the legal points in due course. But I have read your statement very carefully, Mr. Ely, and my analysis of it is that the construction of these participating projects would not injure California at all. If that is true, then that satisfies a very large doubt in my mind with respect to this legislation because, so far as I am concerned, I propose to be a ditch tender of California's water and see that none of it gets away from us. As I read these statements, they say that these projects could be built without it getting away from us.

Now I want to refer again to the report filed by the State of California on February 28, 1947, on the interim report of the Secretary of the Interior on the Colorado River.

Mr. ELY. What page is that on?

Mr. ENGLE. I will refer to the pages in a minute. The comments were submitted by Assistant State Engineer A. D. Edmondston, approved by State Engineer Edward Hyatt, and approved by the Colorado River Board of California by Evan T. Hewes, chairman and ex officio commissioner, and are found in House Document 419, pages 19 through 54.

Mr. ELY. Yes.

Mr. ENGLE. The first quotation I want to read, which appears on page 25, is as follows:

> The situation in the upper basin, however, is quite different from that in the lower basin in that the water requirements of existing and authorized projects, as estimated in the report, are only about a third of the 7,500,000 acre-feet apportioned to the upper basin by the Colorado River compact.

Mr. ELY. Pardon me, sir. I do not identify the document. If you will permit, I would like to follow as you read it.

Mr. ENGLE. House Document 419, 80th Congress.

> With this leeway it would appear that some new consumptive use projects may be authorized and constructed before a final division of water is reached among the upper basin States.

That is the end of the quotation. That is prior to the time——

Mr. ELY. What page is that on, please?

Mr. ENGLE. I was reading from page 25.

Now that statement, I take it, is in accord with the statement that has been previously made here, namely, that additional uses could occur without jeopardizing the lower basin.

Mr. ELY. That is what we repeatedly said, Mr. Engle. I made it as clear as I possibly could in my prepared statement.

Mr. ENGLE. Now I am going on, proceeding with the same document. I read the statement that says:

In order not to deplete the total flow at Lee Ferry below 75 million acre-feet during a period such as 1931–40, the upper basin could use from the virgin flow of the Colorado River system only 47 million acre-feet total for the period, or an average of only 4,700,000 acre-feet a year.

Mr. ELY. What page is that on, sir?

Mr. ENGLE. That is on page 34.

Mr. ELY. I will find it in a moment.

Mr. ENGLE (continuing).

If the water supply available for consumptive use in the upper basin during a critical period such as 1931–40 is to be greater than 4,700,000 acre-feet a year, holdover storage must be provided above Lee Ferry.

Mr. ELY. That is what I have also stated in my statement.

Mr. ENGLE. Yes, I believe you said the same thing, and Mr. Matthew has said substantially the same thing.

Mr. ELY. The limit I gave was of the order of 4,300,000, I believe. This statement some years ago was 4,700,000.

Mr. ENGLE. Reading from page 39 of the same document, I read the following statement:

Construction of the required holdover storage dams should be concurrent with or precede construction of new projects that would consume large additional amounts of water in the upper basin.

Mr. ELY. What page is that, sir?

Mr. ENGLE. That is on page 39. I am working from this document published by the Bureau of Reclamation, Mr. Ely, called The Colorado River, Interim Report of the Secretary of the Interior, July 1947.

Mr. ELY. Yes, I find the quotation.

Mr. ENGLE. All right.

Construction of the required holdover storage dams should be concurrent with or precede construction of new projects that would consume large additional amounts of water in the upper basin.

Do I correctly interpret this statement to mean that California in its report is urging for the protection of California the construction of upper basin storage preceding construction of new projects that would consume large additional amounts of water in the upper basin? Do I read that right or do I misunderstand English?

Mr. ELY. You are referring now to the report of 1947?

Mr. ENGLE. I am referring to the statement made on page 39 of that report.

Mr. ELY. I take it, Mr. Engle, that you have run into the question of what is "new projects that would consume large additional amounts of water in the upper basin." The quantities proposed in the bill before you are 400,000 acre-feet. The amount to be evaporated by the storage projects is half again as much. No storage is needed to support the 11 participating projects named in section 1.

Mr. ENGLE. All right now—

Mr. ELY. If you propose——

Mr. ENGLE. That may be true, Mr. Ely, but I am trying to understand what the State engineer said and what the Colorado River Board, which you represent here today, said in 1947. If I can understand English, it says that this holdover storage is beneficial to the lower basin and is necessary to the protection of the lower

basin, and that it should precede the construction of new projects that would consume large additional amounts of water in the upper basin.

Mr. ELY. That is perfectly clear, Mr. Engle, to me, "as large additional amounts of water in the upper basin are consumed."

At that time there was no proposed Colorado River storage project before us. The Storage Project report was submitted in 1950. The reports subsequently made and which appear in House Document 364 relate to that project which is a project before this committee. It proposes only 400,000 acre-feet of consumptive use and does not require the construction of large storage dams.

The statement made in 1947 is quite accurate if you are now proposing projects to use more than 4,300,000 acre-feet or 4,700,000 acre-feet in the aggregate, the figure used in that document, in the upper basin.

Mr. ENGLE. Let me go ahead and read a little more of it, because the more I read of it, the more I am convinced that California has said that the storage projects should be built. I refer you to page 45.

It would appear that the water supply available over the critical period is entirely inadequate for complete development of the basin and that large amounts of holdover storage will be required. Substantial——

Mr. ELY. That is——

Mr. ENGLE. Let me complete. [Continuing:]

Substantial amounts of holdover storage under complete development would be required in the upper basin in order that the flow at Lee Ferry be not depleted below 75 million acre-feet in any 10 consecutive years, as required by article III (d) of the Colorado River compact.

Mr. ELY. Certainly, sir, if they use seven and one——

Mr. ENGLE. Please do not interrupt.

Mr. ELY. I am sorry. I thought you were through.

Mr. ENGLE. You are not answering a question. I am trying to submit some information which is a part of California's statement of their official position, which, if I can understand plain English, is exactly the opposite of what you people have been saying.

Let me complete:

Water-supply studies are required to determine if this holdover storage is feasible. The holdover storage would have to be replenished in seasons of heavy runoff, and such seasons may be of such infrequent occurrence that holdover storage may be impracticable.

Now go on and turn to page 48. I want to read you at the bottom this section:

An immediate and intensive study—

remember this was in 1947—

should be made with respect to new hydroelectric-power projects, upstream from Lake Mead, with a view toward authorizing and constructing, at the earliest practicable date, such hydroelectric-power projects as can be built and operated on a sound economic basis——

Mr. ELY. Will you continue, sir?

Mr. ENGLE. [Continuing:]

will be consistent with the primary purposes of furnishing water supplies for irrigation and domestic uses, and will not be inconsistent with a comprehensive plan of progressive development.

Mr. ELY. The project before you fails——

Mr. ROGERS of Texas (presiding). I want to ask the witness not to interrupt until the member of the committee gets through.

Mr. ELY. I am sorry, I thought he was through.

Mr. ENGLE. I have read this for the purpose of placing before you what the State of California has said. Now I want to ask you whether or not I interpret these statements correctly. As I interpret them, they are an argument by the State engineer for the necessity of upper basin storage projects. Is that true?

Mr. ELY. Not of this project, no, sir. This project does not meet any of those criteria.

Mr. ENGLE. What project was he talking about?

Mr. ELY. I think he has described it. First, a project which would be required if the upper basin is to use 7½ million acre-feet of apportioned water—holdover storage would be required. If that is done, then the hydroelectric projects should be developed in such a way as is consistent with the primary purposes of furnishing water supplies for irrigation and domestic uses and will not be inconsistent with the comprehensive plan of progressive development.

This plan is not of that character.

And, second, that the hydroelectric-power projects be built and operated on a sound economic basis and will furnish electric power at reasonable cost.

I take it the reference was there to criteria of the Flood Control Act of 1944 which, as Mr. Morris said, provided for the sale of power at the lowest possible cost consistent with sound business principles. This project does not meet those criteria.

Mr. ENGLE. Let us go on and read a little more of it and see if we cannot resolve this. Let us turn to the conclusions here which appear beginning on page 51. Now on page 52, as a part of the "Concluding comments," under No. 6 appears the following statement:

Large holdover surface storage as indicated in the report is required in meeting the requirements of the Colorado River compact and in conserving and utilizing as far as it is ultimately possible the waters of the Colorado River system.

Mr. ELY. What page again, sir?

Mr. ENGLE. That is on page 52?

Mr. ELY. Where on page 52?

Mr. ENGLE. Item No. 6.

Mr. ELY. Perfectly true, Mr. Engle.

Mr. ENGLE. Do you regard that is perfectly true?

Mr. ELY. For full utilization. Quite so.

Mr. ENGLE. Is it not fair to conclude from what the State engineer and what the Colorado River Board said in 1947, which board you represent here today, that large holdover storage reservoirs in the upper Colorado Basin are a necessary requisite to utilization of the water in the upper basin project?

Mr. ELY. No, sir. It is necessary for the complete utilization of the water apportioned to the upper basin.

Might I read some of the paragraphs from page 52 that have been omitted from what you just read?

Mr. ENGLE. No. I want to ask some questions.

Mr. ROGERS of Texas. Let the Chair make this observation now: If the witness will not interrupt, he will be given ample time to

answer and be given ample time to answer questions by other members of the committee.

Mr. ENGLE. I want to proceed now to the statement made by the State of California on February 15, 1954, signed by Mr. A. D. Edmondston, approval recommended by Raymond Matthew, and approved by Fred W. Simpson, chairman of the Colorado River Board of California. Two of those gentlemen are here at the table, Mr. Simpson and Mr. Matthew. Therefore, these statements presumably are statements which they approved at that time.

This is House Document No. 364, 83d Congress, 2d session. Here is what the document says on page 16:

> The one reason given for the proposed allocation to irrigation on the storage project is that the storage units would provide holdover capacity so that the upper basin can proceed with the development and use of water without violating the Colorado River compact. Information in the basic report shows that at the present and anticipated future rate of upper basin development, Glen Canyon alone would suffice for this purpose for 40 to 50 years hence. Furthermore, it appears that the additional consumptive use estimated for the participating reclamation projects proposed for initial authorization in the Secretary's report could be made even without Glen Canyon Reservoir.

Which, of course, is precisely what the gentleman has said.

Now I want to read on.

> However, the early construction of Glen Canyon Reservoir would be justified from other considerations and advantages. Based upon the cost analyses in the report, the Glen Canyon Reservoir and power development could be constructed and operated on a sound financial basis and therefore merits authorization at this time.

Now what I want to ask is whether or not the Colorado River Board did not in 1954 on February 15 advocate the immediate authorization and construction of Glen Canyon Reservoir.

Mr. ELY. No, Mr. Chairman. May I refer that question to Mr. Matthew, who participated in that report, or Mr. Tillman who testified on that subject.

Mr. ENGLE. Mr. Ely, what I am seeking is an interpretation of language. All I want to know is whether or not I am interpreting this report correctly. You gentlemen may have a different idea at this time, as you presumably do have, but when I read this language it says to me that the State of California advocated and recommended the immediate construction of the Glen Canyon Reservoir; and as I read this report, it says that the participaing projects proposed in this legislation do not violate California's water rights.

Mr. HOSMER. Will the gentleman yield for a parliamentary inquiry?

Mr. ENGLE. No, I will not yield. I want to find out if I am correct in reading this document. Have I read it correctly? It is plain English as I understand it.

Mr. ELY. I think you read part of it, Mr. Engle. Would you mind reading the next paragraph?

Mr. ENGLE. Let me read you a portion of the concluding comments.

Mr. ELY. Would you mind reading the next paragraph on page 16?

Mr. ENGLE. That appears where?

Mr. ELY. Page 16, the next paragraph, beginning "Analyses indicate."

Mr. ENGLE. Well, that relates to the other storage projects. I am asking about Glen Canyon. I ask whether or not it is true in this

case that the State of California in its official position has recommended the immediate authorization and construction of Glen Canyon.

Mr. ELY. No, sir. The State of California has said that—

Glen Canyon Reservoir and power development could be constructed and operated on a sound financial basis and therefore merits authorization at this time.

It would if authorized and constructed on a sound basis with respect to the water——

Mr. ENGLE. Mr. Ely——

Mr. ELY. Let me complete. [Continuing:] With respect to the water and power rights in the lower basin as well as with respect to the financial feasibility of the Glen Canyon project. This project before you does not do that.

Mr. ENGLE. I am not talking about this project. I am talking about the participating projects authorized in this legislation, and I am talking about the Glen Canyon project, which is the chief cash register in this whole program. I am asking you whether or not it is not true on the plain black and white statement by California that California has recommended the authorization and construction of Glen Canyon.

Mr. ELY. No, sir, I do not think——

Mr. ENGLE. You see it differently than I do, then.

Mr. ELY. I do not see how it could be plainer.

Mr. ENGLE. We have a right to disagree about what English says.

Let's go over to the concluding comments on page 18, and I want to read some of that because it seems to me it makes the cheese more binding.

No clear and adequate justification is shown in support of the allocation of a large part of the storage project cost to irrigation on an interest-free basis.

I am reading the whole paragraph so the gentleman will be satisfied.

Only minor use could be made of the regulatory reservoirs of the storage project directly for water-consuming projects. The report indicates that the proposed allocation to irrigation on the storage project is based upon the need of holdover capacity to permit the upper basin to develop and use water without violating the compact. However, it appears from the report that the additional consumptive use estimated for the reclamation projects proposed for initial authorization could be made without holdover storage; and that at the anticipated rate of development, Glen Canyon Reservoir alone would suffice for this purpose for 40 to 50 years hence. Therefore, the justification for immediate construction of initial units of the storage project would be based upon other considerations and purposes to be served.

That is No. 9.

No. 10 reads:

The early construction of Glen Canyon Reservoir would be justified from the standpoint of other immediate advantages. Based upon the cost analyses in the report, the Glen Canyon Reservoir and power development could be constructed and operated on a sound financial basis and therefore merits authorization at this time.

No. 11:

Glen Canyon power could be readily disposed of in the lower basin where there is a great need for additional power. The question of policy regarding its disposal merits the special consideration of the Executive and the Congress.

Now taking this whole series of quotations which I have given in the context, am I correct in my analysis that the State engineer and the Colorado River Board itself, which you represent here today,

made the statement in 1954 that although Glen Canyon was not necessary to implement the regulation of the river at this time, nevertheless, it could be constructed and operated on a sound financial basis and therefore merits authorization at this time. Is that not correct?

Mr. ELY. That could be true of a sound project. This is not one.

Mr. ENGLE. What is the matter with Glen Canyon? Do you say Glen Canyon is not sound?

Mr. ELY. Do you want to get into the subject of the effect on water rights?

Mr. ENGLE. All I am asking is, Do I interpret that statement correctly, that the State of California and the Colorado River Board regard Glen Canyon, standing by itself, as a sound project?

Mr. ELY. Not as proposed, no, sir. May I explain?

Mr. ENGLE. Yes, if you can explain that, go ahead.

Mr. ELY. In Glen Canyon, as proposed, the financial setup is based upon the assumption there may be withheld from the lower basin and accumulated in storage for power generation at Glen Canyon, water which may not lawfully be held there under the Colorado River compact. Such water must be released to the lower basin and is not available for power generation at Glen Canyon. That is point 1.

Point 2. The 6-mill rate proposed here is not realistic. This project is not sound economically.

Mr. ENGLE. Just what project was the State engineer and Colorado River Board reporting on in 1954, which was just about a year ago?

Mr. ELY. If you will read his report, Mr. Engle, you will find that the State engineer and the Colorado River Board pointed out that Glen Canyon power can be generated and marketed at 4 mills.

Mr. ENGLE. I understand all of that, but if it can be generated at 4 mills, that makes it all the better looking project to me. In other words, what I am getting to, Mr. Ely, is this: I think it is the obligation of Californians to protect California's water.

Mr. ELY. I agree with you.

Mr. ENGLE. As I read this report, it indicates to me indisputably that these participating projects, either in part or in whole, would not impair California's water; and, further, that the State engineer and the Colorado River Board itself in 1954 advocated the authorization and construction of Glen Canyon.

From my viewpoint, that puts the project together, if you do not have anything else. And I am not trying to put a project together particularly for the upper basin, but I am interested in seeing the upper basin go ahead and develop what water it can if it can do so without hurting California. When I read this material I simply come to no other conclusion than that. It is not only possible to build the project, but California itself has recommended the construction at least of Glen Canyon, plus the participating projects.

Mr. ELY. May I——

Mr. ENGLE. Now, as I understand the position of the State, they say, "Well, you don't need this storage right now," but there are other questions relating to water.

As I understand, the upper basin uses at the present time come to about 2½ million acre-feet. If the uses under the participating projects go as high as 2 million acre-feet, that is 4½ million acre-feet, and that is within 200,000 acre-feet of the limit where this report shows

that storage must be built. Mr. Matthew, in his statement before the Senate, said at that time the upper limit was 4,300,000 acre-feet.

Now, in my view, if we are getting that close and if upper-basin storage is beneficial to our State, as it says here, then a proper regard for California's water rights would indicate that we build a Glen Canyon Storage dam when we undertake the participating projects because in that way we can most surely safeguard the State of California in the event we have misjudged to the tune of, say, two or three hundred thousand acre-feet the quantities of water which may be available.

Mr. ELY. Mr. Engle, may I comment?

Mr. ENGLE. Yes.

Mr. ELY. If you will refer to page 12 of the report from which you have been reading, House Document 364, in the second full paragraph, halfway down appears the statement:

The plans for construction and operation of the proposed developments, insofar as revealed in these reports, give no proper or adequate consideration to the interests of the lower-basin States. Furthermore, the studies involve or imply what California considers to be erroneous interpretations of the Colorado River compact.

Mr. ENGLE. What document are you reading from?

Mr. ELY. House Document 364, page 12. The same document from which you have been reading, the second full paragraph.

Mr. ENGLE. I see. Go ahead.

Mr. ELY (continuing):

The erroneous interpretations of the compact include: (1) that article III (a) apportions to the upper basin a water use of 7,500,000 acre-feet a year in terms of depletion of the virgin flow at Lee Ferry instead of a beneficial consumptive use of 7,500,000 acre-feet a year at places of use; (2) that the upper basin would be entitled to the consumptive use of an average annual amount of 7,500,000 acre-feet instead of a maximum of 7,500,000 acre-feet in any one year.

Mr. ENGLE. All right. You went over that in your statement, did you not?

Mr. ELY (reading):

Because of these erroneous interpretations—

California's comments continue—

the report is invalid as regards the showing of how soon and how much holdover storage will be needed and as regards the ultimate quantity and pattern of residual flow into the lower basin at Lee Ferry.

Then at the bottom of the page:

It is evident that the building, filling, and operation of the proposed mainstream reservoirs, with an ultimate total capacity of about 48 million acre-feet, would have substantial effect upon lower-basin facilities and operations. Even the filling of the two reservoirs, Glen Canyon and Echo Park, now proposed for initial authorization with combined capacity of 32 million acre-feet would have a material effect and would present serious problems.

Mr. ENGLE. We have been through all that.

Mr. ELY. Then skipping one paragraph. [Reading:]

No discussion of such problems, including the inevitable reduction in power output at lower basin plants and its economic effect from a national standpoint, is presented in the reports. Insofar as the original basic report or the 1953 supplement indicate there is no evidence that the effects on operation of lower basin storage and power facilities have been given due consideration in planning the schedules of constructing, filling, and operating the proposed upper basin storage and power facilities.

Mr. ENGLE. That is all right. That relates to the ultimate development and that does not derogate one iota.

Mr. ELY. No, Mr. Engle, you misunderstood me.

Mr. ENGLE. Let me complete my statement. You made yours.

Mr. ELY. Surely.

Mr. ENGLE. That does not derogate one iota from the statement made on page 19, and this is a separate and concluding paragraph. This is item No. 10 in conclusion:

> The early construction of Glen Canyon Reservoir would be justified from the standpoint of other immediate advantages. Based upon the cost analyses in the report, the Glen Canyon Reservoir and power development could be constructed and operated on a sound financial basis and therefore merits authorization at this time.

And that is just as plain English as I have ever listened to.

Mr. HOSMER. Will the gentleman yield at that point?

Mr. ENGLE. Just a minute. I want to ask one more question with regard to these legal arguments.

The gentleman testified over before the Senate, and he was asked how many acre-feet of water were involved in these legal arguments and, as I recall his testimony, it was 2 million acre-feet.

Mr. ELY. Approximately, yes, sir.

Mr. ENGLE. Approximately. Which figure do you subtract the 2 million acre-feet from? Do you subtract it from 7,500,000 or 4,700,000?

Mr. ELY. My statement, Mr. Engle, is that there is in dispute between the upper basin and the lower approximately 2 million acre-feet per year.

Mr. ENGLE. Now which figure——

Mr. ELY. May I finish answering your question?

Mr. ENGLE. Do not go all around Robinhood's Barn. I would like to get an answer to it.

Mr. ELY. I am answering the best I can.

Mr. SAYLOR. If you will yield, he is trying to answer it if you allow him to.

Mr. ENGLE. He is answering like a lawyer.

Mr. HOSMER. He has a right to; he is a lawyer.

Mr. ASPINALL. Just a minute.

Mr. ELY. The storage project would be constructed, operated and filled on the assumption that the upper basin may retain in storage during the filling period, which is about 20 years, some 2 to 3 million acre-feet per year that we say the lower basin is entitled to receive. It withholds that from us. That is the consequence during the filling period. There would be a consequent reduction in the quantity of water available for consumptive use in the lower basin in violation of the compact—we say the upper basin would be doing this—and in violation of the power contracts. I am still speaking of the filling period. After the reservoirs are filled, then the consequences depend upon the rate of development of the consumptive use in the upper basin.

The plans of the Bureau of Reclamation contained in House Document 364 are based upon the assumption that the ultimate consumptive use planned by section 2 of the bill will be at the rate of 9,500,000 acre-feet in extreme years and will average 7½ million and be calculated

upon depletion instead of consumption at the site of use. That means a permanent deprivation of water from the lower basin of about 2 million acre-feet, taking into account the further consequences of the Mexican Treaty.

So my answer to you is, sir, that the effect of this project is immediate in withholding from the lower basin 2 million acre-feet or more per year to which we are entitled as soon as the gates are closed at Glen Canyon. That situation will prevail during the entire filling period. It will recur thereafter to the extent that the upper basin is developed in accordance with the plans presented in the project before you.

Mr. ENGLE. All right. You say now that these things are in controversy in the Supreme Court?

Mr. ELY. That is correct.

Mr. ENGLE. Let us just assume that the upper basin loses all the legal arguments, everyone of them, and therefore loses the whole 2 million acre-feet. What do you subtract that from—7,500,000 or 4,700,000?

Mr. ELY. Their own engineering reports indicate there would be available about 5½ million to 6 million acre-feet for them in those circumstances.

Mr. ENGLE. I am asking you which one you would take it away from.

Mr. ELY. That is the engineering result I am giving.

Mr. ENGLE. No, it is not. That is the legal result.

Here is the position: If you deducted from the 7.5, it does not affect these 2 million acre-feet of consumptive use at all because their consumptive use will not go about 4.5 under these participating projects.

Mr. ELY. I made that statement myself.

Mr. ENGLE. If you deducted from the 4.7, you have them down to 2.7, and then indisputably they need storage capacity. You are on the horns of a dilemma and I would like to see you get off.

Mr. ELY. There is no dilemma there and no horns to it.

Mr. ENGLE. Just tell me which one.

Mr. ELY. I said——

Mr. ENGLE. Which one do you subtract from—the 7.5 which they are legally entitled to under the compact or the 4.7 which you say is physically there?

Mr. ELY. No, you are subtracting from the wrong one.

Mr. ENGLE. What it that?

Mr. ELY. This project imperils 2 million acre-feet of lower basin supply. We have said throughout that the upper basin uses, consistently with our interpretations of the compact, consistently with our own uses, consistently with the availability of water, can stand to total 4,300,000 acre-feet without any holdover storage. The extent to which they can stand beyond that depends upon the interpretation of the compact. The 4,300,000 acre-feet which we say they can go to without holdover storage is not affected by the lawsuit unless the Indians come in ahead of all of us.

Mr. ENGLE. All right. Now you have finally answered the question, even though you did not do it directly. You say they can go to 4,300,000 acre-feet and not be affected by the legal decisions of the Supreme Court, which means you subtract the 2 million from the 7.5. If that is true, then the argument in the Supreme Court is wholly

irrelevant so far as the authorization of this series of projects is concerned by the Congress of the United States.

Mr. ELY. I think otherwise.

Mr. ENGLE. I yield the time.

Mr. ELY. I think otherwise. May I answer that?

Mr. ASPINALL. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. I would like to observe that during the past few days while these continued hearings have been going on, I do not think that I was near as energetic as the gentleman from California, Mr. Engle, and I was accused both on my right and on my left of badgering witnesses. I would say, if there has been any badgering that has occurred, it seems to me it is between Mr. Engle, the lawyer, and Mr. Ely, the lawyer.

Mr. ENGLE. We are used to badgering each other; so we do not mind it.

Mr. SAYLOR. I think it should be noted in the record.

Mr. ASPINALL. The Chair should say that the gentleman from Pennsylvania is taking a slap at the Chair, and the Chair understands it and wishes the gentleman to proceed.

Mr. SAYLOR. It is no slap at the Chair. I am talking about the gentleman from California.

Mr. ENGLE. He was rapping me.

Mr. ELY. Mr. "Wildcat"——

Mr. ENGLE. Let me say to the gentleman from Pennsylvania, that if I appear to be badgering the witness, it is only because I am pursuing these matters with such intensity in my desire to get to the truth and protect California's water. [Laughter.]

Mr. ELY. I take no offense. The "Wildcat from California" and I are used to clawing each other.

Mr. SAYLOR. Now, Mr. Ely, on page 9 of House Document 364, the 83d Congress, second section, appears the letter of February 15, 1954, from the State of California. That continues from page 9 to page 19.

My understanding of your explanation, while Mr. Engle may be able to pick out certain isolated paragraphs from this letter and come to the conclusion which he has tried to get you to agree to, then if you pursue the same policy which Mr. Engle asked you with regard to your statement, to look at the letter from its four corners, you come to the conclusion that California, by its State engineer and its chief engineer of the Colorado River Board, and by the chairman of the Colorado River Board of California, have not come out and stated that the storage projects could be built either at Glen Canyon or anywhere else.

Mr. ELY. You are correct, Mr. Saylor. I think a great deal of this discussion results from taking language out of context, and I renew the offer I made yesterday to place the whole of the letter of February 15, 1954, in the record at this point. May I offer that for inclusion in the record?

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. Yes.

Mr. HOSMER. I would ask unanimous consent that the entire document go in at this point.

Mr. RHODES. Objection.

Mr. ASPINALL. Objection is heard. The request is denied to place the document in the record.

Mr. SAYLOR. I move that the letter of February 15, 1954, now be placed in the record.

Mr. HOSMER. Second the motion.

Mr. ASPINALL. You have heard the motion and the second.

Mr. ENGLE. Just a minute. I want to be heard, Mr. Aspinall.

Mr. ASPINALL. The gentleman from California.

Mr. ENGLE. This document is part of the official record with these proceedings, anyway. This is a big document. I do not know why we should run up the printing costs of this record in order to set it up in hoc verba. I think we could probably attach it in separate printed form as an attachment and appendix without burdening the committee budget with reprinting this entire matter in the record.

Mr. RHODES. Will the gentleman yield?

Mr. ENGLE. Yes.

Mr. RHODES. We made the document a part of the file so it is available for anybody who wants to see it.

Mr. ENGLE. It is really part of the official comments of California which are set forth here. It just seems to me it is not right to constantly burden the record with repetitious matter.

Mr. ELY. May I comment that it takes 10 printed pages?

Mr. SAYLOR. I would like to say that I do not feel this is burdening the record with repetitious matter. We have had now an hour's cross-examination with regard to certain segments of this report which the gentleman from California, Mr. Engle, has read. I say that anyone who is going to examine this report is entitled to have the entire letter before them so they need not look in any other place or any other document to find it.

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. I yield.

Mr. HOSMER. I do not see how any person could intelligently read this report of the hearings and evaluate the testimony this morning without having the full document before them, and I think it is the duty of this committee to have the document in the record so it can be read and evaluated in connection with the testimony.

Mr. RHODES. Will the gentleman yield to me?

Mr. SAYLOR. Yes.

Mr. RHODES. Then I suppose we should probably put in the document entitled "Colorado River" from which the chairman was questioning, also, because it was being used in cross-examination.

Mr. ASPINALL. Is there any further discussion?

Mr. ENGLE. They are all official documents, all a part of the committee records.

Mr. ASPINALL. All those in favor of the motion signify by saying "aye."

Opposed, "no."

The "noes" appear to have it. The "noes" do have it and the request is denied.

The gentleman from Pennsylvania will proceed.

Mr. SAYLOR. Now, Mr. Ely, section 2 of all of the bills, beginning with H. R. 270 and other similar bills which this committee is considering at this time, contain a provision that in my opinion is very far reaching and, I believe, authorizes not only the projects which have been specified in this bill, but, in effect, authorizes the Secretary of the Interior to proceed with all of the projects in the upper basin

which have been set forth in House Document 419 of the 80th Congress.

Do you feel that all of the participating projects, storage projects, which have been specified in House Document 419 should be authorized at this time by this Congress?

Mr. ELY. First, I think you are correct in your assumption that section 2 is a commital by Congress to the construction of all projects required to utilize the full 7½ million acre-feet apportioned to the upper basin. It is a declaration of intent to that effect. It may fall short of a specific authorization. It may, however, be enough of a declaration of intent to support appropriations without further authorization, or it may be a sufficient declaration of intent to be regarded by the Secretary of the Interior as a mandate to submit such projects.

I think that it is totally unwise to authorize or to commit the Congress to the future authorization of unnamed, unidentified projects, particularly while litigation is pending which affects the quantity of water to which the upper basin is entitled.

Mr. SAYLOR. Am I correct in my understanding of your written statement and the examination which you have undergone by Mr. Engle, that the claim which the United States Government has interposed on behalf of the Indians is over and beyond any commitment which has been made by either the lower or the upper basin as far as water in the Colorado River is concerned?

Mr. ELY. Mr. Saylor, we have done our best to smoke out the Department of Justice on just what is intended by their allegations in their petition of intervention—so far unsuccessfully. What they do is to tabulate Indian diversion rights in the lower basin, so far about 1,700,000 acre-feet. We know from House Document 419 and other sources that there are Indian projects with total diversion rights of something over a million acre-feet in the upper basin to date. We do not know what additional projects they may think of in the future.

The Government pleading denies that all rights of the United States are subject to the Colorado River compact and asserts rights "as against the parties to this cause", that is, independently, for the satisfaction of these Federal claims. We have endeavored to get from the Department of Justice a specific interpretation or determination as to what they intend to try to prove, and that has not been forthcoming. We know that the Indian Bureau asserts the right of the Indians outside of the compact and ahead of it. The assertion is that the whites divide up what is left, and furthermore, that the Indian rights take precedence over non-Indian rights even though the use of water under Indian claims may be long delayed.

If the United States should assert that extreme claim and have it sustained, then all calculations of rights under the Colorado River compact are out the window.

Mr. SAYLOR. Let us assume in the next question I ask you that the claims of the United States as far as the Indians are concerned are granted. Then am I correct that the order in which water must be allocated from the river is first to the treaty between the United States of America and the United Mexican States, second, to the claims of the Indians, whatever that right may be, and third, the waters to be allocated under the Colorado River compact?

Mr. ELY. I think that is correct.

Mr. SAYLOR. It is my interpretation of your written statement, in presenting your opposition to the authorization by the upper States for participating projects, that you do not object to any storage which is incidental or necessary or occasioned by dams constructed in participating projects?

Mr. ELY. In general that is correct. So far as participating projects require diversion works, we do not object to it. There is implication in some of these reports that some of these very large dams would in the future have some utilization for direct diversion by pumping or by tunnels for participating projects, and I make no comment on that. Not enough detail is given.

Mr. SAYLOR. Now on page 3 of your report, part way down the page, is this sentence:

> The Secretary of the Interior is required to submit new feasibility reports, but the O'Mahoney-Millikin amendment to the Flood Control Act of 1944 is waived, except as to two projects, and the Secretary thus need not clear the supplemental feasibility reports with the affected States.

Will you tell us just what the O'Mahoney-Millikin amendment to the Flood Control Act of 1944 is?

Mr. ELY. Yes, sir.

Mr. SAYLOR. That is waived in all of these bills.

Mr. ELY. It is a provision that the plans of the Secretary of the Interior or the Chief of Engineers for the construction of works in the West shall be submitted to the affected States through their governors for comment, and that if a comment of any State affected by the project is adverse to the report, the Secretary of the Interior is deprived of the authority he has under section 9 of the Reclamation Projects Act of 1939 to authorize a project upon his own finding of feasibility.

The provisions of the pending bills would waive that mandate that the supplemental reports be submitted to the affected States.

Mr. SAYLOR. I have underlined that provision in all of the bills to ask the respective authors as to why the upper Colorado Basin should be exempt from the amendment which you have referred to. I personally can tell you that I know of no reason why that amendment should not apply to all of these projects.

Mr. ELY. We agree with you.

Mr. SAYLOR. On page 24 of your statement this appears:

> If Arizona is sustained by the court in this position, there is no water for Mexico in the 75 million acre-feet at Lee Ferry referred to in article III (d), and the upper basin, under article III (c), must, in addition, deliver water to supply one-half of any deficiency in meeting the Mexican burden. This would add about a million acre-feet per year, or 10 million in 10 years, to the 75 million required by article III (d).

Am I correct in my understanding that Arizona has claimed that the million and a half acre-feet which are due by treaty to be delivered to Mexico are not to be included in the 75 million acre-feet?

Mr. ELY. That is the effect of their contention; yes, sir. Arizona identifies the 75 million acre-feet referred to in article III (d) with the 7½ million acre-feet per annum apportioned the lower basin by III (a). If that is true, then there obviously is no water for Mexico in the 75 million; it is all water apportioned to the lower basin.

Mr. RHODES. Will the gentleman yield there?

Mr. SAYLOR. Yes.

Mr. RHODES. I do not know of any pleadings by Arizona which tend to nullify that portion of the compact that states that of water we owe to the United Mexican States because of the treaty will come equally from the upper basin and the lower basin in the event there is no surplus to meet it. My understanding is that the State of Arizona has said repeatedly, first, that must come from surplus; second, it will come equally from each basin in the event it becomes necessary.

Mr. ELY. I think you are substantially correct. The difference, however, Mr. Rhodes, is that upon California's interpretation the 75 million acre-feet received at Lee Ferry under article III (d) does contain substantial amounts of surplus in part available for satisfaction of the Mexican burden, in part available for use by California under the terms of the Limitation Act. Under Arizon's interpretation there is no surplus in that 75 million available either for Mexico or for California or any other lower basin State.

Mr. RHODES. I would like to go into that later when I have my own time. I will not infringe upon the time of the gentleman from Pennsylvania to do that.

Mr. SAYLOR. Am I correct that it is your interpretation of the compact that there is nothing in the Colorado River compact which authorizes the withholding of water in the upper basin for any uses except agricultural or domestic?

Mr. ELY. That is correct in substance, Mr. Saylor.

Mr. SAYLOR. In other words, the position which ex-Senator Johnson, now Governor of the State of Colorado, has taken, that the Colorado River compact strictly forbids the storage of water for any purposes except agricultural or domestic uses, would forbid the construction of any storage projects in the upper basin?

Mr. ELY. I would like to state it somewhat differently, Mr. Saylor. We do not contend that the upper basin may not utilize storage for the generation of power. We contend, however, that under article IV (b) any such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with, or prevent use for, such dominant purposes in either basin. Consequently, that there is no right in the upper basin to withhold and store water at Glen Canyon or other power dams for the generation of power if that water is required for agricultural and domestic uses in the lower basin, even though such water may be admittedly excess or surplus waters.

Article III (e) provides that—

> **The States of the upper division shall not withhold water, and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses.**

We state further, even if the water impounded at Glen Canyon or other storage dams in the upper basin is not required for agricultural or domestic use in the lower basin, it may nevertheless not be retained by the upper basin for power generation if the effect would be to short the Government power contracts made in the lower basin. That is the point Mr. Tillman testified on. I will not trespass upon his field. At some point I hope he gets an opportunity to amplify it.

Mr. SAYLOR. Might I ask either you or Mr. Tillman whether or not, if this storage could take place in the upper basin at a place where it could thereafter in the upper basin be put to use for domestic or agricultural purposes, would your same argument hold true?

Mr. TILLMAN. Congressman, the bare fact that it might be put to that use, that is was physically able to be put to that use, or available, would not control the matter. In other words, if you needed it for a storage dam in order to equate the flow properly for irrigation purposes, you needed a thousand acre-feet of storage, and you put it in at that place where all of it overlay the irrigation project a million acre-feet of storage, you could not claim that as an agricultural use.

A thousand—without laboring the point too much—a thousand might well be conceded to be necessary or would be used for agricultural purposes, in other words. A million would not. A million would obviously be being used for power.

Mr. SAYLOR. Now I call your attention to a section of the Regional Director's Report of 1950, that part which appears on page 73 of House Document 364, 83d Congress, section 15:

> Initial filling of the project reservoirs may require temporary adjustments in the operation of power facilities on the Colorado River below Lee Ferry. Any adjustments required, however, could be accomplished without prejudice to developments both above and below Lee Ferry. Because of their strategic location, the large Glen Canyon Reservoir and powerplant would be of particular importance in effecting the proper integration of power and river operations.

Am I correct in my understanding that in the original regional report of 1950 of the regional director, subsequently approved by the Commissioner and the Secretary of the Interior, it was bluntly said that the erection of the storage projects will interfere with the contracts which have been entered into for delivery of power from downstream reservoirs?

Mr. TILLMAN. I would say, Mr. Congressman, that is anything but a blunt statement. That is one of the neatest pieces of evasion I know. They refer to temporary adjustments. I have never known what was really meant by that. But by taking their testimony and the report by the four corners, it is quite obvious that they intend, first, all things being equal, to permit enough water for the fulfillment of the so-called firm power obligations under the contract, and to divert to storage all water that would otherwise go down the river for generation of secondary energy. But that is the plan.

Mr. SAYLOR. That would be true until the reservoir was filled?

Mr. TILLMAN. Yes, sir.

Mr. SAYLOR. Now in a situation such as you have had in the past 25 years when there would not have been enough water to fill the reservoirs, what would be the effect of this provision?

Mr. TILLMAN. I do not believe I have the import of the question.

Mr. SAYLOR. It is my understanding from testimony that has been given here by other witnesses that from 1930 until now there has not been sufficient water in the river to meet downstream commitments of 75 million acre-feet every 10 years, plus a million and a half acre-feet every year for Mexico, and to fill the reservoirs. That would mean that all of the waters other than those actual commitments to the lower basin would be kept in the upper basin; is that correct?

Mr. TILLMAN. That is undoubtedly the plan.

Mr. SAYLOR. And they would continue to do that over any period of years in which the storage reservoirs and the upper basin were not filled?

Mr. TILLMAN. Yes. It might take from 5 to 50 years. I do not know.

Mr. SAYLOR. That is all.

Mr. ASPINALL. Has the gentleman finished?

Mr. SAYLOR. That is all the questions I have.

Mr. ASPINALL. Off the record.

(Discussion off the record.)

Mr. ASPINALL. Unless there is some objection, the committee will now recess until 1:30. We will come back with the understanding we will have at least 2 hours before we adjourn.

The Chair has a letter from the Mellon Institute of Industrial Research which asks for deferment of action upon this legislation.

The gentleman from Pennsylvania suggests it should be made a part of the record. I see no reason why it should not be.

Is there any objection?

Hearing none, it is so ordered.

The committee will stand in recess until 1:30.

(The letter referred to follows:)

MELLON INSTITUTE OF INDUSTRIAL RESEARCH,
UNIVERSITY OF PITTSBURGH,
Pittsburgh 13, Pa., March 16, 1955.

Hon. WAYNE N. ASPINALL,
Chairman, Subcommittee No. 2,
Committee on Interior and Insular Affairs,
House Office Building, Washington, D. C.

DEAR MR. ASPINALL: The National Water Policy Panel of Engineers Joint Council desires to present a viewpoint to be made part of the record of the current hearings on the Colorado River storage project and participating projects.

As you know, Engineers Joint Council never supports or opposes legislation per se, but it does concern itself with overriding national policy. Last year the hearings committee of the National Water Policy Panel testified before the Task Force on Water Resources and Power of the Commission on Organization of the Executive Branch of the Governent. Our statement contained material pertinent to the present inquiry, particularly the section entitled "Some Important Pending Problems" and especially items 7, 8, 9, and 10 thereof. Fifty copies of this statement are being sent under separate cover for the convenience of your committee.

In the statement referred to it was urged that the Congress delay action on the Colorado River storage bills until the report of the Task Force on Water Resources and Power becomes available on or about May 1. It is anticipated that the report will deal specifically with matters of policy affecting water resources, and we respectfully suggest that it would be in the public interest to defer action on these pending bills until the findings of the task force can be studied.

Yours sincerely,

RICHARD D. HOAK,
Chairman, Hearings Committee, National Water Policy Panel.

(Whereupon, at 12:05 p. m., the subcommittee recessed to reconvene at 1:30 p. m., of this same day.)

AFTERNOON SESSION

Mr. ASPINALL. The committee will resume its hearings. The Chair recognizes the gentleman from Montana, Mr. Metcalf.

QUESTION PERIOD OF NORTHCUTT ELY, SPECIAL COUNSEL, COLORADO RIVER BOARD; RAYMOND MATTHEW, CHIEF ENGINEER, COLORADO RIVER BOARD; FRED W. SIMPSON, CHAIRMAN, COLORADO RIVER BOARD OF CALIFORNIA; AND GILMORE TILLMAN, CHIEF ASSISTANT CITY ATTORNEY FOR WATER AND POWER, CITY OF LOS ANGELES, CALIF.—Resumed

Mr. METCALF. Mr. Ely, this morning when you were testifying in response to questions by Mr. Engle, you were telling the people you did not represent. So, as I understand it, all of these agencies that you have reported as representing in the quarterly report that you have to make under the Lobbying Act you are not representing today, except the Colorado River Board and the six agencies under them?

Mr. ELY. That is correct. We represent also some of the agencies which are included in the six agencies in their own matters here in Washington, including the city of Los Angeles and the Imperial Irrigation District. Both of those have representatives on the Colorado River Board, also.

Mr. METCALF. And they are representing themselves here and you are not representing them?

Mr. ELY. They are here, and to the extent that they are here and hear me expressing myself in accord with their testimony I assume it can be assumed that I am representing them; yes, sir.

Mr. METCALF. And, therefore, the statement of fees and expenses that you have filed with respect to your regular quarterly report, insofar as this hearing is concerned, your report for the Colorado River Board is the only one pertinent?

Mr. HOSMER. Will the gentleman yield?

Mr. ELY. I do not understand the question nor its intent.

Mr. METCALF. You have filed certain accounts every quarter under the Federal Lobbying Act.

Mr. ELY. That is correct.

Mr. METCALF. And under the terms of that act and the terms of the report you have made, you have enumerated several other agencies in addition to the Colorado River Board.

Mr. ELY. That is correct.

Mr. METCALF. But insofar as this hearing is concerned, the expenses that you have enumerated for the Colorado River Board are the only ones that are accountable to your appearance here?

Mr. HOSMER. A point of order. Will the gentleman yield?

Mr. METCALF. Yes.

Mr. HOSMER. The inquiry is not germane to the matter before the committee.

Mr. METCALF. May I be heard on the point of order?

Mr. ASPINALL. The Chair thinks it is germane.

Mr. ELY. I have no objection to trying to answer if I understand the question. My client here today is the Colorado River Board of California. Represented on that board—rather, members of that

board are appointed, as I have indicated, from nominees made by the six agencies. Two of them, we represent in other matters from time to time in Washington—the city of Los Angeles and Imperial Irrigation District. We file quarterly reports, as the Lobbying Act requires, for all of our clients that have any degree of legislative work, whether it relates to only part or all of the employment.

I am glad to give you any information you like on that, Mr. Metcalf, but I do think it is fair to say, if I may, that our opponents have not registered, so far as I know. Perhaps they have recently—the Aqualantes, the Grass Roots, Inc., the Upper Basin Commission. While I will be glad to answer your questions, I really think in fairness that similar questions should be addressed to our opponents.

I have registered. The facts are available. They are published.

Mr. METCALF. And I have them.

Mr. ELY. I certainly do not intend to withhold any information from you, but it is all of record. Similar material on our opponents is not.

Mr. METCALF. The reason I bring this up, Mr. Ely, is because the other day, when Governor Miller was testifying, he mentioned $39,000 had been raised by the Aqualantes, and I inquired if that was an excessive amount. Then, knowing you were going to testify, I looked up your lobbying report which, as you say, is a matter of public record.

Mr. ELY. Surely.

Mr. METCALF. And I have found that you have drawn money from the State of California and the various public agencies you have said you represented.

Mr. ELY. I have the honor to represent my State and a number of its fine public agencies; yes, sir.

Mr. METCALF. Right. And one of those is the Colorado River Board?

Mr. ELY. Yes, sir.

Mr. METCALF. I was going to put the amount that has been drawn from the Colorado River Board for fees and expenses in the record. I was not going to say anything about the other agencies that you said you are not representing here today.

Mr. ELY. You had better include, then, the amounts paid by the Six-Agency Committee.

Mr. METCALF. Maybe.

Mr. ELY. I would like to suggest that the same data go in from all sides. If it is pertinent that mine be furnished, it is pertinent that my opponents' be furnished, too. It is a matter of fair play.

Mr. ASPINALL. Will the gentleman from Montana yield?

Mr. METCALF. Yes; I yield.

Mr. ASPINALL. Mr. Ely, you do not object to the committee knowing you are back here officially representing for hire the people whom you represent, do you?

Mr. ELY. No; certainly not. I am honored to have that known.

Mr. ASPINALL. May the Chair say that you are very able in your representation as well.

Mr. ELY. Thank you, sir.

Mr. ASPINALL. No one else has asked the question of these other people, so far as that is concerned, and with the exception of individuals representing their own particular interests, the only one you

might suggest that might have shown this same information would be the Upper Colorado River Commission, which is a legal entity existing under the authority of the Congress of the United States.

Mr. ELY. That is also the status of the Colorado River Board.

Mr. HOSMER. Will the gentleman yield?

Mr. ELY. That is also the status of the Colorado River Board, Mr. Chairman, existing under the laws of my State. I am in favor of the policy of the Lobbying Act. I think disclosures should be made of amounts paid in legislative matters, and I report whatever is paid me by any client, work for whom may touch upon legislations even though 90 percent of his work may relate to nonlegislative matters. I lean over backward. I simply say, I rather feel, if the spotlight is to be turned upon me with respect to what I am paid and my registrations under the Lobbying Act, that it be turned upon those who have not even taken the trouble to register.

I should not be pilloried here because I complied with the act.

Mr. ASPINALL. I do not think anybody is trying to pillory you. My thought is they are trying to show the direct relationship between your hire and the Colorado River Board of California. Personally, if I were in your position, I think I would rather answer the question than to, perhaps, make it appear as if you are trying to get around it by saying the others have not. However, that is up to you.

Mr. ELY. I have tried to make very clear that I am delighted to answer. The figures are a matter of public record. I do not have them with me. You are quite welcome to insert them in the record, so far as I am concerned.

Mr. HOSMER. Will the gentleman yield?

Mr. ASPINALL. Will the gentleman from Montana yield to the gentleman from California?

Mr. METCALF. I yield to the gentleman from California.

Mr. HOSMER. Mr. Chairman, I think that a matter has been injected into these hearings of considerable importance here. If it is true that the Aqualantes, Inc. and the Grass Roots, Inc. and the Upper Colorado Basin Commission is here in Washington lobbying the Congress of the United States and taking up the time of this committee while they are in an unlawful status, that matter should be directed to the attention of the Department of Justice and the appropriate steps taken.

I ask unanimous consent that the chairman of the committee do so inquire of the Justice Department whether or not these witnesses are violating the law, that have heretofore appeared.

Mr. METCALF. Is this all coming out of my time, Mr. Chairman?

Mr. ASPINALL. Yes; it is coming out of your time. You have heard the unanimous consent request of the gentleman.

The Chair will suggest to the gentleman from California that unless someone is a paid lobbyist he does not come under the terms of the act itself.

Mr. METCALF. Mr. Chairman, I am going to object to the unanimous consent request because there is not any showing that those people should or need to comply with the Lobbying Act. I would like to pursue the inquiry, if I may, in my time, and not get off on to what people filed or should have filed.

Mr. ELY. If you have the figures on me, you are welcome to put them into the record.

Mr. METCALF. According to my figures, from the year 1950 to 1954 the Six-Agency Committee of the Colorado River Board has paid a total of $146,168.35. Is that correct?

Mr. ELY. I have not the figures before me, Mr. Metcalf. I did not know you were going to ask this question or I would have had the data here.

Mr. METCALF. May I ask unanimous consent to put this table of figures on the Colorado River Board and the Six-Agency Committee, the total of money reported, fees and expenses, by Mr. Ely, in the record?

Mr. HOSMER. Reserving the right to object, Mr. Chairman.

Mr. ASPINALL. Yes.

Mr. HOSMER. I believe that if those figures are going to be included in the record, the figures on all the witnesses who appeared in behalf of the project should likewise appear. As a consequence, I will object to these figures going in unless the others go in, unless the gentleman amends his request to that extent.

Mr. ASPINALL. Does the gentleman respond?

Mr. METCALF. I have no way to find out what the others are.

Mr. DAWSON. Will the gentleman yield to me?

Mr. HOSMER. I think that is the reason why the committee should investigate with the Justice Department.

Mr. METCALF. I yield to the gentleman from Utah.

Mr. DAWSON. For the information of the gentleman, I might state there are only two paid employees of the opposition that I know of. One is Mr. Talmadge, and one is Mr. Bolack, both registered, and the amount they are receiving is an amount of record, and I think should be put alongside of that received by the witness.

Mr. HOSMER. Will you yield there for a question?

Mr. DAWSON. Yes.

Mr. HOSMER. Is Mr. Jeffrey Will paid by the Upper Colorado Commission for his efforts?

Mr. DAWSON. I will let the chairman answer that. I think it was previously answered, however. As far as I know, Mr. Will is an employee of the Upper Colorado Commission.

Mr. HOSMER. And he is in town as a proponent before this committee of the legislation?

Mr. ASPINALL. If the gentleman from Montana will yield?

Mr. METCALF. I yield.

Mr. ASPINALL. I believe I can give the answer to that question. Mr. Jeffrey Will, Mr. Ival Goslin, and Mrs. Lois Byrnes are employees of the Upper Colorado River Compact Commission with headquarters in Grand Junction, Colo. Mr. Will is not in town at the present time, but he has been back here and he has been back here at the request and under the authority of the Upper Colorado River Compact Commission, seeking the approval of Congress of this legislation.

Now, as to their salaries, I do not know, but it is a matter of public record, and if the gentlemen and the members of this committee desire that information, it can be obtained and placed in the record of the hearings at this place.

Mr. HOSMER. Will the gentleman yield further?

Mr. ASPINALL. I do not have the time.

Mr. METCALF. I yield.

Mr. HOSMER. I would just like to ask the same information be obtained as to the State of Arizona and its lobbyists.

Mr. METCALF. I have not heard anything about the State of Arizona and its lobbyists. I know Mr. Ely's activities as a lobbyist because he filed a report required by the National Lobbying Act, and I am merely asking that it be put in the record.

Now, I am informed by the gentleman from Utah there are two other lobbyists, and it is perfectly satisfactory that their expenses be put in the record, and I will add to my unanimous consent request that some accounting be made of this $39,000 that the Aqualantes are allegedly spending.

Mr. HOSMER. Will you add this Grass Roots Association or whatever the true name of that is?

Mr. DAWSON. That is the Aqualantes.

Mr. METCALF. Is that the association Governor Miller was referring to?

Mr. DAWSON. Yes.

Mr. METCALF. I will add that.

Mr. HOSMER. And the upper Colorado River Commission, Mr. Jeffrey Will.

Mr. METCALF. The point I am making is we have $146,000 that Mr. Ely reported spending in the last 5 years for the Colorado River Board and the Six-Agency Committee, and I want to set that over against the $39,000 of the Aqualantes.

Mr. ELY. Not spent, Mr. Metcalf. If you are correct in your figures, and I do not have them before me, that is money received by myself and my law firm for the services of myself and my associates and the matters entrusted to us.

Mr. RHODES. Will the gentleman yield to me now?

Mr. METCALF. I yield to the gentleman from Arizona.

Mr. RHODES. I thank the gentleman from California for bringing up this point because otherwise I probably could not have got it in the record. But to the best of my knowledge, I would like to say to the committee that the State of Arizona has no employees or no paid lobbyists in the city of Washington for this measure or any other measure pending before the Congress.

If such exists, I am not aware of it.

Mr. ELY. If I may comment, the Central Arizona Project Association has registered and has reported very large expenditures for legislative activities.

Mr. METCALF. Mr. Chairman, this was a minor issue. I hope I am not going to use up all my time on this?

Mr. ASPINALL. Is everybody satisfied now?

Mr. HOSMER. I am not, Mr. Chairman, because he has not yet included all these lobbyists.

Mr. METCALF. I will withdraw my unanimous consent request, Mr. Chairman, and try to go on to something else.

Mr. ASPINALL. The unanimous consent request has been withdrawn. The gentleman will proceed.

Mr. METCALF. In the case of *Arizona* v. *California*, which you referred to in your statement, Mr. Ely, there are only four parties. Not all of the States on the river are parties to that action, are they?

Mr. ELY. Not yet.

Mr. METCALF. And that is the purpose of this motion to get them in as parties to the action?

Mr. ELY. Yes, sir.

Mr. METCALF. I want to call your attention to provisions of all the bills that are before this committee except H. R. 270. All of the other bills, H. R. 3383, H. R. 2836, H. R. 3384, and H. R. 4488, provide that any State of the Colorado River Basin may maintain an action in the Supreme Court of the United States to enforce operation of the Colorado River compact, the upper Colorado River Basin compact, the Boulder Canyon Project Act, the Boulder Canyon Project Adjustment Act, and the Treaty with the United Mexican States, and gives consent to the joinder of the United States as a party in such suit.

Do you agree with that?

Mr. ELY. Agree with what?

Mr. METCALF. Do you agree that that provision is in every one of these bills except H. R. 270?

Mr. ELY. I have not taken the time while you were speaking to examine all the bills. I will take your word for it.

Mr. METCALF. It is a provision in some of the bills, is it not?

Mr. ELY. Shall I look at one of them while you are waiting?

Mr. DAWSON. Will the gentleman yield?

Mr. METCALF. Yes.

Mr. DAWSON. I do not want to see the gentleman waste his time. I can say it is in all of the bills and will be put in H. R. 270, which is my bill.

Mr. METCALF. Which is your bill.

Then, if any rights of the State of California have been violated by the Boulder Canyon Project Act or any subsequent act to the Colorado River compact, there is authority given to the State of California to seek damages, redress by damages, in the Federal Court, is there not?

Mr. ELY. That is not an adequate remedy. We are not very enthusiastic about buying a second lawsuit, Mr. Metcalf. One is enough.

Mr. METCALF. Mr. Ely, if you are infringed upon by rights that were granted to the upper basin as result of their entering into the Colorado River compact, then you do have a remedy in the courts?

Mr. ELY. If we are infringing on their rights, we have a remedy? Is that your statement, sir?

Mr. METCALF. If you are infringing on their rights, they have a paramount right and should be entitled to the waters that were given them by the compact.

Mr. ELY. Now, I have to disagree with your statement that they have a paramount right.

Mr. METCALF. I am saying, if they have a paramount right, then they are entitled to the water.

Mr. ELY. That is a very iffy question. They have no paramount right, they have no rights we are infringing in any way, Mr. Metcalf. If anyone's rights are infringed, I suppose he can resort to the courts provided Congress gives the consent of the United States.

Mr. METCALF. And consent is in here to enforce all of these acts?

Mr. ELY. I say that is a totally inadequate remedy. In the first place, the language in here, as much as I have examined it hastily, is not adequate to cover the types of controversies likely to arise. In the second place, it is not right that a project be authorized which is de-

pendent upon retention of water which is required under the compact to come to the lower basin.

Mr. ENGLE. Will the gentleman yield for an inquiry?

Mr. METCALF. Yes.

Mr. ENGLE. It was the language you drafted last time, was it not, that I put in the bill at the request of the Southern California Water Agencies?

Mr. ELY. No, you are mistaken, Mr. Engle. The language you finally put in the bill differs from the language I drafted.

Mr. ENGLE. Wait a minute. I put the language in the bill. My recollection is that the last time this thing was up I had five different amendments that were proposed by the Southern California Water Agencies and I got one of them in. The rest were voted down, if my recollection serves me, and the one that I got voted in was the one that permitted any affected State to go to the Supreme Court.

Mr. ELY. The language, Mr. Engle, that was finally included is not the language we originally submitted. The language finally included—I am speaking from my own recollection now of the proceedings last year—gave the consent of Congress to a suit to control the operation of reservoirs. It did not relate to diversions above the reservoirs.

Mr. METCALF. Mr. Chairman?

Mr. ENGLE. Wait a minute. What it did, it said that if any State regarded the actions with reference to the administration of the river as a violation of the compact, that any affected State could go to court and challenge it.

Mr. ELY. It related only to the administration of the reservoirs.

Mr. ENGLE. What is that?

Mr. ELY. The language which you finally got in, Mr. Engle, went part way. It went, as I recall it, to the administration of the reservoirs, not to actions of the defendant States in the upper basin above the points of storage in the reservoir.

Mr. ENGLE. It was precisely the language you prepared for me.

Mr. ELY. I respectfully differ.

Mr. ENGLE. I certainly did not redo it. I will tell you that.

Mr. METCALF. Mr. Chairman, I did not yield for extended questioning.

Mr. Ely, you said that the rights of the upper basin should await the determination of the issues of this lawsuit, in your original testimony.

Mr. ELY. I do not follow you exactly, Mr. Metcalf. I said that the issues in the present litigation are issues also involved in the legislation which is before you.

Mr. METCALF. And we should wait until those issues are resolved until we pass any act for the development of this program for the upper basin.

Mr. ELY. Before authorizing any of the storage reservoirs. We have also told you that, so far as the consumptive use projects are concerned, the 11 named in section 1 use such a small quantity of water that their construction would not affect us, so far as we can see, except for the implication of transmountain diversion.

Mr. METCALF. As Mr. Engle brought out this morning, that is a change of the position that was previously taken by the State of California in recommending Glen Canyon Reservoir.

Mr. ELY. No, I think not. I—unless you wish me to go over all of those answers—but I do not agree.

Mr. METCALF. I do not wish you to go over them. If there is a conflict between the rights of the upper basin and the rights of the lower basin and you, as representing the Colorado River Board, insist that these issues have to be resolved before we can go ahead with the project authorizing the Glen Canyon storage reservoir or any other storage reservoir, you are delaying the development of the upper basin until these rights are resolved.

Mr. ELY. Delaying the construction of those reservoirs; yes, sir.

Mr. METCALF. What remedy, then, do the States in the upper basin have, either by lawsuit or any other way, if this bill is not passed?

Mr. ELY. Remedy to do what, Mr. Metcalf?

Mr. METCALF. For your invasion of the rights of the upper basin, if the issues in the present case are resolved in favor of the States in the upper basin.

Mr. ELY. If the upper basin feels we are invading any of their rights, they can at once intervene in the present lawsuit instead of objecting to being brought in. They can get into it in 15 minutes.

Mr. METCALF. They are giving you authorization to get into a lawsuit by enactment of this legislation.

Mr. ELY. Mr. Metcalf, if I may be clear about it, you do not need any authorization for the upper basin States to sue us. We are in court now. All they have to do is intervene, as Nevada has already intervened, and they are in court.

Mr. METCALF. You are contending, however, that your rights are inadequately protected because all you will have is a lawsuit.

Mr. ELY. No. What I am saying is that one lawsuit is plenty. This one should determine all the issues. The upper basin States can intervene over night, as Nevada has already done. We can get all of these issues determined in this suit. We do not want a second suit at some time in the future.

Mr. METCALF. How long will it take to determine all this?

Mr. ELY. The present suit?

Mr. METCALF. Yes.

Mr. ELY. The master expressed the opinion that he could render his report within 1 year after the case is at issue and before him. We filed our motion to implead the upper basin States as necessary parties last July. They could, had they wished to expedite this matter, have at once indicated they had no objection to being brought into the suit, and we would have been to trial by now. They did object. The hearing before the master upon our motion to implead these States will be held in Phoenix, Ariz., April 12. Consequently, something like 6 or 7 months has been lost in the progress of that suit by the decision of the upper basin States to object to being brought in instead of, as you suggest, seeking an opportunity for adjudication of their rights as against us.

Mr. RHODES. Will the gentleman yield?

Mr. METCALF. Yes.

Mr. RHODES. The witness has not answered the question of the gentleman from Montana. If I may refer to your question, assuming all of the States of the upper basin are brought into the lawsuit, how long do you think the lawsuit will last?

Mr. ELY. As I tried to indicate, Mr. Rhodes, the master has said he would expect to render his report within a year after the case was at issue before him. Following that, I suppose exceptions to the master's report would be filed by one party or the other, and arguments held before the Supreme Court, and I suppose, taking time for briefs and other delays, between the filing of the master's report and the final decision of the court perhaps another year might elapse.

Mr. RHODES. Of course, some time will be involved in bringing it at issue before the master in the filing of the pleadings of the various upper basin States and others not party to the lawsuit at this time?

Mr. ELY. That is correct.

Mr. RHODES. How long do you feel that might take?

Mr. ELY. It depends upon the character of their pleadings, which I have not seen, and I cannot give you an answer to that until I do see them.

Mr. RHODES. You have no estimate which you might make?

Mr. ELY. I could not give one until I see what position they take.

Mr. RHODES. Did you not state before the California Legislature or a committee of the California Legislature that the suit might take as long as 6 or 8 years?

Mr. ELY. Yes, sir. They were asking how long the financial burden of the suit might be expected to continue, and I told them they should, in my opinion, assume the worst, that it might last 4 to 6 years.

Mr. RHODES. You feel that is the worst?

Mr. ELY. Yes, sir.

Mr. RHODES. I thank the gentleman from Montana.

Mr. METCALF. I was going to go into this a little further, but I think Mr. Udall will take it up.

Mr. Ely, Mr. Larson testified that the money to make this preliminary survey came from California as a result of an amendment to the Boulder Canyon Project Act, that California gave money to support a survey of the resources of the upper basin. Now what resources of the upper basin is California willing to have developed?

Mr. ELY. First, as to your initial statement as to where the money came from. The Boulder Canyon Project Adjustment Act, the act of July 19, 1940, which changed the basis of the power rate at Hoover Dam required that there be included in the rate an increment to provide $500,000 per year to be paid by the power users, primarily in California, into a Colorado River development fund. That has been done. That is the source of the funds which have been expended for preparation of the information contained in House Document 364. California power users in that sense have paid for the investigation of the upper basin project.

Mr. METCALF. That is right.

Mr. ELY. That statute provided that the moneys which we were so paying "are authorized to be appropriated"—only for a certain number of years—

are authorized to be appropriated only for the continuation and extension under the direction of the Secretary of studies and investigations by the Bureau of Reclamation for the formulation of a comprehensive plan for the utilization of waters of the Colorado River system for irrigation, electrical power, and other purposes in the States of the upper division and the States of the lower division, including studies of quantity and quality of water and all other relevant factors.

It then goes on with provision for the proceeds after that period covered in the way I have described.

The next such receipts up to and including the receipts for the year of operation ending in 1955 are authorized to be appropriated only for the investigation and construction of projects for such utilization in and equitably distributed among the four States of the upper division.

Then follows at a later point the direction:

Such projects shall be only such as are found by the Secretary to be physically feasible, economically justified, and consistent with such formulation of a comprehensive plan.

That is the understanding upon which we consented to the increment to our power rates to provide that money.

Mr. METCALF. You mentioned the quality of the water?

Mr. ELY. That is correct.

Mr. METCALF. Do you agree with Mr. Larson's testimony on page 10 when he says, "Our studies show that the recommended units and projects would have no material effect on the quality of the water downstream"?

Mr. ELY. May I refer that question to Mr. Matthew, our chief engineer?

Mr. METCALF. This is the survey that your half million dollars a year paid for.

Mr. ELY. Paid for, but did not get. There is no adequate report——

Mr. METCALF. Here it is.

Mr. ELY. There is no adequate report by the Bureau of Reclamation on the quality of water. That is one thing we are concerned about here.

Mr. HOSMER. Will the gentleman yield for a clarification?

Mr. METCALF. Yes.

Mr. HOSMER. Last year Mr. Larson, Mr. Jacobsen, and Mr. Dexheimer all testified that the studies with respect to the quality of water were, at best, meager, and that the Bureau was anxious to go ahead and make additional studies so that they could come up with some accurate figures. During this hearing they testified as you have stated, but upon cross-examination they stated that they had nothing more than they had the previous year on which to base their figures.

Mr. ELY. If I might, Mr. Metcalf, refer your question to me to Mr. Matthew, who is better informed on this subject and an engineer.

Mr. METCALF. With the chairman's permission.

Mr. MATTHEW. It is true that the Bureau testified that in their opinion these projects would not materially affect the quality of the water of the lower basin. They were referring to these initial projects which might consume up to, say, 3½ million acre-feet of water in the upper basin. That is in addition to existing and authorized projects, including the existing and authorized projects.

Mr. METCALF. It says "recommended units and projects." The whole development program would have no material effect on the quality of the water downstream.

Mr. MATTHEW. No. I think if you read the statement carefully they are referring to the initial projects proposed to be authorized. They testified that would be an increase of 12 percent. They also testified this year that the effect of the ultimate development of the upper basin would be to have a salinity content at Lee Ferry in total

salinity of 1 2/10 tons per acre-foot. That would be an increase of 54 percent above the salinity of the water at the present time.

Now that figure came directly out of an answer that was given to Congressman Hosmer last year in response to a question which he directed to the Secretary of the Interior, and which the Secretary in replying said, based on a very preliminary investigation they estimated that the ultimate salinity at Lee Ferry might be 1 2/10 tons per acre-foot. The fact of the matter is there has been no intensive or properly constituted investigation of the matter of quality of water.

Mr. METCALF. That 1 2/10 tons is with full use of the 7½ million acre-feet per annum allotment in the upper basin?

Mr. MATTHEW. That is right, and it was stated by the Secretary that was based on a very preliminary investigation in a letter to Congressman Hosmer.

Mr. METCALF. And that is well within the standard range for irrigation water designated by the United States laboratory?

Mr. MATTHEW. That is correct, but we are not satisfied with that very preliminary investigation. The salinity along the lower Colorado River would be 25 to 30 percent greater. We want to have a properly constituted and full investigation made of the problem to satisfy us as to what the results of upper basin development may be.

Mr. METCALF. It is your contention that if this water is used for irrigation in the upper basin and as a result has this salt content, that it does not satisfy the terms of the compact?

Mr. MATTHEW. That is right. That is, if it results in a quality of water for lower basin use which makes it unfit for all purposes, then we feel that that would be in violation of the compact.

Mr. METCALF. So neither can they use the water for irrigation in the upper basin, nor can they use the water for power in the upper basin?

Mr. MATTHEW. No, sir, that is not true. We have never taken that stand at all. But we want to see the picture and we think we are entitled to see the picture before it goes too far.

Mr. ASPINALL. I wonder if the gentleman from Montana——

Mr. METCALF. I just have two more questions. I have yielded a good deal of my time around here.

Mr. ASPINALL. Proceed.

Mr. METCALF. Would you express approval of this project if, let us say, Echo Park Reservoir was taken out and only Glen Canyon remained in as a storage reservoir?

Mr. MATTHEW. No, sir.

Mr. METCALF. It is your position that all of the storage reservoirs have to be removed from the project before you would consent?

Mr. MATTHEW. I think my statement will speak for itself. We have simply pointed out——

Mr. METCALF. I wanted to be sure.

Mr. MATTHEW (continuing). That for these initial participating projects, even the 14, holdover storage is not needed to permit the upper basin to make consumptive uses to that amount; and, in fact, it would not be necessary for some 27 years. That is the testimony of the Bureau of Reclamation. At the rate of development in the upper basin they estimate no holdover storage will be necessary for about 27 years.

The Secretary of the Interior also stated in response to a question by Congressman Hosmer last year that a 26,000,000 acre-foot reservoir at Glen Canyon would suffice for another 40 years after the first need for holdover storage. So that would be 65 years altogether that Glen Canyon alone would take care of the situation, or that much storage in the proper location.

Mr. METCALF. One last question. Do you make the same objection to the Fryingpan-Arkansas project?

Mr. MATTHEW. At the present time, yes.

Mr. ASPINALL. The Chair recognizes the gentleman from Utah, Mr. Dawson.

Mr. DAWSON. I have been very much interested in the answers of all these witnesses. Pursuing the line adopted by the gentleman from California, Mr. Engle, and the gentleman from Montana, Mr. Metcalf, in regard to these inconsistencies that we find in the statements and in the record, generally it seems to me that you are following the line, you are saying that you do not object to us using the water, but—and then you go on to say why we cannot use it. It reminds me of an old poem I memorized when I was a kid:

> Mother may I go out to swim?
> Yes, my darling daughter.
> Hang your clothes on a hickory limb,
> But don't go near the water.

What we want to know is how much water we can use and when we can get it, and if you will permit us to use it.

With that much preliminary statement, I am going to direct my first question to a gentleman who has been sitting here and has not taken any part, yet he is the chairman of the Colorado River Board of California, Mr. Simpson.

Mr. Simpson, as chairman I assume that you represent all of these groups who were here testifying?

Mr. SIMPSON. Yes, sir. I do sit as the chairman of the board in its deliberations.

Mr. DAWSON. In your statement that you submitted, you furnished along with it a resolution of the California-Colorado River Board, in which you state that the Federal subsidy for irrigation in this case amounts to over $2,500 per acre of irrigated land. Do you consider that to be a fair estimate?

Mr. SIMPSON. Yes, sir; according to the computations of very competent engineers.

Mr. DAWSON. Will you tell me how you arrived at those figures?

Mr. SIMPSON. I will refer that to Mr. Matthew.

Mr. DAWSON. You tell me. If you do not know, just say you do not know.

Mr. SIMPSON. Personally?

Mr. DAWSON. Yes.

Mr. SIMPSON. In detail?

Mr. DAWSON. Yes.

Mr. SIMPSON. I do not know in detail, except that I am perfectly confident and have all the confidence in the world in our advisers, both legal and engineering.

Mr. DAWSON. In other words, you think it is fair, but you do not know how they arrived at it?

Mr. SIMPSON. Yes, sir, I do, sir.

Mr. DAWSON. Tell me.

Mr. SIMPSON. If you will give me a little time, I shall answer that.

Mr. DAWSON. Yes, I will.

(A short pause.)

Mr. DAWSON. Let me say this: If you do not know, if you are going to ask Mr. Matthew, I will ask him the question. That is the reason I said, "If you do not know, say you do not know." I will ask him.

Mr. SIMPSON. Thank you, sir.

Mr. DAWSON. Let him answer it. Would you care to answer it, Mr. Matthew?

Mr. MATTHEW. I would be very glad to.

Mr. DAWSON. Make it brief. I just want to know what you have included.

Mr. MATTHEW. The computation is made exactly in the same way the Secretary of the Interior answered a similar question in connection with the central Arizona project in 1950, in which he was asked the question as to what the cost of interest would be to the taxpayers occasioned by the central Arizona project according to the repayment plan.

Mr. DAWSON. I simply want to know this: You are including the interest in the charge to the taxpayers, are you not?

Mr. MATTHEW. Certainly. It is the Federal subsidies in accumulated interest under the repayment plan.

Mr. DAWSON. You are familiar with the fact that the average cost per acre, actual cost, attributed to the participating projects is less than $500, if you do not consider the interest. Is that right?

Mr. MATTHEW. The average of the 11 participating projects is about $545 an acre.

Mr. DAWSON. All right, now. Let's go on from there. I take it, by adding the interest and compounding it over a period of 50 years you come up with a figure of $2,500 an acre. Is that right?

Mr. MATTHEW. No; that is an entirely separate figure. It does not include the principal. The principal is paid off over the repayment period, but in the meantime, even though the principal is paid back, the Federal Government and the taxpayers have accumulated a debt of over $2,500 an acre.

Mr. DAWSON. My next question is this: Do you, as the California Water Board, object to the using of interest-free money on the repayment of irrigation costs?

Mr. MATTHEW. No, sir.

Mr. DAWSON. Then why do you include the interest?

Mr. MATTHEW. This repayment plan of the upper basin project proposed is a complete departure from the existing law, which provides that the principal construction costs on irrigation and reclamation projects shall be repaid in approximately equal annual installments in 40 years following a 10-year development period.

Mr. DAWSON. Wait a minute. You are talking about degree now. You are saying that it goes for longer periods of time. But you say you have no objection to the principle of interest-free money on irrigation projects?

Mr. MATTHEW. Under existing law. Under the provisions of existing law, no.

Mr. DAWSON. You are talking about the fact that it may be going a little longer than some of the projects you have in mind. Is that it?

Mr. MATTHEW. Not only that, but no repayment, or only 15 percent repayment for 40 or 50 years.

Mr. DAWSON. You have never objected before, have you, to any of the California projects that have come up and used interest-free money?

Mr. MATTHEW. The California projects I do not think involve that situation. But I have not had occasion to come in on California projects.

Mr. DAWSON. You are familiar with the Santa Maria and Santa Margarita projects?

Mr. MATTHEW. Only generally.

Mr. DAWSON. This is the first one, is it not, that you have come in and called attention to the fact that the taxpayers are paying a subsidy in the form of interest-free money?

Mr. MATTHEW. No. We called attention to that in connection with——

Mr. DAWSON. The Fryingpan-Arkansas?

Mr. MATTHEW. In connection with the central Arizona project.

Mr. DAWSON. Did you object to the financing of the central Arizona project?

Mr. MATTHEW. Yes, sir.

Mr. DAWSON. That is the southern California group?

Mr. MATTHEW. No. The State of California did in their official comments on the report.

Mr. DAWSON. Objected to the use of interest-free money in the central Arizona project?

Mr. MATTHEW. The method of financing the project which was the use of the interest component of power revenues at that time.

Mr. DAWSON. That is another thing entirely.

Mr. MATTHEW. It comes down to the same thing, whether you have the Collbran formula or interest component.

Mr. DAWSON. I am talking about strict interest-free money on irrigation projects. I might ask you that question. Are you opposed to using the interest component?

Mr. MATTHEW. Yes, sir.

Mr. DAWSON. Are you opposed to using power revenues to help defray the costs of irrigation projects?

Mr. MATTHEW. No, sir, not if it is set up in the proper way.

Mr. DAWSON. So it is just simply a matter of degree. You think in this particular case they are probably going a little too far; is that it?

Mr. MATTHEW. Well, it is quite a way, yes.

Mr. DAWSON. So you feel $2,500 an acre subsidy is a fair figure, too, do you?

Mr. MATTHEW. Yes. I think it would be more than that. Incidentally, I think that in answer to a question propounded by Senator Kuchel at the Senate hearings, the Bureau of Reclamation has already reported that the acumulated debt for the projects recommended by the Secretary, that is, 2 storage units and 11 participating projects, would be over a billion dollars over the repayment period. If you divide that by 366,000 acres that would be benefited, it would be over $3,000 an acre. So the $2,500 figure an acre is conservative.

Mr. DAWSON. You say it would run around $3,000 an acre?

Mr. MATTHEW. That is what a billion dollars would be, yes.

Mr. DAWSON. Then I will go back to Mr. Simpson. Do you agree with that, Mr. Simpson?

Mr. SIMPSON. Yes, sir.

Mr. DAWSON. Now I show you a pamphlet that has been distributed under your signature and the name of the Colorado River Association, California.

Mr. SIMPSON. May I say that the Colorado River Association is not the Colorado River Board.

Mr. DAWSON. Well, now, do you or do you not approve of this pamphlet?

Mr. SIMPSON. We did, sir; yes.

Mr. DAWSON. You did?

Mr. SIMPSON. Yes, sir.

Mr. DAWSON. All right. In here you state that the costs to the American taxpayer will be $5,000 an acre. Now you say $3,000.

Mr. SIMPSON. Ultimately; yes, sir.

Mr. DAWSON. Would you tell us what you take in consideration when you arrive at a figure of $5,000 an acre?

Mr. SIMPSON. I will let Mr. Matthew answer that. He pursued the question.

Mr. DAWSON. All right. I will say, Mr. Matthew, I have read your statement, and you make a similar statement using the figure of $5,000. I think in your statement you include the total cost of powerplants, the dams, and everything, charging it all up to the irrigators. Is that right?

Mr. MATTHEW. No, sir. The statement has reference to all of the projects proposed to be authorized in the bill.

Mr. DAWSON. That includes the storage reservoirs?

Mr. MATTHEW. The six storage reservoirs.

Mr. DAWSON. The powerplants?

Mr. MATTHEW. The 14 participating projects.

Mr. DAWSON. And the powerplants?

Mr. MATTHEW. That is correct.

Mr. DAWSON. And charging everything in against the irrigators?

Mr. MATTHEW. No, only relating it to—that is of the whole project. Presumably, all of these powerplants are for the benefit of irrigation. The record is very clear that is why you are building them—to get revenue to help pay for the irrigation projects. So that you have to look at the project in its entirety.

Mr. DAWSON. Let me ask you this question: You state that the Hoover Dam was financed by power revenues exclusively. Do the irrigators who are getting the benefits of Hoover Dam pay one penny of the cost of Hoover Dam?

Mr. MATTHEW. No, they do not pay any.

Mr. DAWSON. They do not pay anything?

Mr. MATTHEW. They do not pay anything, because the act provided that those irrigation interests who had prior rights dating back to 1877 were merely getting replacement water for rights that had been taken away from them and invaded by junior appropriators upstream.

Mr. DAWSON. Let's get into that——

Mr. ELY. Might I answer that?

Mr. DAWSON. No. I will get to you in time. Let's talk to Mr. Matthew, here.

Let us take the Imperial Irrigation District as an example. That is the one included in your organization. If I remember rightly, in Imperial Irrigation District they were having a lot of difficulty down there with silted water, they could not get the water on the land, and so they were pushing for some relief. As a result of the Hoover Dam they got clear water down there. Is that not correct? Did they not benefit in the Imperial Valley?

Mr. MATTHEW. There is no question but what Hoover Dam was a benefit for flood control and silt control.

Mr. DAWSON. And, consequently, the irrigators. Is that not right?

Mr. MATTHEW. A lot of irrigators benefited, yes.

Mr. DAWSON. I see Mr. Dowd here in the room. I recall his testimony last year when he was telling some of the benefits that got down there in the Imperial Irrigation District.

Mr. MATTHEW. That is right.

Mr. DAWSON. That cannot be denied, can it?

Mr. MATTHEW. No.

Mr. DAWSON. Yet they did not pay a penny, did they, toward the construction of the Hoover Dam?

Mr. MATTHEW. That is right.

Mr. DAWSON. Would you not consider that to be a subsidy to the irrigators?

Mr. MATTHEW. On the other hand——

Mr. DAWSON. Just answer that.

Mr. MATTHEW. Pardon me?

Mr. DAWSON. Would you not consider that to be a subsidy to the irrigators?

Mr. MATTHEW. No, sir, because they had their rights before Hoover Dam was ever constructed. Now, on the other hand, Mr. Dawson, they did not and do not get a penny of subsidy from the Hoover power revenues, which is the basic tenet in this upper basin project, you see.

Mr. DAWSON. They did indirectly, did they not?

Mr. MATTHEW. No, sir.

Mr. DAWSON. Through these benefits I have mentioned?

Mr. MATTHEW. No, sir.

Mr. DAWSON. Now I would like to pursue that further with you, but I am going on to Mr. Tillman.

Mr. Tillman, you mentioned in your statement the fact that you have some sort of vested rights in the use of this secondary power.

Mr. TILLMAN. I did not use the words "vested rights." We have a contract. All we stand on is our contract.

Mr. DAWSON. Is it not a fact that your contract provides it is subject to the upper Colorado River compact all the way through?

Mr. TILLMAN. Certainly, sir. I beg your pardon. I did not hear the word "upper." You mean the Colorado River compact.

Mr. DAWSON. The Colorado River compact?

Mr. TILLMAN. Yes.

Mr. DAWSON. I have a copy of your contract here, and I would just like to read one part of it. I ask the gentleman from California to listen to this because it ties in to a question he asked this morning as to whether or not these power contracts down there were not subject to the Colorado River compact.

Mr. TILLMAN. They are, of course, sir.

Mr. DAWSON. Let us just read part of it. I am reading from section 10 (2) of the contract between Los Angeles City and the Government.

The further statutory requirement that this contract is made upon the express condition and with the express covenant that the rights of the City as a contractor for electric energy through the use of the waters of the Colorado River or its tributaries shall be subject to, and controlled by, the Colorado River compact.

Mr. TILLMAN. Certainly, sir.

Mr. DAWSON. So there is not anything to your argument, then, that you have got a lawsuit against the Government if they deprive you of some of these waters which give you secondary power, is there?

Mr. TILLMAN. Why certainly, sir. Of course there is something to it.

Mr. DAWSON. What is that?

Mr. TILLMAN. Of course there is something to it. I would be very happy to state, somewhat oversimplified, our position on that; restate it.

Nothing in our contract with the United States, nothing in the operations of the United States in delivering water to us must run crosswise with the Colorado River compact. There is no question about it. We do not suggest the possibility of such a thing. But their conduct must be consistent with the compact.

Now, what is the situation we are talking about here?

They have promised to deliver certain water, to sell power to us, rather, falling water.

Mr. DAWSON. Subject to the compact.

Mr. TILLMAN. Subject to the compact. Now, last year and the year before last, they delivered very large quantities of water. If the United States were bound, in other words, in some fashion under the Colorado River compact—the United States, our contractor—were bound to build a dam, compelled by the compact to build a dam at Glen Canyon and to impound water there, then our rights are gone, we have so no such rights. But the compact does not require the United States to build any dam at Glen Canyon. The United States has not built a dam at Glen Canyou.

Mr. DAWSON. Your city spent a lot of money up there investigating Glen Canyon Dam.

Mr. TILLMAN. That is true. We are talking legal rights. You asked me if there was no sense to my suggestion we might have a lawsuit against the United States. The question under the compact is, Is the United States bound to impound this water at Glen Canyon? Is there something illegal about letting it run down the river? Is it in some way prohibited by the contract?

Mr. DAWSON. Just a minute.

Mr. TILLMAN. May I finish my answer?

Mr. DAWSON. No one is contending it is illegal, but I am following your contention that they are under some obligation for continuing to let that excess water go over the turbines down there so you can get cheap electric energy for secondary power.

Mr. TILLMAN. They are under such an obligation to allow the water to come down, and not for their own particular purposes. Bear in

mind this not—as the compact states, the States of the upper division shall not withhold and the States of the lower division shall not demand. I am not demanding as a State of the lower division, at all. I am demanding for my client the rights which we have as the Department of Water and Power of the City of Los Angeles, as a State of the lower division against the United States of America, not the States of the upper division, at all.

Mr. DAWSON. You use the expression all the way through your statement that you assumed you were going to get so much water down there; you assumed this and you assumed that.

Mr. TILLMAN. And it was estimated by the United States, our contractor. That is right.

Mr. DAWSON. Was there anything in writing to guarantee you were going to get that?

Mr. TILLMAN. There is no guaranty; the river may not run.

Mr. DAWSON. That is the point I want to make. There is no guaranty. There is no guaranty; therefore, there will be no obligation against the United States Government if the water in the upper-basin States should be put to use for purposes for which it was intended. Is that not right?

Mr. TILLMAN. The answer to your question is "yes," but it is wholly irrelevant to our problem. That is the problem—it is not the use intended.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. You do not——

Mr. TILLMAN. May I finish my answer to this one question? If the sovereign State of Utah diverts from the Colorado River for domestic or irrigation purposes, all of the water, the 7½ million allocation, and we lose all our secondary, and if that results because of low flows in the river in our losing our farm power, we have no complaint about that. That is your right, just as our rights under our contract are our rights.

Mr. HOSMER. Will the gentleman yield?

Mr. DAWSON. Just a minute, and then I will yield. Let me tell the witness this: That is all in the world we ask for. However, your contention is that we have no rights to build storage dams up there or to produce electrical energy, which you contend has no connection with our participating projects for consumptive use; then everything you say is a nullity.

Mr. TILLMAN. Congressman, when you say "we" you obviously are speaking——

Mr. DAWSON. The upper basin.

Mr. TILLMAN. As a citizen of Utah or the State. No State is proposing to build anything up there. The proposition before this Congress is not that Utah shall build something. The United States of America, our contractor, is proposing to build something.

Mr. DAWSON. I realize that.

Mr. TILLMAN. And, Congressman, under the compact and the matters of private contract rights there is all the difference in the world between the States of the upper division and the United States of America.

Mr. DAWSON. We understand that, of course.

I want to refer to the statement you used and Mr. Ely uses that in constructing Hoover Dam you referred to the fact that you underwrote the costs of Hoover Dam.

Mr. TILLMAN. Yes, sir.

Mr. DAWSON. Is there any difference in the way that we are proposing to finance this project in the upper basin States and your system of underwriting down there? I am not talking about terms, I am talking about the statement you use.

Mr. TILLMAN. Congressman, I should say approximately the same difference as between night and day.

Mr. DAWSON. Are we not, as users of the water there, also going to pay back this money to the Government? Is that not what you agreed to do down in the Hoover Dam?

Mr. TILLMAN. There is no suggestion in any one of these bills I have seen, Mr. Dawson, as there was not only a suggestion but a peremptory mandate in the Boulder Canyon Project Act, that the Secretary of the Interior and the Bureau of the Reclamation shall not spend a dollar on any one of these projects until they have in hand contracts, firm contracts, for revenues sufficient to pay for them. If that is somewhere in here, I have certainly overlooked it.

Mr. DAWSON. I think you have overlooked it, because it is predicated upon the fact that the water users will repay the cost to the Federal Government of this project over a certain period of time and sets forth the terms.

Now, I will yield to my friend from California.

Mr. HOSMER. With respect to the State's operations of withholding waters upstream, as I understand, your contention is there would be no liability if the United States withheld waters which were entitled to be withheld upstream, but there would be if waters were withheld that were not entitled to be withheld under the compact. Is that right?

Mr. TILLMAN. That is correct.

Mr. HOSMER. And the burden of your testimony is that such actions are contemplated under this?

Mr. TILLMAN. Clearly.

Mr. DAWSON. I yielded for a question. I did not yield for an answer. If he has an answer, he can tell me.

The fact of the matter is, it is primarily the power you are interested in; is it not?

Mr. TILLMAN. I should explain the narrow grounds upon which I am here to testify——

Mr. DAWSON. Will you answer that yes or no?

Mr. TILLMAN. Well, I will answer "No," then. I am primarily interested in our contracts, the contracts of the department of water and power of the city of Los Angeles, and their enforcement, their protection by the Congress of the United States.

Mr. DAWSON. But the burden of your argument in your statement is all on power?

Mr. TILLMAN. Surely.

Mr. DAWSON. So it is the power that——

Mr. TILLMAN. Entirely so, sir.

Mr. DAWSON. All right. Now, do you think it is fair to continue to run surplus waters over the turbines at Hoover Dam to furnish cheap electrical power to southern California when the upper basin States are going thirsty for water?

Mr. TILLMAN. Congressman, I tried to make it as clear as I can, there is no possible conflict between the use of water in the upper basin and my argument concerning these storage projects. You need not be thirsty for water so far as me and my arguments are concerned. You may take the 401,000 acre-feet required for the 11 participating projects, which is wet water, to be used for thirst. Take it. I have no argument with you.

Mr. DAWSON. What you are doing is arguing with the Bureau of Reclamation that it is impossible to go ahead and to develop our participating project without these holdover storage reservoirs.

Mr. TILLMAN. I do not have to argue that with the Bureau. I am sure they concede it. They do not need it.

Mr. DAWSON. They certainly have not conceded it.

Mr. TILLMAN. Mr. Larson——

Mr. DAWSON. Or they would not be here proposing it.

Mr. TILLMAN. Congressman, Mr. Larson conceded it in the testimony to the Senate committee and conceded it in the testimony before this committee, which I have in my briefcase. There is no question about that.

Mr. DAWSON. I have the transcript here and have read it a number of times, too.

Mr. TILLMAN. You have to look a little to observe this.

Mr. DAWSON. I am not going to labor that point here with you, but that is the burden of your argument.

Mr. TILLMAN. I would like to labor it with you to make it clear.

Mr. DAWSON. Let me see if I sum up your stand correctly. You are contending that we have no right to construct holdover reservoirs; is that right?

Mr. TILLMAN. No, sir, that is much too broad.

Mr. DAWSON. I mean main-stem reservoirs.

Mr. TILLMAN. That is much too broad.

Mr. DAWSON. Then if we can construct them, which ones can we construct?

Mr. TILLMAN. Again, the formula you set is much too broad that it is my contention you have no right to construct holdover storage.

Mr. DAWSON. Do we have the right to construct Glen Canyon Dam?

Mr. TILLMAN. To my mind, at the moment, obviously not. Beyond question.

Mr. DAWSON. Do we have the right to construct Echo Park?

Mr. TILLMAN. At the moment, as of this year, it is perfectly clear to me at law that the United States—and I do not know who you mean when you say "we."

Mr. DAWSON. We, the upper basin.

Mr. TILLMAN. The upper basin States are not proposing to construct anything. The United States is proposing here, our contractor.

Mr. DAWSON. Let's not wiggle around on this point. Let's just say the Government.

Mr. TILLMAN. I do not mean to be wiggling. We have no contract with the upper basin States concerning a delivery of power in any year, but we do have a contract with the United States.

Mr. DAWSON. Does the United States Government have a right to construct Echo Park Dam?

Mr. TILLMAN. In this year, the diversion proposals of the upper basin States for domestic and irrigation purposes being what they are,

I say the United States has no right to do it without indemnifying the downstream contractors, at least.

Mr. DAWSON. All right. You can just answer yes or no and save that. Do we have the right to construct the Curecanti?

Mr. TILLMAN. This year, I say no dam.

Mr. DAWSON. No storage dams?

Mr. TILLMAN. No storage dams.

Mr. DAWSON. And you also contend that we have no right to develop any hydroelectric power?

Mr. TILLMAN. Now, that is a totally different matter. The storage dams, first, divert an enormous quantity of water to fill the reservoirs and, second, result in evaporation losses of some minimum of 615,000 acre-feet a year, none of which flows down the river to the turbines below. But as far as turbines in the river, that is different from storage dams and some are actually putting generators in the river. Of course, you could have what is known as run-of-the-river plant, of course.

Mr. DAWSON. The answer then is "No"?

Mr. TILLMAN. As to generation, you can put all the plants in the river you want.

Mr. DAWSON. If we do not have any storage plants?

Mr. TILLMAN. That is right.

Mr. DAWSON. In other words we can put a little paddle in the river, and as long as we do not fill the dam there to run the paddle, we can use it. Is that it?

Mr. TILLMAN. Yes. As with any business. And bear in mind these were and are regarded as commercial money raisers for the United States. The Boulder Canyon project was originally. And when you have once sold something, you, as a businessman or a farmer or anything else, when you have once sold it at a time when you wish to sell it and you have made a contract, you obviously cannot act contrary to that and be free from liability.

Mr. DAWSON. That is my very reason, Mr. Tillman, in reading you the terms of your contract which says your contract is subject to the Colorado River compact.

Mr. TILLMAN. Certainly it is.

Mr. DAWSON. So they have an out on it. If in violation of the compact, you have terms written in this bill that permit you to go to court at any time and makes the whole project subject to the terms of the compact. So I cannot for the life of me see where your objections lie.

That is all, Mr. Chairman.

Mr. TILLMAN. My objection is this, Mr. Congressman——

Mr. ASPINALL. The gentleman has finished his time and yielded back. The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. I want to direct my questions to Mr. Ely.

Mr. Ely, you are the chief counsel in this pending litigation in the Supreme Court; are you not?

Mr. ELY. Yes, sir, under the direction of the attorney general of California, Mr. Brown.

Mr. UDALL. Have you been in on this lawsuit from the outset?

Mr. ELY. Yes, sir.

Mr. UDALL. When did the suit originally commence?

Mr. ELY. In August of 1952 by filing of Arizona's petition for leave to file its bill of complaint.

Mr. UDALL. And you have been in the lawsuit from the outset, you came in and filed these papers, and you have been associated in the case during the entire time?

Mr. ELY. The first papers filed in response to Arizona's suit, I believe, were by Mr. Shaw, my predecessor, who died soon after that time. But I have been connected with the suit practically from its inception.

Mr. UDALL. Your position—I am speaking now of the legal aspects of the matter here. I assume that is what you are here primarily for yourself.

Mr. ELY. Yes, sir.

Mr. UDALL. It is on the legal aspects of it. Your position, I take from reading your statement, is that there are serious legal questions here that should be determined before this project is authorized; is that correct?

Mr. ELY. Yes, sir.

Mr. UDALL. And that the proper way to proceed then, as you see it, would be to have the legal adjudication first and the authorization and so on after that?

Mr. ELY. Yes, sir.

Mr. UDALL. Now you took a quite similar position, did you not, 3 or 4 years ago when the Central Arizona project was before the committee? Your position was similar in that you felt there were legal issues which should be adjudicated before authorization of the project.

Mr. ELY. Yes, sir.

Mr. UDALL. And, in fact, that was one of the arguments which led this committee about 3 years ago to reject the central Arizona project, in effect saying to Arizona, "You had better go over and get your rights adjudicated before you come in here and ask for the project." Is that not true also?

Mr. ELY. The committee did decline to report out the bill, and in one of the reports mentioned the necessity for litigation.

Mr. UDALL. That was very much discussed in the committee, and you attended hearings where it was discussed and made presentations on that point?

Mr. ELY. Yes.

Mr. UDALL. I want to ask you this: During those hearings and during those presentations, was not the general impression given by you and others here on the legal aspects of this that there would be a prompt and expeditious determination of this matter?

Mr. ELY. Yes; we hoped so.

Mr. UDALL. And the general impression was given this committee that you could go over to the Supreme Court and get a prompt determination, and if Arizona was entitled to the water from the Colorado River, they could come back and then would be in a different posture before the committee?

Mr. ELY. You are speaking now of the question of time?

Mr. UDALL. Yes.

Mr. ELY. Because, if everyone cooperated, there would be reasonably prompt adjudication. We feel the same way today with respect to the present suit.

Mr. UDALL. Yet 2½ years have already elapsed since the lawsuit was filed.

Mr. ELY. Not by reason of our delay, Mr. Udall.

Mr. UDALL. That is a matter that can be argued, and I will not go into that with you. But 2½ years have elapsed, and on March 7 of this year you stated, as you admitted a moment ago, that you testified before the Ways and Means Committee of the California Assembly on March 7 and indicated that it might be another 6 to 8 years before the litigation finished.

Mr. ELY. I do not have that figure in mind. My recollection is I told them, in response to questions of some members as to how long the financial burden was likely to last—I indicated they should be prepared, in my opinion, to sustain it for 4 to 6 years.

Mr. UDALL. I have an Associated——

Mr. ELY. At worst, I hope.

Mr. UDALL. I have an Associated Press dispatch that quotes you as saying "May last 6 to 8 years." You think you said 6 to 8 or 4 to 6?

Mr. ELY. I think I said 4 to 6, but if it says 6 to 8, it may last too long. We hope not. If everyone cooperated, this case could be disposed of very rapidly. As I indicated earlier, we have lost 7 months on the single question of whether the upper basin States shall file objections on the motion to implead them.

Mr. UDALL. When did you file the motion to bring in the upper basin States?

Mr. ELY. Our motion was filed on July 15, 1954.

Mr. UDALL. And at the time that motion was filed the upper Colorado project was before the Congress and was very much discussed, and they were trying to get it through at that time. Is that not so?

Mr. ELY. There was legislation pending here at that time; yes, sir.

Mr. UDALL. In fact, that was the first time a major effort had been made, last year, to get the upper Colorado out onto the floor and get a vote on it in the House. Is that not right?

Mr. ELY. Is that a question?

Mr. UDALL. Yes.

Mr. ELY. I think that is correct.

Mr. UDALL. And this motion was filed by you to bring that into the suit?

Mr. ELY. That is correct.

Mr. HOSMER. Will the gentleman yield at this point for a unanimous consent request?

Mr. UDALL. Yes.

Mr. HOSMER. I would like to renew at this time, since the pleadings in the lawsuit have become relevant again, my unanimous consent request that the summary of the proceedings in the Supreme Court, which was offered yesterday, be placed in the record at this point.

Mr. DAWSON. A point of order, Mr. Chairman.

Mr. ASPINALL. You have heard the unanimous consent request. Is there objection?

Mr. DAWSON. A point of order.

Mr. ASPINALL. A point of order does not lie at this time.

Mr. RHODES. I object.

Mr. DAWSON. I object.

Mr. ASPINALL. Objection has been heard. Proceed.

Mr. UDALL. As you people would like it then, you would like to have the upper Colorado people brought in and have an adjudication of all the rights of all of these States under the compact in one lawsuit. Is that what you are trying to do?

Mr. ELY. In general, yes. The answer to your question falls into two parts: The first, the issues raised as between Arizona and California, in our opinion, cannot be completely and finally adjudicated without bringing in the upper basin States as necessary parties to the determination of that quarrel. Second, there are issues as between the upper and lower basins, as such, which should be determined in the present suit. You cannot arrive at a final decree specifically with reference to Arizona's right to 3,800,000 acre-feet, of which, they say, 2,800,000 is III (a) water, which they say they may take from the main stream, without the first step of adjudication of the right of the lower basin against the upper basin to 7½ million acre-feet of III (a) water at Lee Ferry.

Mr. UDALL. And it is foreseeable, as lawyers, Mr. Ely, knowing the procedure that is followed in this type of suit, if the upper basin States are brought in, that lawsuit could not be determined within at the very least about 3 years from now.

Mr. ELY. It could be done much more rapidly if there were determination on all hands to do it. But I do not quarrel with your estimate. It might drag that long or longer.

Mr. UDALL. I am saying that would be a fair estimate.

Mr. ELY. That could happen. I do not say a minimum. I would not agree with you there.

Mr. UDALL. Going on to another subject for just a moment. Assuming that Arizona and the upper basin people win a lawsuit in the sense that their interpretation as opposed to California's interpretation is accepted by the Supreme Court, are you in any position to give assurance here to this committee today that the Colorado River Board, once that adjudication is made, since you said it is necessary, that you would not come in and oppose either the upper Colorado project, the central Arizona project, further on legal grounds?

Mr. ELY. First, Mr. Udall, it is impossible to answer that question because the position of Arizona, on the one hand, and of the upper basin States, on the other, will not be known until the upper basin States file their pleadings. In my view there is an irreconcilable and hopeless conflict between the position of Arizona and that which the upper basin States must take for their own protection in this suit.

Furthermore, I cannot tell you at this moment what position they will take in their pleadings. Will they take the position of Governor Johnson of Colorado or take the position of some of the sponsors of this project in these present proceedings?

Mr. UDALL. What I am trying to get from you—I want you to assume that you lose, your position is not accepted by the court; that whatever position the upper basin States take, or whatever position Arizona and the upper basin States may be in this, the decision is found against you.

Mr. ELY. Lose to whom?

Mr. UDALL. I say assurance from you. I want to know if you are in position to give assurances as to what your position would be.

Mr. ELY. Lost to whom?

Mr. UDALL. As to both the central Arizona project and the upper Colorado.

Mr. ELY. They are not in accord. They are in complete conflict with each other.

Mr. UDALL. You obviously do not want to answer my question about assurance.

Mr. ELY. I cannot answer——

Mr. UDALL. If you lose to them.

Mr. ELY. We cannot lose to both simultaneously. They are in hopeless conflict with each other.

Mr. UDALL. In other words, you feel you are going to win as to one or the other?

Mr. ELY. We feel we will sustain our right to 5,362,000 acre-feet per annum for three projects. That is all we have. That is 4,400,000 acre-feet apportioned under artice III (a) and 1 million of surplus waters unapportioned by the compact.

Mr. UDALL. Let us assume that Arizona's position is correct and the litigation is determined against you. You are not going to place further legal arguments against our projects?

Mr. HOSMER. A point of order. This inquiry with respect to the central Arizona project is completely aside from the matter before the court, or the committee.

(Laughter.)

Mr. ASPINALL. Would my colleague agree with the Chair that there have been many matters a little bit outside of the realm?

Mr. UDALL. Particularly from the other gentleman.

Mr. ASPINALL. All right.

Mr. ELY. I did not hear the question.

Mr. HOSMER. Will you rule on my point of order?

Mr. ASPINALL. I rule it out of order at this time.

Mr UDALL. I want some assurances, if you can give me any, as to what your position would be.

Mr. ELY. Mr. Udall, if Arizona should win her suit completely and totally, both the upper basin and California are busted. The upper basin, in such event, must let down much more water than this legislation or the underlying Reclamation Bureau report assumes. California will get much less water than we think we are entitled to. I cannot tell you in that circumstance what kind of a quarrel we would be thrown into with the upper basin States, nor they with us.

Mr. UDALL. I just want to ask one other question. This is a brutally frank question and you can give me an answer in equal kind. That is, as far as you people are concerned, as far as this current lawsuit and pending lawsuit, that you would like to draw the upper basin people into, you are personally willing that it drag out and last as long as possible, Mr. Ely. Is not that your real basic attitude?

Mr. ELY. The answer is emphatically "No." Does that satisfy you, sir?

Mr. UDALL. It does.

I have finished my questions, but I want at this time to make a statement, and then I will yield to my colleague in a moment.

It seems to me—and I give this as advice to the upper basin people—that there has been a bad faith by the Colorado River Board people throughout this whole business. They came in here—at least two of you gentlemen were on the committee at that time—and the whole thought and idea was given and was thrown out here—and I am preparing a memorandum on it at the present time—that if the central Arizona project would be rejected, they could just go over to the court

and there would be a prompt determination, and it could be done speedily. Yet, when we got around to filing a lawsuit, and we have been in it 2½ years, and despite what the gentleman has just said the lawsuit has been dragged out. It has become a morass, a jungle. They are trying to draw you people into it to create complex issues rather than make it a clean-cut lawsuit, and I say it is bad faith. And I say to you, if you are going to be sucked into it, that it will last 6 or 8 years, and if you have got to wait for your project until then, why, you may never get it.

That is the history of the litigation.

When these people come in here and say that the answer to this thing is a lawsuit, if our experience is worth anything to you on it, why, you will get nothing out of the lawsuit except delay.

Now I yield to Mr. Hosmer.

Mr. HOSMER. A point of personal privilege, Mr. Chairman.

Mr. ASPINALL. The gentleman will state it.

Mr. HOSMER. The statement and allegation of bad faith to my State and its official body is an implication of bad faith on the part of myself, and I want to speak to it at this point under my personal privilege.

Mr. ASPINALL. You have that privilege.

Mr. HOSMER. When it is alleged in a committee of Congress that there is bad faith on the part of the State who is simply going into court after they have been sued by another State, then justice has fallen to pieces in the United States of America. If there is any implication by the gentleman from Arizona's remarks that going into court in defense of your own rights when you are sued by somebody, and using competent, able attorneys, fighting as hard as they know how to fight, then, gentlemen, the revolution has come.

(Mr. Hosmer subsequently submitted the following statement:)

Actually, the facts are these:

Arizona filed its motion for leave to file its bill of complaint (and the bill of complaint) in August 1952. (The Court rules, in an original action, require the complainant to obtain the Court's permission to file its complaint.) The Court, upon convening in October, issued a rule to the California defendants to show cause why the bill of complaint should not be accepted for filing. In their return to the rule to show cause, filed in December 1952, the California defendants offered no objection to Arizona's motion for leave to file a bill of complaint and, in fact, stated: "Defendants desire that the * * * action proceed to an effective judgment on the merits."

On January 19, 1953, the Court ordered the bill of complaint officially filed. California filed answer on May 19. On August 28 Arizona filed a reply.

On December 31, 1952, the United States of America filed a motion to intervene, which was granted on January 19, 1953. But not until the following December, a year later, did the United States actually file its petition in intervention, a year later, did the United States actually file its petition in intervention, which was answered by Arizona in February of 1954 and by the California defendants in April of that year.

Meanwhile, the State of Nevada, in December 1953, filed a motion to intervene and a petition of intervention. The Court granted this motion on June 1, 1954.

On May 13, 1954, the United States filed a memorandum with the Court requesting a pretrial conference. That same month the California defendants filed a memorandum in reply, suggesting the appointment of a special master to expedite the trial of the case. By order entered June 1, 1954, the Court appointed a special master.

On July 15, 1954, California filed its motion to join as necessary parties the States of Colorado, New Mexico, Utah, and Wyoming. These States filed briefs in objection on December 28, 1954. The Court subsequently referred

the motion to the special master and the parties will be heard on this question in Phoenix, Ariz., on April 12.

I submit, Mr. Chairman, that the foregoing chronology certainly does not show that California has been dragging its feet in connection with this lawsuit. It must be remembered that Arizona initiated it, that she knew at the time she filed it that the lawsuit could not proceed unless the United States intervened, and that it was probably inevitable that the development of the issues would make it necessary for all of the States of the basin to be parties to the action. This situation developed beyond question following the claims advanced by the United States, in the opinion of the California defendants.

Our people are entitled as defendants to have every possible protection afforded them by our attorneys in this lawsuit. I can see no reason why we should have to submit to another suit sometime in the future when all of the problems can be resolved in an action already before the Court, nor do I see any basis whatsoever from the record of this case for the charge that California is acting in bad faith.

Mr. DAWSON. Will the gentleman yield to me?

Mr. ASPINALL. Let us go in order.

Mr. DAWSON. The gentleman yielded to me.

Mr. TILLMAN. May I treat that statement as a question and very briefly answer?

Mr. UDALL. I yielded. I have the time.

Mr. ASPINALL. You used your time.

Mr. DAWSON. The gentleman from California yielded to me before he finished.

Mr. ASPINALL. All right.

Mr. DAWSON. I just wanted to ask the gentleman how much of a struggle it took to drag California into this lawsuit with Arizona?

Mr. TILLMAN. May I answer that?

Mr. ASPINALL. No, you are not before the committee at this time.

Mr. TILLMAN. I thought the question——

Mr. HOSMER. I yield to the gentleman from Pennsylvania.

Mr. SAYLOR. I would like to make an observation to the gentleman on my left from the great State of Arizona. I sat here in this room and listened for several years to representatives from his State say that it was absolutely impossible to get into the Supreme Court. Now if the State of Arizona would have had lawyers at that time that were cognizant of how to get into the Supreme Court with a justiciable issue, you would have been there 2 or 3 years before, as far as my own personal knowledge is concerned, and the case would have probably been decided.

Mr. UDALL. Will you yield?

Mr. RHODES. Will you yield to me?

Mr. HOSMER. Are you talking to me?

Mr. RHODES. Yes, you have the floor.

Mr. HOSMER. I yield to the gentleman from Arizona.

Mr. RHODES. I would like to address myself to the remarks of the gentleman from Pennsylvania.

As I understand, the State of Arizona tried from time to time to get into the Supreme Court and was denied access to the Supreme Court because of the lack of justiciable issue. That issue did not arise until such time as California actually diverted more water from the main stream of the Colorado River than she was allowed to divert under her self-limitation act; that that issue arose—I do not know the year—shortly before the actual time the suit was filed. That was my understanding and I give it to the committee as an understanding.

Mr. ASPINALL. The gentleman from Arizona. Mr. Hosmer is through?

Mr. HOSMER. I yielded.

Mr. ASPINALL. Do you not think that when you have yielded four times on a point of personal privilege you have used your rights under personal privilege? I was trying to get you the time.

Mr. UDALL. I yield back.

Mr. ASPINALL. Now the Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Chairman, I think the gentleman from Arizona, Mr. Rhodes, may cover a good deal of what I want to question about, and therefore I will yield to him first and hope it may save some time.

Mr. RHODES. The gentleman from California is too kind, and I at this time decline to be deferred to. It is not that I am afraid of my friend bearing gifts, but at the same time I think that you can probably see that value, perhaps, of closing this argument. I also see the same value. So if the gentleman desires time, I think he should take it.

(Discussion off the record.)

Mr. ASPINALL. The gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Ely, there was under discussion this morning when you were questioned the document of the Colorado River Board, I believe, was it not?

Mr. ELY. Yes.

Mr. HOSMER. And numerous extracts from that document were read to you and quoted and your opinions were asked relating to the same. Are you familiar with the document as a whole?

Mr. ELY. Yes, in general.

Mr. HOSMER. Will you state what is the burden of that document?

Mr. ELY. The letter of February 15, 1954, about which I was being questioned, is a comment of the State of California upon the project plan, as amended and resubmitted in 1953 by the Department of the Interior, and it is one that calls attention to a number of the points that we have endeavored to make in our testimony here.

I do not think it is useful to take the time to try to read in very much of it. I wish it were all available in the record. I agree with you it should be.

Since it has not been placed in the record in its entirety, there are portions of it that I would hope the committee would give attention to, and if you wish, I will read those. If not, we will pass them by.

Mr. HOSMER. Then let me just ask you this question: Is it a document which endorses the proposed upper Colorado Basin storage project?

Mr. ELY. No; emphatically the contrary, Mr. Hosmer.

Mr. HOSMER. I want to direct your attention to the Colorado River compact, with which of course you are familiar. Does that document purport to make a physical division of the waters of the Colorado River system?

Mr. ELY. No, sir.

Mr. HOSMER. What does it purport to divide?

Mr. ELY. It makes an apportionment of the consumptive uses, not of the flow or the water of the stream.

Mr. ASPINALL. Will my colleague yield for a question?

Mr. HOSMER. Yes.

Mr. ASPINALL. As I understand, Mr. Ely, you mean an equitable proportionment?

Mr. ELY. No. His question related as to whether it divides the water of the stream, and my answer was it does not, that it apportions the uses of the water. It is not a division of the flow of the stream but of the right to use.

Mr. ASPINALL. You do not wish to suggest that it apportions equitable uses?

Mr. ELY. I thought Mr. Hosmer's question related to whether it apportions water or use of the water, and I was applying the latter.

Mr. HOSMER. I think article I states it is an attempt to make an equitable distribution of the use of the waters in the system.

Mr. ELY. Article I provides that the major purposes of this compact are:

> To provide for the equitable division and apportionment of the use of the waters of the Colorado River system; to establish the relative importance of difference beneficial uses; to promote interstate comity; to remove causes of present and future controversies and secure the expeditious agricultural and industrial development of the Basin; to secure the storage of its waters and the protection of life and property from floods.

Mr. HOSMER. But it did make some sort of a distribution, and whether or not that is equitable, the distribution still exists. Is that right?

Mr. ELY. That is correct.

Mr. HOSMER. Now in the document is there any allocation or distribution of the use of water for anything other than beneficial consumptive uses for irrigation and domestic purposes?

Mr. ELY. Article IV (b) provides that—

> Subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

Mr. HOSMER. Is there any other provision in the article which allocates that use as between basins or as between States and basins?

Mr. ELY. Article IV.

Mr. HOSMER. Use for power?

Mr. ELY. No, sir.

Mr. HOSMER. In other words, the document does not contain an allocation of use of water for power?

Mr. ELY. No, sir.

Mr. HOSMER. The only reference, then, to power is that it makes its use subservient to agricultural and domestic uses?

Mr. ELY. Yes, sir.

Mr. HOSMER. Then, as pertains to these contracts about which Mr. Dawson was asking questions, the power contracts, and their provisions with respect to observing the compact terms, those apply to agricultural and domestic uses and not to power uses?

Mr. ELY. That is correct, sir. We say that there is no right to withhold water, required for the generation of power at Hoover Dam in discharge of the Government's power contracts there, for the accumulation of water in Glen Canyon Dam for the generation of power there.

Mr. HOSMER. So when it comes to a matter of whether water is going to be used in the upper basin or the lower basin for power uses, separate

and apart and distinct from domestic and agricultural uses, the compact is silent except only that they shall not interfere with domestic and agricultural uses?

Mr. ELY. Yes, but may I defer to Mr. Tillman for a more complete answer?

Mr. HOSMER. Yes.

Mr. TILLMAN. One point that occurred to me might be interesting in answer to that—before the compact was approved the Congressman from Arizona was very much concerned upon that very matter.

Mr. HOSMER. Mr. Hayden?

Mr. TILLMAN. Now Senator Hayden. He propounded the question to Herbert Hoover. He was much interested in the result to Arizona of Black Canyon or Boulder Canyon. Arizona felt they had a tremendous asset. So the question was asked, and it was question 20 of the series propounded by Congressman Hayden:

> Will this subordination of the development of hydroelectric power to domestic and agricultural uses, combined with the apportionment of 7,500,000 acre-feet of water to the upper basin, utterly destroy an asset of the State of Arizona consisting of 3 million horsepower, which it is said could otherwise be developed within that State if the Colorado River continues to flow, undiminished in volume, across its northern boundary line and through the Grand Canyon?

The answer is, of course, available to all of you in full, but the most peremptory part was explicit:

> The compact provides that no water is to be withheld above that cannot be used for purposes of agriculture. The lower basin will therefore receive the entire flow of the river, less only the amount consumptively used in the upper States for agricultural purposes.

That was the assurance given to Arizona which at that time was more interested in the power potential at Boulder than was California.

Mr. HOSMER. Let me ask you this question then: What, if any, uses for agricultural purposes are going to be made of the water stored at proposed Glen Canyon or proposed Echo Park Dam?

Mr. ELY. The only use that can be made for agricultural purposes of the waters stored at Glen Canyon Dam will be in the lower basin.

Mr. HOSMER. Not in the upper basin?

Mr. ELY. That is correct. It is not upper-basin water in any sense. The compact apportions the use of the water, not the corpus of the water. The water which they do not use, they have no title to, flows on into Glen Cayon Dam, is impounded there, and can be used for agricultural and domestic uses physically only in the lower basin and in Mexico.

Mr. ASPINALL. Will the gentleman yield at that point?

Mr. HOSMER. Yes.

Mr. ASPINALL. I want to be made clear on this particular subject. Is it your contention, Mr. Ely, that water that might be caught above Lee Ferry, even though it was in excess of the amount of water that must be delivered at Lee Ferry under the compact, has forever escaped from any right of use of the upper basin?

Mr. ELY. Physically it cannot be used for agricultural or municipal purposes. It has escaped any possibility of consumptive use in the upper basin.

Mr. ASPINALL. You did not answer my question, exactly, because I have in mind, of course, the right of the upper basin then to deliver that water in accordance with the terms of the compact at Lee Ferry,

and to use in exchange for its right to the use of that water which has physically gone beyond its ability to use it, other water which would be in the upper reaches of the Colorado River Basin. Now is it your contention that it is impossible and an unwarranted use of the water by the upper basin?

Mr. ELY. No, but that it is limited by the provisions of the compact which require that water not required for agricultural use in the upper basin shall not be withheld there. I am speaking now of article III (e) of the compact. In our view you may not withhold Glen Canyon water for power generation, or water which you desire to accumulate to enable you in some future years to make good under the III (d) guaranty, which is, in fact, required for agricultural and domestic use in the lower basin, even though such uses constitute the use of excess or surplus.

Mr. ASPINALL. But in assuming that position, what you do, in effect, is to deny to the upper basin the opportunity to make use of its equitable apportionment of the water to which it is entitled under the compact. Is that not right?

Mr. ELY. No; we think not, Mr. Aspinall. The physical uses in the upper basin will always be occasioned by storage and diversion dams many hundreds of miles above Glen Canyon. We do not deny your right to build such storage dams, nor the works to use them, up to the extent of 7½ million acre-feet of consumptive use in any one year. But if you do not use the water and it flows downstream to Glen Canyon, we deny your right to withhold it there for power generation if we need it for agricultural and domestic use in the lower basin. Under article III (e) that is what is said.

Mr. ASPINALL. We come right back to the place where anybody in the conference on the Colorado River compact would have known that under that condition the upper basin would never have had the right to the use of 7½ million acre-feet of water which was allocated to it.

Mr. ELY. No; I do not think our position reaches that extreme result.

Mr. HOSMER. I will decline to yield further because I believe I have a question here that may bring that out.

Mr. METCALF. Will you yield to me for a question?

Mr. HOSMER. After I get through here.

The distinguished chairman of the subcommittee used this expression, "water above which must be delivered by the compact." I am interested in that because I have heard in the committee from time to time that apparently some people believe that the only water above what must be delivered by the compact, or all the water above 7½ million acre-feet over a 10-year annual average is in that category.

Now I direct your attention to that section 3 (d) of the compact, also to section 3 (b) of the compact, also to section 3 (c) of the compact, which has to do with the Mexican burden, and also to section 4 (a), I believe it is, of the Project Act, again dealing with surplus waters, and ask you to discuss that with particular emphasis on the Mexican Water Treaty.

Mr. ELY. Yes, sir.

Mr. HOSMER. In other words, I am seeking to find out what they are entitled to hold up, up in the upper basin.

Mr. ELY. We think that that upper basin is entitled, first, to make beneficial consumptive use of up to 7½ million acre-feet in any one year. That is the starting point under article III (a).

We think that the lower basin is entitled to demand the release from the upper, under article III (e), of all water not required for beneficial consumptive use in the upper basin.

We qualify that to the extent that when, as, and if the upper basin is developed to the point where holdover storage is in fact required under article III (d) to enable compliance with the mandate of III (d) that the States of the upper division shall not deplete the flow of the stream below 75 million acre-feet in any 10-year period, that there should be a reasonable right to such storage. That affects the rate at which water can be accumulated in Glen Canyon Reservoir. We say there is no right to accumulate water in that reservoir for power generation or for the future 50 to 75 years hence at which time such accumulation may be required for compliance with article III (d); that insofar as the rights of the lower basin are concerned, they have a right to the beneficial consumptive use of 7½ million acre-feet of the waters apportioned by article III (a), which includes, in our view, the waters of tributaries; that there is a right to increase our use by 1 million acre-feet from the waters of both the main stream and the tributaries; and that, moreover, the Boulder Canyon Project Act, in offering to California the Limitation Act, and in our acceptance of it, established in California the right to the beneficial consumptive use, not only of 4,400,000 acre-feet per annum of the waters apportioned by article III (a), but also up to one-half of the excess or surplus waters unapportioned by the compact.

Also that our contracts with the United States fixing a figure of 5,362,000 acre-feet are in accord with that and spell out our rights to excess or surplus waters to the extent of a million acre-feet.

Mr. RHODES. May I ask a question?

Mr. HOSMER. Wait a minute.

Mr. ELY. In addition to that, Mr. Hosmer asked the relation to the Mexican Water Treaty.

The treaty's obligation is with respect to the United States as a whole, and therefore, the basin as a whole, and is the law of the land. It is a guarantee of 1,500,000 acre-feet per annum measured at the boundary. That requires a great deal more water at Lee Ferry, perhaps 2 million acre-feet. But that water, under the provisions of the compact, is to be supplied, first, out of waters which are surplus to those specified in articles 3 (a) and 3 (b). Consequently, the combined effect of the right recognized in California by the project act to one-half of the excess or surplus and the right of Mexico to at least 1,500,000 acre-feet, constitute appropriations in a general sense of excess or surplus waters to that extent.

There are, in addition, probably rights in Arizona to some waters which are in that category. Arizona asserts that the waters I am speaking of are within the protection of article 3 (a). We think some of Arizona's claims on the main stream fall against excess or surplus.

But, in any event, the rights of the lower basin to excess or surplus waters are rights which are good as against any accumulation of storage in Glen Canyon for power generation.

Mr. HOSMER. Certainly it cannot be said, just as long as 7½ million acre-feet on an annual average flow by Lee Ferry, that the upper basin States are entitled to withhold all over and above that upstream for any purpose they wish?

Mr. ELY. You are exactly correct. The commitments which the United States Government has made in the lower basin aggregate about 10 million acre-feet per year. The Department of Justice in the pending Supreme Court action alleges that all of those are binding covenants. Consequently, whatever the rights may be, basin against basin, we say that all of the contractors in the lower basin have the right as good against the United States against the infringement of their contracts by the United States arbitrarily and of its own volition withholding water from the lower basin and storing it at Glen Canyon.

Mr. HOSMER. Mr. Ely, there has been considerable conversation about your compensation or your legal efforts on behalf of the State of California, and I would just like to say, sir, that you and the able staff of attorneys you have, and the work you have done on this thing, indicates that whatever you are getting, you have earned every single cent of it, and that the State is fortunate to have you as their counsel.

Mr. ELY. Thank you, sir.

Mr. METCALF. Will the gentleman yield to me?

Mr. HOSMER. With that preface and tribute to your legal skill and ability, I would like to have you tell me if the provision of article 4 (b) in the compact, which in its terms states that the one basin shall not withhold or the other basin require water for power purposes—if you feel that the statement that the lower basin shall not require implies an authorization and authority on the part of the upper basin to withhold.

Mr. ELY. Not for power generation, no, sir.

Mr. HOSMER. And any interpretation to the contrary as to the meaning of that clause, in your opinion, would be completely erroneous?

Mr. ELY. Absolutely. Neither the upper division States nor the United States, in our view, has any right under the compact to withhold water at Glen Canyon for power generation required for consumptive use in the lower basin, and that such retention, to the extent that it disabled the United States from the performance of its power contracts in the lower basin, would be in violation of those contracts. That is the question which is somewhat apart from the compact question.

Mr. HOSMER. Now, Mr. Ely, the distinguished gentleman from Montana has directed certain questions to you with respect to a fund, I believe, that was set up by the Boulder Canyon Project Act.

Mr. ELY. Boulder Canyon Project Adjustment Act.

Mr. HOSMER. Is that the fund which was blackjacked out of the lower basin as a tribute after the upper basin's 10 years of obstruction to lower basin development?

Mr. DAWSON. Now——

Mr. ELY. I have heard it so described.

Mr. DAWSON. Mr. Chairman? Who is presiding?

The CHAIRMAN. I am presiding. Does the gentleman yield?

Mr. HOSMER. I decline to yield.

The CHAIRMAN. The gentleman declines to yield.

Mr. ELY. I answered it that I have heard it so described.

Mr. HOSMER. Now, I will yield to the distinguished gentleman from California.

The CHAIRMAN. I am not asking you to yield. I am presiding.

Mr. HOSMER. I will yield to the gentleman from Montana. He asked me to yield before.

Mr. DAWSON. I do not think he answered your question.

Mr. ELY. I have heard it so described.

The CHAIRMAN. The committee will be in order. Does the gentleman from California yield to the gentleman from Montana?

Mr. HOSMER. Yes, sir.

Mr. METCALF. Mr. Chairman, I am afraid I will object to the use of the word "blackjack" even though the gentleman has already answered the question and said he heard it so described. I was trying to find out the source of the report that Mr. Larson had made, and it was a part, was it not, of an agreement that you would make this payment of a half million dollars?

Mr. ELY. The money came out of the pockets of our power consumers in rates.

Mr. METCALF. And it was a part and parcel of the whole negotiation for the compact?

Mr. ELY. No.

Mr. METCALF. The limitation act.

Mr. ELY. No, sir. This provision appeared in the Boulder Canyon Project Adjustment Act of 1940. It came long after the compact, long after the Boulder Canyon Project Act. It resulted from a persuasiveness of the gentleman to your right, then the attorney general of Colorado, and others of the upper division States.

Mr. METCALF. He was the attorney general at that time?

Mr. ELY. Yes, sir, and Mr. Rogers was a very able one.

Mr. ROGERS of Colorado. Will the gentleman yield so I can ask a question?

Mr. HOSMER. I will be glad to yield.

Mr. ROGERS of Colorado. Mr. Ely, if you prefer, the approach was made by the State of California to the upper basin States, and through a period of years, 1936, 1937, 1938, 1939 and 1940, we met those in the upper basin States with all of you people from the California-Colorado River Commission; did we not?

Mr. ELY. I am delighted to reminisce with my old friend, the former attorney general of Colorado, and what happened was this:

Before the power was ever begun to be generated at Hoover Dam, the Bonneville Administration had been built to distribute power on an entirely different rate base, which pulled the rug out from under the Boulder rate.

We sought reduction in the interest rate from 4 percent to 3 percent and some other concessions. The upper division States were in a position to say no to that, and they did say no, unless there were provided for those States $1 million per year. Having been presented with such an ultimatum at a conference, we moved to adjourn, and a new conference was held the next day, at which the price was reduced to $500,000 per year, and we accepted and the legislation went through.

Mr. ROGERS of Colorado. At that time did not the group from southern California agree that this money would be used in making the survey and when the report was received from the Bureau of Reclamation, that you of southern California would cooperate with us in development of the water in the upper Colorado River?

Mr. ELY. Not quite. We put up the money.

Mr. ROGERS of Colorado. Now, we had some kind of agreement on that along that line, did we not, Northcutt?

Mr. ELY. No.

Mr. ROGERS of Colorado. Was not that the object and purpose of inducing us to back the amendment of the Boulder Canyon Project Act and you would get the reduction?

Now, would you tell the committee that the reduction in power rates less what you paid for the water constituted between 5 and 6 million dollars a year? Is that right?

Mr. ELY. I am a little hazy after these years have gone by. But my recollection is a reduction of about 40 percent altogether in the total rate. What that is in dollars per year, I would have to have my memory refreshed.

Mr. ROGERS of Colorado. If my memory serves me correctly, it was in that neighborhood, if not more, and that was the thing that you wanted, and we agreed to it. You also agreed that if this fund were made available—and it was made available, and Mr. Larson has made the surveys and come up with an answer to the development—that you would help us in development of the upper basin.

Mr. ELY. Mr. Rogers, the statute on its face says the money shall be used for the development of plans.

Mr. ROGERS of Colorado. Oh, sure.

Mr. ELY. Including the quantity of water and the quality of water. We are still waiting for the quality report and 15 years have passed.

Mr. ROGERS of Colorado. Let me ask this one question: Was anything ever said about quality of water at any of the conferences we had?

Mr. ELY. That is right, sir; it is right on the fact of the statute that the report shall include that.

Mr. ROGERS of Colorado. But when we were talking the southern Californians never raised the question about the quality of water at that time, did they?

Mr. ELY. Yes, I think so; otherwise it would not be in the statute.

Mr. ROGERS of Colorado. You never indicated you were dissatisfied with any possible use we might make of the water in the future in any of those conferences.

Mr. ELY. Yes, I do not think there is any doubt of that. It is right on the face of the statute.

Mr. ROGERS of Colorado. The statute was passed authorizing development of the upper basin, was it not?

Mr. ELY. That is correct. And furthermore, we spelled out what we thought were feasibility standards for these projects. We never dreamed of any invention like this showing up.

Mr. ROGERS of Colorado. You said you never dreamed of anything like that?

Mr. ELY. Anything like this present bill.

Mr. ROGERS of Colorado. Yes.

Mr. ELY. I can assure you we did not.

Mr. ROGERS of Colorado. Did not all of the upper basin States at that time tell you they wanted to generate electricity and use it in the development of the water in the upper basin States? Did they not tell you that?

Mr. ELY. At that time the Collbran formula and the interest component were just gleams in somebody's eyes.

Mr. ROGERS of Colorado. I know, but you knew we expected to develop. You knew the potentialities and the things we advocated at those meetings.

Mr. HOSMER. If the gentleman from Colorado does not mind, my time is just about to expire here. Has it expired or not?

Mr. ASPINALL. Your time has expired.

Mr. METCALF. Will the gentleman from California yield to me for a question to clarify?

Mr. ASPINALL. The gentleman from California does not have any time.

(Discussion off the record.)

Mr. ASPINALL. The Chair will recognize the gentleman from Arizona, Mr. Rhodes.

Mr. RHODES. Mr. Chairman. The first thing I would like to do is to establish a set of figures here which I have. This has to do with the investment of California in their works, which investments have been made as a result of the diversions from the Colorado River and the electrical works which have been built.

Mr. Simpson, I believe in your resolution of the Colorado River Board you state that there is some $700 million in this item, and Mr. Ely in his statement, on page 6, says there is $500 million. I recall Mr. Matthew said in his oral statement there was somewhere near three-quarters of a billion or more. Is it possible to get you gentlemen together and get a good figure as to just how much these investments amount to?

Mr. ELY. Yes, sir. I tried hard to put in the record yesterday exactly that information. I was restricted to a summary and rather chided for reading that. The figures are six pages long, with footnotes, and I would be delighted to have the opportunity to offer now for the record this tabulation.

Mr. RHODES. I believe you offered a summary and read into the record that summary the other day. What is the correct figure?

Mr. ELY. As I told you at that time, Mr. Rhodes, to understand these figures requires there be reference to the notes, which was not permitted me to do. I will give them to you, if you like.

The grand total of the investments and commitments of California agencies, including water and power, as I refer to, is $799 million. However, that is broken down as follows:.

Coachella Valley County Water District, $27,094,855; Imperial Irrigation District, $54,462,000; Metropolitan Water District of Southern California, three items: First is construction cost as of June 30, 1953, $254,235,589; second is estimated near future investments, 1953 to 1957, some of which are now underway, $67 million; third, required for "Ultimate Aqueduct," $134 million.

Excluding the latter figure, the total is of the general magnitude of $300 million.

Palo Verde Irrigation District, $5,854,180; San Diego County Water Authority, $19,570,000; Yuma project in California, $919,452.

The Los Angeles Department of Water and Power:

1. Water service connections to metropolitan water district, 2, Eagle Rock Reservoir, and, 3, Eagle Rock-Hollywood conduit, $8,833,480.

The total for all the expenditures and obligations for water facilities detailed above, $571,733,967, rounded to $572 million.

Mr. RHODES. That is the figure you had reference to on page 6 where you said it was more than $500 million?

Mr. ELY. No. We included in my testimony also a reference to a portion of the commitment with respect to power. I arrived at the

more conservative figure by omitting all reference to the feature investments of the metropolitan water district.

Mr. RHODES. This is money, then, that has actually been spent?

Mr. ELY. Either spent or firmly committed by agencies of California to date, aside from investments related to power.

Mr. RHODES. I presume the rest of the $799 million was spent for power?

Mr. ELY. Yes, $227 million invested or committed for power. I will give you the breakdown of that.

Mr. RHODES. I think you did the other day, did you not, Mr. Ely?

Mr. ELY. I do not believe so.

Hoover Dam and powerplant, $166,049,941.

California Electric Power Co., Hoover-San Bernardino circuit, $1,008,636.

California Pacific Utilities Co., Hoover-Needles circuit, $185,651.

Los Angeles Department of Water and Power, Hoover-Los Angeles circuits. Nos. 1, 2 and 3, $28,653,204; substations and miscellaneous, $3,438,567; subtotal, $32,091,861.

Imperial Irrigation District——

Mr. RHODES. Do you have much more? Do you want to submit it for the record?

Mr. ELY. May I put this whole business in the record?

Mr. RHODES. As far as I am concerned you can. The objection came from somebody else the other day, it did not come from me.

Mr. ELY. It would facilitate matters if I were permitted to do that.

Mr. RHODES. How much longer is it?

Mr. ELY. Two more pages, plus footnotes.

Mr. ASPINALL. Does the gentleman from Arizona make the request?

Mr. RHODES. I will ask unanimous consent that it be put in the record.

Mr. ASPINALL. Is there any objection?

Mr. DAWSON. What is that?

Mr. RHODES. Investments of various California Water Districts, Power Districts, in works built because of Colorado River water. I have asked questions about it and I think the whole thing should be in the record.

Mr. DAWSON. I think we have some of it in.

Mr. RHODES. A summary. This is the whole thing.

Mr. DAWSON. It is all in their statements. I objected to it before.

Mr. ASPINALL. Does the gentleman from Utah wish to renew his objection?

Mr. DAWSON. Yes.

Mr. ELY. Then may I complete my answer to Mr. Rhodes' question?

Mr. RHODES. Do not take too much time. I will give you three more minutes by my watch.

Mr. ELY. Imperial Irrigation District, $17,670,767; Southern California Edison Company, $10,100,000; total expenditures and obligations for power facilities of $227,106,856, for a grand total of $799,000,000, rounded.

There are footnotes that explain some of these items. I am quite sure that some of them will be attacked or questioned, and I would much prefer to have the explanations go into the record. That has not been permitted.

Mr. RHODES. I believe the explanation is in the file, is it not?

Mr. ELY. That is correct.

Mr. RHODES. I hope I do not get into such a long answer on this next one, but I have one more figure that I would like to compare.

Mr. Simpson says in the resolution of the Colorado River Board that the population of the area which is benefited by these works is 4 million; Mr. Ely says 5 million and maybe a little over; and Mr. Matthew says about 6 million. Is there any way to resolve that difference?

Mr. ELY. I think the difference relates primarily to the area considered involved. The total population of the——

Mr. RHODES. When you arrived at your figure, what area did you include, roughly?

Mr. ELY. I arrived at my figure by taking the pleadings in the lawsuit. Subsequent to that time the Metropolitan Water District has annexed additional territory, and I think the figure of 6 million which other witnesses have used is more nearly accurate than mine.

Mr. RHODES. In other words, the population of those areas that are covered by districts which are defendants in the suit of *Arizona* v. *California*?

Mr. ELY. Yes.

Mr. HOSMER. Will the gentleman yield?

Mr. RHODES. Yes.

Mr. HOSMER. And that population increases a great deal every day. I think it is a thousand a week; is it not?

Mr. ELY. It is growing.

Mr. RHODES. I might say to the gentleman from California, maybe there are more people going into his State, but there is a bigger percentage going into mine.

Mr. SAYLOR. Will the gentleman yield for another off the record observation?

Mr. RHODES. Certainly.

(Discussion off the record.)

Mr. RHODES. Back on the record. I would like to get into this surplus situation just a little bit more, Mr. Ely.

As I understand your position regarding the upper basin facilities to store water, they really cannot store any water at all. Is not that roughly your position?

Mr. ELY. No, sir. They may not store water in excess—we will put it this way around: They may store the water that is available in excess of the requirements of the lower basin for agricultural and domestic uses and of the power contracts the Government has made in the lower basin.

Mr. ROGERS of Colorado. Will you yield for a question?

Mr. ELY. Those aggregate, including the Mexican Water Treaty, approximately 10 million acre-feet per year. Excuse me. Mr. Tillman corrects me. Firm power requires a somewhat higher figure than 10 million.

Mr. RHODES. To generate the firm power required by the contracts at Hoover Dam?

Mr. ELY. The firm and secondary. I will ask Mr. Tillman to give the figures.

Mr. TILLMAN. Approximately 12 million.

Mr. RHODES. For firm and secondary?

Mr. TILLMAN. For firm and estimated secondary of 800 million a year.

Mr. RHODES. How much water will it take to produce the firm power?

Mr. TILLMAN. Approximately 10 million.

Mr. RHODES. Approximately 10 million?

Mr. TILLMAN. Yes.

Mr. RHODES. That figure has nothing to do with your estimate as to the requirements in the lower basin, does it?

Mr. ELY. For consumptive use, no, sir. The 10 million figure I gave relates to the aggregate of the water contracts in Arizona, California, and Nevada and the Mexican Water Treaty.

Mr. RHODES. So I would like to ask Mr. Matthew, if I may, how long under the definitions which have just been given in the criteria laid down by Mr. Ely, would it take to fill the Glen Canyon and Echo Park Reservoirs. Have you figured that out?

Mr. MATTHEW. No, sir, I have not figured it out exactly on that basis. Of course, it would depend upon the available stream flow and the filling of the upper basin reservoirs at any time, when and if they are built, would depend largely on the occurrence of above normal runoff. In other words, large years of runoff.

Mr. RHODES. Going back to the matter of surplus, Mr. Ely, you have stated many times that, according to the California Self-Limitation Act, the State of California is entitled to 4,400,000 acre-feet of water plus one-half of the unapportioned surplus?

Mr. ELY. Yes.

Mr. RHODES. You did not say you meant the unapportioned surplus allocated to the lower basin.

Mr. ELY. No, sir.

Mr. RHODES. Did you mean that?

Mr. ELY. No, sir.

Mr. RHODES. In other words, even though the compact says that the States of the lower basin are all entitled to one-half of the unapportioned surplus, it is your opinion that the State of California gets all of the surplus which would otherwise be apportioned to the lower basin?

Mr. ELY. No, Mr. Rhodes. The compact does not say that States of the lower basins or the lower divisions shall have one-half of the surplus. It makes no provision at all with respect to allocation of surplus; that is left for future determination. The States are invited by the compact to attempt to agree after 1963 upon that. However, that is only one method of determination. If they are as far apart then as they have always been to date, I suppose that litigation will be required to divide up the surplus.

What I am talking about with respect to California's right is a right derived from the statutory compact between the Congress of the United States and the Legislature of California, evidenced by the Boulder Canyon Project Adjustment Act and the Limitation Act.

Mr. RHODES. Does the Boulder Canyon Project Act affirm the right of California to one-half of all the surplus unapportioned?

Mr. ELY. In our view, yes, sir, one-half of the excess or surplus waters unapportioned by the compact.

Mr. RHODES. I take it that is subject to some dispute at this time.

Mr. ELY. Arizona contends in their pleadings before the Court there is no present right in California or any other State to excess or surplus waters as a matter of right; that that can be acquired only after a new compact is made; and that California will then become entitled to one-half of such excess or surplus waters that is apportioned to the lower basin. We disagree with that.

Mr. RHODES. Is it your position, then, that California has already appropriated one-half of an unapportioned surplus of the river?

Mr. ELY. Yes, sir; apportioned in the dual sense of acquiring rights under State law and acquiring rights by contract with the United States under section 5 of the Boulder Canyon Project Act.

Mr. RHODES. Is it your position that Arizona has appropriated any of the surplus water of the river?

Mr. ELY. That is a question I am not prepared to give you a firm answer on. It depends in part, Mr. Rhodes, upon the determination of other issues in the present lawsuit. We think that a considerable part of the water which Arizona may put to use from the main stream is dependent upon the present availability of excess or surplus to the lower basin, including Arizona. That is to say that, from your viewpoint as well as ours, it is imperative that the lower basin establish its right to appropriate excess or surplus waters presently.

Mr. RHODES. You said in response to a question which I asked, I believe yesterday, that it was your view that part of the 3 (d) water, 75 million acre-feet in each 10 years, was surplus. Would you care to explain how you arrived at the conclusion?

Mr. ELY. Yes, sir. We say that article III (a) of the compact apportions to the lower basin the beneficial consumptive use of 7½ million acre-feet per year of the waters of the Colorado River system, and that article II (a) defines the Colorado River system in these words: "Means that portion of the Colorado River and its tributaries within the United States of America." That includes the tributaries specifically, and therefore the Gila, which is an important tributary.

Article III (a) directs that the 7,500,000 acre-feet of water therein apportioned" shall include all water necessary for the supply of any rights which may exist." Consequently, the rights upon the Gila and other lower-basin tributaries which fall within the expression "rights which may now exist" are, as well perhaps as some others, chargeable against the lower basin's right to the apportionment of 7½ million acre-feet per year. If that is true, then that 7½ million acre-feet cannot be claimed twice, once on the tributaries and again at the main stream at Lee Ferry. Accordingly, the 75 million acre-feet referred to in article III (d) is entirely independent of the apportionment made to the lower basin by article III (a). It is 75 million acre-feet of wet water. Since, on my previous hypothesis, is not all 3 (a) water, it includes water of other categories. Those are waters referred to in article III (b), the right of the lower basin to increase its use up to the extent of 1 million acre-feet as well as excess or surplus waters over and above those referred to in articles III (a) and (b).

We say that the Boulder Canyon Project Act and the California Limitation Act established in California the right to appropriate one-half of the excess or surplus, and that the phrase "excess or surplus" is inclusive of that million acre-feet referred to in article III (b).

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Mr. RHODES. I will ask you to put yourself in the position of the people who wrote this compact, and ask if you have any ideas as to how they came up with this figure of 75 million acre-feet in 10 years?

Mr. ELY. Yes. In my view they took account of the anticipated main stream uses in Arizona, California, and Nevada, and the Mexican burden.

Mr. RHODES. In other words, the 75 million acre-feet in each 10 years is the amount of water which will be taken from the main stream by all users in the lower basin; is that correct?

Mr. ELY. That is correct; but the 7½ million acre-feet per annum apportioned by article III (a) is inclusive of certain uses on the tributaries as well as those same uses on the main stream.

Mr. RHODES. So that by some mental gymnastics the people who devised this compact decided that the 75 million in 10 years would be exactly the same as 10 times 7½ million, but they did take into consideration some surplus involved?

Mr. ELY. Why there is an approximate identity, I cannot tell you, but I can give you the contemporary explanation of Governor Sloan of Arizona who was chairman of the legal committee in the drafting of the compact. His report appears in the Hoover Dam documents, House Document——

Mr. RHODES. Do you mean Governor Sloan of Arizona?

Mr. ELY. I do, sir.

Mr. RHODES. Go ahead.

Mr. ELY. He accompanied Mr. Norviel of Arizona to Santa Fe and was the chairman of the drafting committee of the compact, or chairman of the legal committee. I have heard both titles used for him.

His report appears in the Hoover Dam documents, House Document 717, 80th Congress, at page A63, and at page A69 he gives the answer to your question as follows:

> It may be of interest to know why the figures of 7,500,000 acre-feet for the upper basin and 8,500,000 acre-feet for the lower basin were reached. It grew out of the proposition made by the upper basin that there should be a 50–50 division of rights to the use of the water of the river between the upper and lower basins which should include the flow of the Gila, and the insistence of Mr. Norviel, commissioner from Arizona, that no 50–50 basis of division would be equitable unless the measurement should be at Lee's Ferry. As a compromise the known requirements of the two basins were to be taken as the basis of allotment with a definite quantity added as a margin of safety. The known requirements of the upper basin being placed at 6,500,000 acre-feet, a million acre-feet of margin gave the upper basin an allotment of 7,500,000 acre-feet. The known future requirements of the lower basin from the Colorado River proper were estimated at 5,100,000 acre-feet. This, when the total possible consumptive use of 2,350,000 acre-feet from the Gila and its tributaries are added, gives a total of 7,450,000 acre-feet. In addition to this, upon the insistence of Mr. Norviel, 1,000,000 acre-feet were added as a margin of safety, bringing the total allotment for the lower basin up to 8,500,000 acre-feet.

Mr. RHODES. That being true, Mr. Ely, why is it not your position that the upper basin must deliver 8,500,000 acre-feet at Lee Ferry per annum?

Mr. ELY. No; their guaranty is 75 million every 10 years. They are entitled to use themselves up to 7½ million acre-feet in any year and the balance must come downstream. It may be more or less than 7½, more or less than 8½, more or less than 10. It does not matter. But in the course of 10 years it must aggregate 75 million. It has no

relation whatever to the 7½ million apportionment which includes the Gila.

Mr. RHODES. So the 3 (b) water has to originate in the lower basin?

Mr. ELY. It may be taken either from the tributaries or the waters of the main stream. There is a specific answer of Mr. Hoover to then Congressman Hayden upon that point also.

Mr. RHODES. Before the Senate Interior Committee, Mr. Ely, I recall that you made the statement that if the upper basin started using surplus water they would then be in competition with the State of California, at war with the lower basin. I think I quote you correctly. If not, correct me.

Mr. ELY. You are substantially correct.

Mr. RHODES. Would you explain that statement?

Mr. ELY. Yes, sir. We say that, to the extent that the upper basin uses in excess of 7½ million acre-feet in any one year—not on an average but in any one year—it is using waters which are not apportioned to the upper basin but which are excess or surplus; and that its right to do so is a right based upon appropriation and competition with the appropriations of excess or surplus in the lower basin and in competition with the dedication of a portion of surplus to Mexico.

We say that the rights established in the lower basin to excess or surplus are inclusive of approximately 1 million acre-feet—California I am referring to—and a million and a half and upward for Mexico, and probably some rights in Arizona.

Mr. RHODES. So that it is your position, apparently, that all of the surplus water of the river has been appropriated in the lower basin?

Mr. ELY. There may be more. There may be more in certain years.

Mr. RHODES. But in most years, the average year, there would be no surplus available for use in the upper basin?

Mr. ELY. I would not give you a categorical answer to that, but certainly we feel that the lower basin appropriations have priorities against the upper basin.

Mr. RHODES. We have been kicking another figure around, and that is 4,300,000 acre-feet which, I believe, according to the testimony of some of your witnesses is that amount of water which could be safely diverted or put to beneficial consumptive use by the upper basin without harming the quality of water to go to the lower basin below a safe point.

Would it be your position that if more water than that is beneficially used in the upper basin the upper basin would then be violating the rights of the lower basin?

Mr. ELY. I think perhaps we are at cross purposes somewhat here, Mr. Rhodes.

Mr. RHODES. May I rephrase my question. The point is this: I am getting to the quality of water.

Mr. ELY. The quality of water.

Mr. RHODES. And, as I recall, 4,300,000 was that figure which could be used in the upper basin without putting peril point on the quality of water which goes to the lower basin. So if that is the situation, then in your opinion can the upper basin ever use more than 4,300,000 acre-feet of water from the Colorado River?

Mr. ELY. The figure 4,300,000 acre-feet bears no relation to the quality of water question. We are concerned by large transmountain diversions. The transmountain diversion of pure water at high elevations

concerns us with respect to our rights under article VIII of the Colorado River compact; that is, that our present perfected rights shall not be impaired.

What we tried to say with respect to the 4,300,000 acre-feet is that is a physical quantity which can be used without the necessity for hold-over storage.

Mr. DAWSON. Will the gentleman yield?

Mr. RHODES. So that has nothing to do with the amount which can be eventually put to beneficial consumptive use in the upper basin. It is still your understanding and your belief that 7½ million acre-feet can be beneficially used in the upper basin without violating the rights of the lower basin?

Mr. ELY. Up to that in any one year, subject to the qualification that we want an adequate study of effect of transmountain diversions.

We think that the use of 7,500,000 acre-feet in any one year within the upper basin will have a quite different effect upon the quality of water upon which our presently perfected rights are dependent as compared to the use by the upper basin of 7,500,000 in large part in transmountain diversion. We prefer it to be used in basin. That, however, is the quantitative figure that remains to be determined by adequate studies which we thought were to be made under the Boulder Canyon Adjustment Act from 1940 on, and they have not yet been made.

Mr. RHODES. So there is a qualification on your previous statement that 7½ million acre-feet may be beneficially consumed in the upper basin?

Mr. ELY. Yes. At the time the compact was negotiated the figure commonly given to us was that the upper basin transmountain diversions would probably not exceed 500,000 acre-feet, and the target now is 2 to 3 million.

Mr. RHODES. I have one more question, and then I am going to stop, Mr. Chairman.

You have previously mentioned, not in your prepared statement, but I believe in response to a question, that the lower basin, the State of California particularly, has contracts with the United States of America for delivery of water which would be impaired in the event that Glen Canyon or Echo Park might be constructed. Is it your thought that if this committee and this Congress should pass this bill and should go ahead and construct these works, or attempt to do so, that you, as the counsel for the State of California, should attempt to enjoin the Secretary of the Interior from so proceeding?

Mr. HOSMER. A point of order, Mr. Chairman. That question violates the professional privilege of Mr. Ely as an attorney at law in his relationship with his client, the State of California and/or its agencies.

Mr. ASPINALL. Will the reporter read the question?

(The record was read by the reporter.)

Mr. RHODES. I would like to be heard on the point of order.

Mr. ELY. To save time, my answer is "I don't know." [Laughter.]

Mr. ASPINALL. The Chair would overrule the point of order because the gentleman from California brought it up a few days ago, and I think Mr. Ely can answer without having his professional integrity put in issue.

Mr. ELY. My answer is, "I do not know."

Mr. RHODES. You would not rule out any possibility?

Mr. ELY. I just would not speculate on it. It would not be for me to make the decision, Mr. Rhodes.

Mr. RHODES. I realize a lot of decisions along these lines have to be made by other people. I would like just to allude to the fact that in the Central Arizona project hearings you stated, I think several times, Mr. Ely, that you felt this lawsuit between Arizona and California would be a matter of interpreting documents, and of course the pleadings which you have filed as attorney for the State of California have brought in many issues which make the whole thing as broad as a barn. I would presume you either had a change of mind between then and now or that other people who are in a position to do so have overruled you on the way the suit is to be conducted.

Mr. ELY. No, Mr. Rhodes. I think it is fair to say that the bill of complaint filed by Arizona took us pretty far afield. It alleged, for example, feasibility of the Central Arizona project, and we are confronted with the necessity of trying that issue. Arizona has raised it.

It also, for the first time, I think—I think I am correct about this—raised the contention that California is not entitled to the present right and continued use of any surplus waters at all. In the 1936 suit filed by Arizona she had conceded that California was entitled to the use of excess or surplus waters and in a quantity greater than our own Limitation Act. She conceded to us 5,584,000 acre-feet per year. Now by denying any right at all to the use of excess or surplus and throwing in the question of the quantity of surplus, Arizona injected issues which, it is quite true, in meeting we had to expand upon.

Mr. RHODES. Is it not also true that the issue could have been determined by the documents involved?

Mr. ELY. Certainly the feasibility of the Central Arizona project could not.

Mr. RHODES. Is it not true that in order to have a justiciable issue before the Supreme Court the State of Arizona had to allege the project of Central Arizona was feasible?

Mr. ELY. As to whether or not she had to is not for me to say. She did, and there is the issue.

Mr. RHODES. Thank you.

Mr. ASPINALL. The Chair recognizes the gentleman from Colorado, Mr. Chenoweth.

Mr. CHENOWETH. I want to commend you and your group, Mr. Ely, for presenting a very able and comprehensive statement on your position. I am sure that the accolade given you by Mr. Hosmer is well deserved, that the people of California are fortunate to have you as their counsel.

Mr. ELY. Thank you.

Mr. CHENOWETH. I am also compelled to observe a difference of opinion in California on this project and, perhaps water issues in general. I gained that impression by your colloquy with Mr. Engle of California this morning.

I remember Mr. Engle when he came to Congress, and he is certainly a champion of every right California has ever had, ever claimed to have had. He would not sit here and let California lose any of her water rights or any other rights if it were in his power

to prevent it. So I think it is fair to assume there is a difference of opinion in California on this project.

Mr. ELY. Thank you for the compliment, Mr. Chenoweth. I am sorry Mr. Engle does not seem to be here at the moment. I do not know precisely what his views are as to our rights. His questions directed to me went primarily to whom I did or did not represent, and also as to what the Colorado River Board had or had not reported on this project. I did not get into enough of a discussion with him on the legal issues to learn what differences, if any, exist between his view and mine.

Mr. CHENOWETH. There was enough said to indicate there was some difference of opinion even among those in California.

Mr. ELY. I just do not draw any inference from what he said.

Mr. CHENOWETH. Reference was made to transmountain diversion proposals, Mr. Ely, and I am very much interested since I have introduced a bill authorizing the Fryingpan-Arkansas project. This project was before this committee last year. Naturally I am very much concerned over the attitude of California toward my bill.

As I get your position and that of all of those who appeared here for California, it is that you are not objecting to the participating projects in this upper Colorado River storage project. Is that correct?

Mr. ELY. Yes, sir. If that were all that were involved here, we would not be objecting to the participating projects. We would be expressing our concerns about the application of large transmountain diversions in the second phases of some of those.

Mr. CHENOWETH. There have been transmountain diversions for some years. Has the quality of water been greatly impaired up to this time?

Mr. ELY. Gradually it has been worsening. The transmountain diversions in the upper basin are even yet not at a high level.

Mr. CHENOWETH. In the Fryingpan-Arkansas project we only divert 70,000 acre-feet, which I think is less than 2 percent of the total water of the river. I think someone has estimated it will increase the salinity at Lee Ferry about 10 pounds per acre-foot. You would not say that would be a material addition to the salinity of the river, would you, at Lee Ferry?

Mr. ELY. No, sir.

Mr. CHENOWETH. I wonder why California takes the attitude it does in opposing the Fryingpan-Arkansas project.

Mr. ELY. I am glad to have the opportunity to answer that.

Mr. CHENOWETH. I am not asking that you go into detail. However, I would like to know the grounds on which you oppose the project.

Mr. ELY. I will not go in detail. I will be as brief as I can.

Mr. CHENOWETH. The reason I asked that, Mr. Ely, is this: Why would not this project be the same as any other in-basin project, to which you do not object? I am sure that California does not take the position she wants to dictate or influence the type of project the upper basin is going to promote.

Mr. ELY. No. The primary concern we have about the Fryingpan-Arkansas, Mr. Chenoweth, is the fact that it is unquestionably the first unit of a very large transmountain diversion aggregating 900,000 acre-feet.

Mr. CHENOWETH. Right there. If that idea could be dispelled from your mind, would that remove then your main objection?

Mr. ELY. It would certainly affect our reaction, of course.

Mr. CHENOWETH. Because at the present moment I know of no such project as you suggest.

Mr. ELY. The Reclamation Bureau's original report, I understand, was for a 900,000 acre-foot project.

Mr. CHENOWETH. The Gunnison-Arkansas. Is that what you are referring to?

Mr. ELY. Yes. There has been a good deal of publicity in the upper basin as to whether or not those who want the Fryingpan-Arkansas should not boldly speak out and say they want the whole thing, the 900,000 acre-foot project and this is the opening wedge.

Mr. CHENOWETH. I thought it had been made clear in the operating principles and I would like to read just one quotation:

Colorado approves this statement but such a statement lends weight to the reason for changing the name of the project as herein recommended. Diversion from the Fryingpan River to the Arkansas has no relation to the Gunnison River. It is not proposed under this "self-contained" project to divert water to the Arkansas Basin from the Gunnison River.

I think that is very plain language. I certainly know of no intention to violate the letter or spirit of that declaration. The Fryingpan-Arkansas is a separate and independent project, and has no relation whatever to any other project.

Mr. ELY. Mr. Tillman calls my attention to the fact that in giving you an answer earlier with respect to the participating projects. I must qualify whatever I said about that with a caveat with respect to the Indian claims.

If the Indian claims are sustained in the magnitude and with a priority that we suspect the Department of Justice is going to assert, every answer I give on the Colorado River compact is out the window because we are all in trouble in both basins.

Mr. CHENOWETH. I think that is generally recognized, is it not, Mr. Ely?

Mr. ELY. Yes.

Mr. CHENOWETH. I do not want to take the time to go into this lawsuit between California and Arizona. I think that has been pretty well argued here today.

Colorado furnishes, as I recall, about 70 percent of the water of the Colorado River. We would just like to have a little water, just a little bit, for our own use.

I think, Mr. Ely, in your zeal—and I know that you are honest and sincere, in your position—I think in your zeal to protect California's water rights—I am not going to express my opinion on the merits of this lawsuit—that perhaps you have gone too far afield and have encroached somewhat on matters that should be decided locally. I am thinking now particularly of the Fryingpan-Arkansas and perhaps some other projects in basin.

Mr. ELY. I respect your opinion a great deal, Mr. Chenoweth, and if I may reply in that spirit, I would like to point out and emphasize what I tried to before, that California's entire claim is to 5,362,000 acre-feet of water for 3 projects. We are not seeking to get more water, not trying to get new or additional projects, not trying to ex-

pand our rights. We are trying to hold what we think the Boulder Canyon Project Act gave us in return for our limitation in 1929.

Now I would also like to call attention to the fact that that is not an excessive quantity of water. In the upper basin compact, for example, the percentage allocated to the State of Colorado results in 3,885,000 acre-feet for that State, which was regarded by the 4 upper States as a fair quantity of water for the State of Colorado.

Mr. CHENOWETH. Something less than 2 million acre-feet are now being used.

Mr. ELY. Yes. Now with respect to California, our quantity is about 30 percent greater than that. Unhappily a million of ours is excess or surplus at the hazard of the weather. It is not apportioned. Consequently, I do not think the apportionment of 4,400,000 acre-feet and a right in excess or surplus for another million acre-feet, aggregating 5,362,000 or about 30 percent more than Colorado's apportioned water of 3,885,000, is an unfair portion for California, considering the relative populations and other factors involved. So that I am ready to meet head-on this issue of whether our claim is just or unjust.

Now all we can do is to protect that water. If there were so much water that other States could have a great deal more than they claim, we would be happy. We are not seeking to get more water for ourselves at the expense of any other State.

Mr. CHENOWETH. I have no quarrel at all with you, Mr. Ely, in your determination to protect those rights.

Mr. ELY. Thank you.

Mr. CHENOWETH. What I am questioning now is your judgment and wisdom in pursuing, perhaps, your desire to protect those rights a little too far, which may cause some reflection upon all reclamation. There are those in this country who are opposed to reclamation. California is looked upon as a reclamation State, one of the Western reclamation States, and as we engage in these controversies between ourselves, we are weakening the cause of reclamation and giving aid and comfort to those who are enemies of reclamation. That is why I am disturbed about the attitude that California takes toward some of these projects. I think it is something you should think about.

Mr. HOSMER. Will the gentleman yield?

Mr. CHENOWETH. Yes.

Mr. HOSMER. I think that would also apply in the same sense and with the same import to the disputants within the State of Colorado who have appeared before this committee and urged their own differences as to this project.

Mr. CHENOWETH. I think Colorado can take care of her own disputes, but surely you do not contend that California should try to settle Colorado controversies. I do not think Mr. Ely has any such purpose in his appearance here.

Mr. HOSMER. I am quite sure he does not. He has stated time and again his only purpose here, and in fact the only purpose of all of us who are called upon to exercise activity in this dispute, is for the protection of what we now already have.

Mr. CHENOWETH. He has indicated he has no objection to these participating projects. Apparently his main objection to the bill which is now before us is the storage of the main stream of the river. Is that correct?

Mr. ELY. We object primarily to the interception of our water supply and its use to generate power to subsidize irrigation projects.

Mr. CHENOWETH. You are getting into the legal question that is now before the Supreme Court.

Mr. ELY. Yes.

Mr. ASPINALL. Will the gentleman yield?

Mr. CHENOWETH. I will be glad to.

Mr. ASPINALL. If I understand your position, Mr. Ely, you do not object to the participating projects if they store water for domestic and irrigation uses; is that correct?

Mr. ELY. Yes. You are speaking of local dams for the use of the participating projects so they will use the water which is in fact stored by the dams you are talking about?

Mr. ASPINALL. Is it your position that those reservoirs must be drained even though they are constructed for those purposes, annually?

Mr. ELY. No, sir. You are speaking now still of reservoirs whose waters are diverted onto irrigation projects?

Mr. ASPINALL. Yes. Now do you understand under the present situation it is practically impossible, if not impossible, to build those participating projects unless we can get some help from revenues either directly appropriated by the Federal Government or revenues from power sources?

Mr. ELY. I think perhaps there are other avenues that could be explored if the upper division States were of a mind to do it.

Mr. ASPINALL. Would you suggest them?

Mr. ELY. If these were proposals by those States to participate in the financing of these projects themselves, it would be a very healthy thing. I know of no reason why the entire burden of subsidizing 85 percent of the cost of irrigation projects in Colorado should fall upon the Federal Treasury, and not in part at least upon the State of Colorado itself.

Mr. ASPINALL. Now you are going to the question of degree. You admit that participation by the Federal Government has been all right where the users have accepted 55, 75 percent of the cost. Now what you talk about is the question of degree, is it not?

Mr. ELY. Yes. There are all opinions on the degree to which power should or should not subsidize irrigation.

Mr. ASPINALL. Now with that in mind, and the situation as it is, about the only alternative that this area has, if they are unable to construct these participating projects, is to engage in large transmountain diversions where the water can be sent across the divide and used for domestic purposes or for irrigation purposes. Those possibilities are even present at the present time. And the question of financing them, of course, is not near as difficult at the present time as building the participating projects that you talk about.

Now that would cause a great deal more difficulty in the lower basin, with the total consumptive use going out of the basin, than some of the storage projects which might be necessary to help firm up the building of the participating projects, would it not?

Mr. HOSMER. Will you yield on that?

Mr. ASPINALL. I would like to have an answer.

Mr. ELY. I am not sure I can give you an answer which would be very useful, Mr. Aspinall, because I do not visualize very well the situation that is so familiar to you and you are trying to describe to me.

Mr. ASPINALL. If the city and county of Denver wishes to build one of these large transmountain diversions and take 170,000 acre-feet of water, it could do it, it has the financial ability to do it.

Mr. ELY. All I can do is reassert our basic position that we are entitled under article 8 of the compact to the protection of our presently perfected rights.

Mr. ASPINALL. That matter would not be before the Congress of the United States.

Mr. ELY. If the transmountain diversions were carried on, even without Federal help, in the upper basin to the point where the quality of our water was impaired in violation of article 8 of the Colorado River compact, we, of course, would oppose them.

The fact that they are federally constructed is all that brings us here. If the State of Colorado were proposing to build all of these projects on their own credit, and if the effect was to impair our quality of water, we would have to protect our interest in some other arena than this committee room.

Mr. ASPINALL. What you mean is, you would go into court.

Mr. ELY. I would assume so.

Mr. ASPINALL. As suggested by my colleague from California the other day.

Mr. ELY. I assume that is correct.

Mr. ASPINALL. One other question. In your statement you suggest you are here to protect California's use-right to 5,300,000 acre-feet of water. Assuming the figure is correct, then the lower basin contends that added to that amount of water should be the amount of water that Arizona and Nevada and Old Mexico is entitled to, that then determines the amount of water you can use to produce power. Is that correct? Does that establish the limits?

Mr. ELY. No, not quite. Mr. Tillman's point is that the power contractors who have contracts for Hoover power are entitled to water for the generation of not only the firm energy but the secondary energy, if I understand correctly.

Mr. ASPINALL. In spite of the fact it might be determined that would be in conflict with the provisions of the Colorado River compact?

Mr. ELY. No. I am over in Mr. Tillman's field now, and I prefer he answer it. But, as I understand the power contractors do not contend they have a right to demand the release of water for power generation if it is required for agricultural and domestic use in the upper basin at all.

What they do contend is that there is no right in the United States to disable its own performance of power contracts by withholding water for power generation in the upper basin.

Is that right?

Mr. TILLMAN. Yes.

Mr. ASPINALL. Hearings are——

Mr. ROGERS of Colorado. Mr. Chairman, while I am not a member of the committee, I wonder if I could have the privilege of asking Mr. Ely a question or two?

Mr. ASPINALL. Is there any objection?

Mr. SAYLOR. Mr. Chairman, I have a great deal of respect for the gentleman of Colorado. I know that last year the then chairman of the committee established a precedent which, I fear, will arise to haunt us, that is, to allow members who are not members of this committee to come in and examine witnesses during a hearing. It is a privilege that is not extended to us when we go to other committees.

I just want to say that I am not going to object, but I want to say, Mr. Chairman, that when we are back on this same subject in the 85th Congress, I expect to interpose a valid objection to this policy. I have no objection to the gentleman from Colorado proceeding.

Mr. ASPINALL. With that in mind, and the fact that the Chair might claim at least the 5 minutes of the time, the Chair will give——

Mr. HOSMER. May I ask the gentleman a question? Does he intend to adopt the same policy in the 86th, 87th, 88th, and 89th Congresses?

(Discussion off the record.)

Mr. ASPINALL. The Chair will yield 5 minutes of his time to his colleague from Colorado, Mr. Rogers. When 5 minutes has expired the gavel will fall.

Mr. ROGERS of Colorado. Mr. Ely, reference was made a moment ago to the conference conducted by the southern Californians and the upper-basin States in the amendment of the Boulder Canyon Project Act, upon which we finally got together.

Mr. ELY. Yes.

Mr. ROGERS of Colorado. Do you recall in that discussion when this money was made available to the Department of the Interior for the purposes of making a survey, that you were to also join with us in getting the projects under development that may be recommended by the Bureau? Do you remember any such discussion?

Mr. ELY. No, I do not, Mr. Rogers. I do remember our trying to work out standards of feasibility that would be specified, and we did there in section 2 (d) of the statute. We do not think this project meets the standards we then agreed upon.

Mr. ROGERS of Colorado. When you say "2 (d)" you have reference to the compact?

Mr. ELY. No; the Boulder Canyon Project Adjustment Act.

Mr. ROGERS of Colorado. Yes; the Boulder Canyon Project Adjustment Act.

Now, on page 10 of your statement, filed here with the committee, you sum up, and I quote this statement:

> The upper basin wanted insulation against the law of priority of appropriation, which is "first in time, first in right." The United States Supreme Court, in 1922, in the case of *Wyoming* v. *Colorado*, applied this rule on an interstate stream, regardless of State lines. The Colorado River compact was the resultant of these forces.

Do I understand that this statement means that the rule of "first in time, first in right" was removed from the field, so that we now operate only on the compact?

Mr. ELY. It was abrogated to the extent of the apportionment in perpetuity of the right to the beneficial consumptive use of 7½ million acre-feet in each basin. I emphasize "in perpetuity." You do not have to start this project now or next year or 10 years from now, to keep your right to 7,500,000 acre-feet. You can start any time. In perpetuity.

Mr. ROGERS of Colorado. Any time in the future?

Mr. ELY. That is correct.

Mr. ROGERS of Colorado. That being true, if—first, may I ask you, you do not contend, so far as southern California is concerned, that you can consumptively use more than the amount specified in your Limitation Act, plus the one-half of surplus? You do not contend that California, under any circumstances would be permitted to use more than that water?

Mr. ELY. That is the net effect of our Limitation Act—the right to 4,400,000 acre-feet of water apportioned by article 3 (a) and one-half of the excess waters or surplus waters not apportioned by article 3 (a).

Mr. ROGERS of Colorado. And you are not contending that California should repudiate or attempt to repudiate that?

Mr. ELY. Not at all, sir. We seek to protect that position only.

Mr. ROGERS of Colorado. Now, the gentleman from Arizona a moment ago asked you a question concerning surplus water as it applied to the lower basin. Do you take the position that when water is stored in the upper basin States for the generation of electricity, and electricity alone, that constitutes surplus water?

Mr. ELY. Yes, sir. That water which has passed the points of diversion in the upper basin and is stored in Glen Canyon and other downstream reservoirs is surplus water, certainly, with respect to the upper basin, as Governor Johnson's statement rather clearly stated.

Mr. ROGERS of Colorado. Then, if they built Echo Park, as an example, the minute the water is stored, it then becomes surplus?

Mr. ELY. Yes, assuming it has passed the upper basin points of diversion, which I understand to be the case.

Mr. ROGERS of Colorado. Then suppose they do use it below Echo Park for irrigation purposes?

Mr. ELY. I would say that if the storage is properly and reasonably related to the requirements of irrigation and to domestic use below, then, as Mr. Tillman gave the example this morning, 1,000 v. 1,000,000, you are obviously out of line if a million is put in for power and a thousand acre-feet of storage for irrigation. But to the degree that storage is required for the beneficial consumptive use on irrigation or domestic use projects, we do not deny your right to reasonable storage.

Mr. ROGERS of Colorado. Then you do not deny the right to reasonable storage for electrical energy, but you admit we have the right, even after it is stored for electrical energy, and turn it loose and it goes on down the river, we still have the right to divert it for irrigation or domestic purposes?

Mr. ELY. I think that is just backwards. The power generation is a byproduct of the irrigation and domestic use. It is subordinate to the rights for those purposes under the compact.

Mr. ROGERS of Colorado. Then do you take the position that the waters that may be used or stored at Glen Canyon are surplus and not to be construed as part of the obligation of the upper basin States to deliver the 75 million within a 10-year period?

Mr. ELY. It is excess or surplus waters which you have no—by "you," I should say the United States has no right to retain for power generation if required for beneficial consumptive use in the lower basin, or if required for the fulfillment of the Government power contracts in the lower basin as of the present. Now, when, as, and if

the upper basin development proceeds to the point where holdover storage is required for fulfillment of the obligation under article III (d), we say that is another day, that is for a later determination.

Mr. ASPINALL. The committee is adjourned. The next meeting of this committee on this legislation will be at 10 a. m., March the 28th.

(Whereupon, at 4:20 p. m., the subcommittee recessed to reconvene at 10 a. m., March 28, 1955.)

(Pursuant to consent granted on p. 1113, Mr. Udall submitted the following statement:)

STATEMENT OF STEWART L. UDALL

Mr. Chairman, at the last hearing held before this committee on these bills, I made rather serious charges against the Colorado River Board and the Metropolitan Water District of Southern California and their spokesmen who appeared before us to testify.

As an answer to assertions made by these witnesses, at this time I support my previous statement with fact documentation taken from earlier hearings before congressional committees. These excerpts from prior testimony show clearly that these people have practiced chicanery before this committee and have not kept solemn promises made to this body. In light of the facts set forth below in this memorandum, I seriously question whether the members of this committee will want to give any consideration whatever to their contentions.

Here is the record:

1. Assurances that upper basin development would not be delayed by litigation

Colloquy between Representative Frank A. Barrett and Arvin B. Shaw, Jr., House hearings on H. R. 934 and H. R. 935, May 1949, at page 738 thereof:

"Mr. SHAW. * * * it is recognized right now, and has been for many years, that the share of the waters of the Colorado River belonging to the upper basin is ample for its needs, and therefore we do not come to any question of conflict until you approach right close to the 7,500,000 acre-feet limit."

* * * * * * *

"Mr. BARRETT. As a practical matter, if we should get involved in your lawsuit, if you were successful in getting Congress to authorize a lawsuit, then, of course, the Congress would say, 'We cannot authorize any project at all in the entire basin, until the lawsuit is settled.'"

"Mr. SHAW. * * * This lawsuit (*Arizona* v. *California*) so far as the upper basin is concerned, can only concern this last 800,000 acre-feet, or whatever it is that they want to add to the 7,500,000 acre-feet allotment by the device of this depletion theory.

"I do not think there is any reason to believe that Congress would hesitate to authorize projects or appropriate money for projects up to the 7,500,000 acre-feet."

Violation of these assurances.—On July 15, 1944, counsel for California filed a motion to join the upper basin States as parties in the *Arizona* v. *California* litigation on the ground that the upper basin States are necessary parties in this lawsuit. This motion is still pending before the Supreme Court.

2. Assurances that action would not be delayed by appointment of master

Statement in memorandum by the attorney general of Nevada, the attorney general of California, and Arvin B. Shaw, Jr., assistant attorney general of California, filed as part of the hearings on H. R. 1500 1501 in April 1951, at page 846 thereof:

B. THE ISSUES, BEING LEGAL IN CHARACTER, ARE DETERMINABLE IN A REASON TIME

"From the foregoing review of major issues, it is plain that the matters in controversy between Arizona and California are characteristically legal issues, being matters of interpretation of statutes and other documents. The ordinary factual elements, relating to quantities and time of flow and use, which characterize most water litigation are not to any substantial extent critical factors.

"It is true that some of the classic interstate water cases, such as *Kansas* v. *Colorado* (206 U. S. 46), *Wyoming* v. *Colorado* (259 U. S. 419), and *Nebraska*

v. *Wyoming and Colorado* (325 U. S. 589), have required 10 years or more to reach adjudication. This has occurred because in each of these cases it was necessary for the Court to appoint a master to take voluminous testimony relative to factual issues. *In the case at bar it is not considered that a master need be appointed, nor that factual testimony be taken.* The issues which are significant as between California and Arizona *can be adjudicated upon briefs and oral argument within a reasonable time, not to exceed 2 or 3 years.*" [Emphasis supplied.]

Violation of these assurances.—On April 5, 1954, California counsel demanded the appointment of a special master and subsequently the Supreme Court appointed a special master and referred the case to him.

3. Promises that litigation would be expedited

Mr. Northcutt Ely, assistant attorney general, appearing for defendant, State of California, in testifying in hearings before Subcommittee No. 4 of the Committee on the Judiciary of the House of Representatives on House Joint Resolutions 225, 226, 236, and H. R. 4097 in May of 1948, as page 93 thereof said:

"We feel that the decision can be obtained within a reasonable time, within 1 or 2 years at the most; that the taking of protracted testimony will not be required and that the submission of this case to the Court will advance the cause of the development of the Colorado River. We see no advantage in delay."

Violation of these assurances.—According to a United Press dispatch on March 7, 1955, Mr. Ely testified for the Ways and Means Committee of the California State Assembly and stated the Arizona-California lawsuits: "May take 6 to 8 years to resolve." At the time this statement was made the lawsuit had already consumed 2½ years.

4. Promise that facts would be stipulated to

Excerpt from letter dated April 16, 1949, sent by Gov. Earl Warren of California to Senator Joseph C. O'Mahoney, and placed in record of hearings on H. R. 934 and H. R. 935 by Arvin B. Shaw, Jr., May 12, 1949, at page 707 thereof:

"Since the major issues of the controversy are matters of law and not of fact, it is probable that within a comparatively short time the Court could hear legal arguments, without the necessity of taking extended evidence regarding facts, and adjudicate the rights of the affected States promptly. *I believe the case could be presented to the Court on an agreed statement of facts.* Each year that the settlement of the controversy is delayed means additional years of delay in the development of the areas affected by the use of Colorado River water." [Emphasis supplied.]

Testimony of James H. Howard, general counsel, Metropolitan Water District of Southern California, House hearings, April of 1951 at page 1244:

"* * * I think, pleadings would have to be filed and answers, probably cross complaints, and the issues of law would be clearly framed. *If there are any issues of fact, so far as California is concerned, you would find a disposition to agree upon the facts to the extent that facts are necessary in the case.* We would not run into any 20- or 30-year litigation, you can be assured of that. It might take 2 years * * *." [Emphasis supplied.]

Violation of these assurances.—To date, California counsel have bluntly refused to enter into any stipulations regarding the facts.

I would like to say emphatically at this point that I do not mean to imply the slightest criticism of Chief Justice Warren. He is a man whose word is unimpeachable, and if he were still Governor of California I am certain the *Arizona* v. *California* lawsuit would already be history.

COLORADO RIVER STORAGE PROJECT

MONDAY, MARCH 28, 1955

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON IRRIGATION AND
RECLAMATION OF THE COMMITTEE
ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 9:32 a. m., in the committee room, New House Office Building, Hon. Wayne N. Aspinall (chairman) presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will now be in session for the further consideration of H. R. 3383 and similar bills having to do with the authorization of the upper Colorado River storage project.

This morning for our first witness we have with us Senator Arthur Watkins of Utah, who wishes to make a statement.

Senator Watkins, we shall be glad to listen to you at this time.

STATEMENT OF HON. ARTHUR V. WATKINS, A UNITED STATES SENATOR FROM THE STATE OF UTAH

Senator WATKINS. Mr. Chairman, I greatly appreciate the courtesy extended to me by the committee. I came over, as you will recall, just as you were finishing a very long day. It was rather late and for that reason it was thought unwise to start at that hour to make my presentation.

Mr. ASPINALL. May the Chair interrupt just a moment to make the unanimous consent request that the presentation of Senator Watkins shall be placed in the record at the end of the hearings that have been had heretofore by the proponents of the legislation. Is there any objection?

Hearing none, it is so ordered.

(Senator Watkins' statement appears on p. 704.)

Mr. ASPINALL. Senator Watkins, we will have to proceed with our hearings with the other witnesses who are here from out of town. The committee, as I suggested to you, reserves the prerogative of having you come back and answer questions and being examined later on, which I believe you desire to do.

Senator WATKINS. I would be very happy to do so.

Mr. ASPINALL. We are very much indebted to you for this statement which presents very clearly and definitely another approach to this problem of the Echo Park site. Thank you very much.

Senator WATKINS. Thank you.

Mr. ASPINALL. The committee is meeting this morning to hear statements and testimony in opposition to the project or to a part of the project. It will be the procedure of the committee this morning, unless there is an objection, to listen to the statements which will be made without questioning, hoping that they will be finished as quickly as possible, with the full knowledge that perhaps it will take the larger part of the morning to make those statements. Then the chairman has made a request that we be permitted to sit this afternoon during general debate. However, the amount of time which will be allowed to us is purely problematical, and we do not know how much of the afternoon the members of the committee may be here. We shall be here as much as we can. It will be necessary for the witnesses to stay here in readiness to go into session at any time that any members of the committee can be present in the committee room.

With that understanding, the Chair calls to the witness table Hon. John F. Baldwin, Jr., Congressman from California who wishes to make a short statement to the committee. We are glad to have you with us.

STATEMENT OF HON. JOHN F. BALDWIN, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. BALDWIN. Mr. Chairman and members of the committee, I am appearing in opposition, not to the upper Colorado River project as a whole, but simply to the Echo Park Dam in that project.

I am a life member of the Sierra Club and have worked in conservation matters all my life. I spent 6 days on the Yampa River last summer going through the Yampa Gorge, through the entire Dinosaur National Monument. It seems to me this gorge is the most spectacular and unusual gorge in its present form.

The very theory of our national park and national monument system is that when we have set aside national parks and national monuments that we desire to preserve them in their present form for use by the people of future generations in that present form.

There has been some discussion as to whether or not, when Dinosaur National Monument was created, there was some reservation. There has been a difference of opinion as to, if the reservation existed, whether it applied to the Echo Park Dam as now proposed or whether it applied to a project in Brown's Hole. No matter what it applied to, it seems to me the issue before this committee and before the House of Representatives and the Congress is that we must be sure that we give proper consideration to the preservation of the Dinosaur National Monument or any other monument in its present form, and whether there are alternates to which the upper Colorado River project could successfully be built.

There have been arguments made by some of the proponents that a lake in Dinosaur National Monument would enhance the beauty. I do not think that is true. Those who desire activities on lakes can find lakes all over the United States; they cannot find a Yampa River Gorge in its present form in any other place in the United States, to my knowledge. That is the reason why these people who believe in conservation fight so strongly for the conservation of the beautiful scenic area in its present form be given full and careful consideration.

There have been some discussions—and I know that you gentlemen

have heard a great deal of it—as to whether Echo Park Dam is needed in the present upper Colorado River project, and we in these various conservation groups simply ask that the committee give particular consideration to the alternate plans that have been proposed—a possible increase in the size of the Glen Canyon Dam, possible use of water from Flaming Gorge instead of any proposed use of water from Echo Park Dam—and other similar alternate sites.

We do not feel satisfied that the Department of the Interior has actually given full consideration to all other alternate possibilities, and we feel this committee and Members of Congress have an obligation to the public that every possible consideration be given to the preservation of this area in its present form.

People have said, "Well, there have not been so many people that have viewed its area in its present form." I would like to call attention to Yosemite National Park. It would be like comparing the number of people who saw Yosemite National Park prior to its preservation with those who see it today, but there is no comparison because the number has expanded steadily.

I think the illustration would be comparable to this area as people become aware of the area and as they get into the area and see for themselves what a beautiful area it is.

I realize your time is limited, and I would like to ask permission at this time to extend my remarks in the record, Mr. Chairman.

Mr. ASPINALL. Unless there is objection, it is so ordered.

Hearing none, it is so ordered.

Thank you very much, Mr. Baldwin.

Mr. BALDWIN. Thank you.

Mr. ASPINALL. The Chair wishes to call to the witness table at this time Mr. Richard C. Bradley.

Do you have a statement first, Mr. Saylor?

Mr. SAYLOR. Before these witnesses appear, I would like to say that I appreciate the courtesy of the chairman in extending to this group of Americans the privilege of coming here, who come here not to oppose the development of the upper Colorado, but because they sincerely believe in the fact that Echo Park Dam which has been proposed by the Bureau of Reclamation is not necessary, that it should be preserved in its present status.

This group of individuals that will testify here today represent the conservation groups in America, and I feel certain that they are here in a sense of sincerity and in an effort to assist this committee in arriving at a just conclusion for a very weighty problem.

Mr. ASPINALL. May the Chair state his agreement with the gentleman from Pennsylvania as to the sincerity with which these witnesses appear before the committee. The Chair appreciates that situation also. We are glad to have you with us, Mr. Bradley. We shall be glad to listen to your statement. You may proceed.

STATEMENT OF RICHARD C. BRADLEY, CORNELL UNIVERSITY, ITHACA, N. Y.

Mr. RICHARD BRADLEY. Mr. Chairman and gentlemen of the committee, my name is Richard Bradley. I am a research associate in physics at Cornell University, Ithaca, N. Y.

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I am appearing before you today as a private citizen, to protest the construction of Echo Park Dam in Dinosaur National Monument—a piece of real estate of which we all share in the ownership. I agree with the opinion expressed in the National Park Service report that the effect of this dam would be deplorable. Of the many rewarding and enjoyable experiences I have had in our national parks and monuments, and forest wilderness areas, none was more rewarding nor more delightful than a 6-day boat trip which my wife and family and I were privileged to take through the scenic river canyons of this national monument. All of us who took that trip—14 people ranging in age from 9 to 76 years—are grateful that this lovely area, with its sandy beaches, friendly campsites, and singing rivers, is federally protected in the national park system. We sincerely hope that the Congress will continue to protect this monument for the beautiful place that it is.

The upper basin, however, wants and needs more water, and the primary purpose of this 9-dam storage project is to provide the means of getting it. Power is to be generated as a byproduct. No one objects to this aim. Certainly I do not. But whether it is necessary to build a dam at Echo Park to realize this aim has been hotly contested. Various alternative plans have been proposed for achieving what seemed to be essentially the same result without this dam. Of these the Bureau of Reclamation has considered as legitimate only those which would provide roughly the same total holdover storage capacity—and then has ruled them out because of the increased evaporation losses which would result. "Evaporation," said a Bureau spokesman, "was the decisive factor" in the determination that "there are no substitutes for Echo Park and Split Mountain Units which would not materially diminish the effectiveness of the nine reservoir systems." He then pointed out that the increased loss at the Dewey alternate of 120,000 acre-feet per year was "equivalent to the water required to maintain a city larger than Denver, Colo." And with this very impressive comparison the Bureau rested its case for Echo Park Dam.

There can be no doubt that the Interior Department based its recommendation for this dam squarely on these evaporation estimates and this comparison to Denver's water needs. See, for example, Secretary McKay's form letter to the public written a year ago. Former Under Secretary Tudor told his chief that in his opinion if the dam were built the alteration of the area would be substantial, and if conflicting interests did not exist he would prefer to see the monument remain in its natural state. Any power loss at the alternate sites, he said, was of secondary importance because it could be replaced by steam power at some increased cost. The choice, he concluded, was—

> simply one of altering the scenery * * * or of irreplaceably losing enough water to supply all the needs of a city of more than 600,000 people.

In his statement to this committee last year he said:

> In the final analysis, the increased losses of water from alternative sites is the fundamental issue upon which the Department has felt it necessary to give any consideration to Echo Park Dam and Reservoir.

I would like to limit my remarks about the Department's "fundamental issue." It is my belief that whether it was intentional or not

this whole evaporation argument has been unfairly and misleadingly presented and given an importance out of proportion to its worth and validity.

1. THE TOTAL STORAGE REQUIREMENT

The Department's stipulation that any alternative proposal must necessarily provide equivalent storage is one which other witnesses have challenged. Suffice it to say here that if both the primary and secondary objectives of this project are realizable without a dam at either Echo Park or a substitute site, then clearly the whole evaporation argument for a dam at Echo Park is without meaning. That is, if Echo Park's storage is not necessary for compact requirements, and if its electric power can be generated economically in other ways (for example by steam), then certainly there can be no compelling need at the present time for either Echo Park Dam or a substitute.

2. ALTERNATES

But assuming for the sake of argument that all of the storage contemplated by the Bureau is necessary for the project, the four next best alternates to Echo Park are presumably the ones listed by Mr. Tudor a year ago. He disqualified them, you recall, principally because of their added evaporation loss.

(*a*) *New Moab* (*added evaporation, 108,000 acre-feet per year*)

No one interested in preserving the parks and monuments would now advocate New Moab as a substitute for Echo Park because of its effect on Arches National Monument. Still, as a matter of academic interest, one might inquire what would happen to the evaporation estimate here if this reservoir were fluctuated in a manner comparable to that planned for Echo Park—which it would replace. The Bureau gives the mean operating level of New Moab as only 5 feet below the maximum level, so nearly the full surface area would be exposed for evaporation at all times. At Echo Park the mean operating level is 25 feet below the maximum level, corresponding to a 12 percent reduction in surface area as compared to New Moab's 2 percent reduction.

(*b*) *Desolation* (*added evaporation, 208,000 acre-feet per year*)

In order to replace the storage loss at Echo Park, Split Mountain, and part of Gray Canyon by a Desolation Dam it is necessary to build this dam so high that the reservoir would "spread out over the canyon walls." Again, it might be interesting to know what would happen to the evaporation estimate if the Desolation Dam were built lower so that the water did not spread over the walls, and the remaining storage put behind a somewhat higher Glen Canyon Dam.

(*c*) *Dewey* (*added evaporation, 120,000 acre-feet per year*)

This is thought by the Bureau to be the next best alternate site, so most of my discussion will pertain to this alternate and the implications of this added evaporation loss.

(*d*) *High Glen* (*added evaporation, corrected from 165,000 to 25,000 acre-feet per year*)

While it is perfectly understandable that the Bureau could make a mathematical mistake with respect to the evaporation estimate for

this alternate, it is not at all clear to me why the Department a year ago said of this dam: "This would be an alternate to the construction of Echo Park." Only to say, after acknowledging the mistake: "A high Glen Canyon Dam is not an acceptable alternate." Nor is it clear why the Department a year ago said: "Any alternate to Echo Park must be some new reservoir which is not now included in the basin plan or some increase in reservoirs which are included." Only to say later: "Reservoir capacity at new sites, such as the Dewey site, would offer the only possible substitute in lieu of reservoir capacity at Echo Park."

Some will doubtless say that 25,000 acre-feet per year is still a lot of water to waste. This may well be true. However, when one compares this figure with the size of some of the uncertainties inherent in these evaporation estimates, I think it is very doubtful that any great case can be developed against this alternate on the basis of an estimated additional evaporation loss.

3. THE UNCERTAINTIES IN EVAPORATION ESTIMATES

The Bureau's evaporation estimates are doubtless the most reliable presently available, but like any other estimate (for example weather forecasting) they are subject to statistical errors which cannot be controlled at the present time.

Recent studies by Government scientists at Lake Hefner and Lake Mead have shown that it is possible to measure quite accurately the evaporation losses from existing lakes and reservoirs. However, estimates for reservoirs in advance of their construction are still subject to considerable error. This is because information is lacking with respect to water surface temperature, energy storage, wind movements over the reservoir, etc.

The upper basin evaporation estimates are based on evaporation pan data and relationships derived from pan studies—the data having been taken at Weather Bureau stations rather than the reservoir sites themselves. Uncertainties inherent in the evaporation pan method alone would make an error of 100,000 acre-feet per year not unlikely for the system evaporation estimate—enough water for another Denver more or less. By "not unlikely" I mean there is perhaps a 50–50 chance for such an error. Errors of this order of magnitude are also possible if at Glen Canyon Reservoir the assumed wind velocity is in error by 1 to 2 miles per hour, or if the assumed water temperature is in error by a few degrees Fahrenheit, or if the assumed dam height is altered by as little as 5 percent.

With respect to these items, note that the Bureau says: (*a*) "Wind is probably the most important factor to be considered in selecting a pan site representative of a particular lake * * *"; (*b*) "the chief item lacking (for prediction of evaporation prior to establishing a reservoir) is information on surface temperatures * * *" (reservoir temperatures do not correspond to present air or river temperatures); and (*c*) dam heights " * * * being the result of preliminary studies, are generally shown in round numbers only and are subject to any changes warranted by more detailed investigations." The fluctuating surface areas of the reservoirs are also important but also difficult to predict accurately because they will depend strongly on future climate,

future flows, upstream diversions, and the future economy of the region—over 75 years hence.

The Interior Department has argued that errors will apply equally to all reservoirs, and therefore the comparisons between any two reservoirs, for example, Echo Park and an alternate—would still be "very dependable." I can see how this might be true for defects in formulas, but I do not see how it can apply to possible errors arising from faulty assumptions regarding wind, water temperature, humidity, prereservoir losses from the area to be inundated, dam heights, reservoir surface fluctuations, et cetera. Indeed I would think that the evaporation from every reservoir could have been overestimated or underestimated by an amount largely independent of the situation at any other reservoir, and if this is the case the estimated difference in evaporation between Echo Park and an alternate should be less dependable than the estimate at either reservoir. I therefore would accept the evaporation saving claimed for Echo Park only with the understanding that it could turn out to be pretty far from the true value in either direction. Hence my feeling that the evaporation argument would be somewhat academic for the High Glen alternate.

The above remarks find their justification not in any original work of my own on water evaporation but rather in the available literature on the subject (e. g. U. S. G. S. Circular No. 229 and standard hydrology textbooks).

4. DENVER'S WATER ECONOMY AND THE UPPER BASIN WATER BUDGET

Let us return to the Dewey alternate and again for the sake of argument assume that this storage is needed for the project, that this dam is the next best alternate to Echo Park, and that its evaporation will exceed that at Echo Park by 120,000 acre-feet per year. We now ask how serious would this extra evaporation loss be if it did occur? About the only clue we have been given is that this would be enough water to maintain a city larger than Denver. This comparison to Denver's water needs may be numerically correct; it is also grossly misleading and not very illuminating.

To begin with, the water economy of a single metropolis like Denver is only remotely related to that of a large river basin comprising an area greater than New York, New Jersey, and Pennsylvania combined and made up of both farms and cities. This is manifest when one considers that at present the upper basin has a population somewhat greater than half that of Denver and yet uses 20 times as much water. On this basis the increased losses at the Dewey alternate site would support, on the average, less than 20,000 people—not 600,000 people. And if indeed one thinks of an economy made up entirely of irrigated upper basin farms, as contrasted to the metropolitan economy suggested by the Bureau, one finds that these increased losses would probably support less than 3,000 people and perhaps even less than 2,000 people. The impression which the Bureau's comparison fosters is that over half a million people would do without water if Dewey were built. This apparently is more nearly an upper limit than an average; hence my feeling that the comparison is misleading.

Furthermore, by itself it is not a very helpful comparison because it is unrelated to the water budget involved here. There is no reference to the size of the total resource against which these increased

losses are going to be charged. Nor is there any mention of the magnitude of other similar wasteful losses in the same general area which are thought to be either acceptable or intolerable, in order that the uninitiated might have some further basis for comparison. Nor indeed any discussion of when that last 120,000 acre-feet per year is likely to be needed. And yet, is this not precisely the kind of information which is required for any decision as to whether or not this extra evaporation is an exorbitant price to pay to keep the monument in its present natural state? Ordinarily, when a person is trying to decide whether or not some service or commodity he wishes to purchase is an extravagant one, does he not relate the price to his total bankroll and to the other expenses he has to meet, at the same time keeping in mind the value, intangible or otherwise, of the thing he wishes to buy?

These are matters which I now wish to discuss.

5. OTHER WASTEFUL LOSSES

Waste should not be condoned, but we are, after all, talking about wasteful losses, and the problem here is to decide whether one particular among numerous other waste is to be singled out as intolerable. For the purposes of comparison only and not as any indictment of western water practices, I note that the following are some examples of other water losses in the same general area, although not confined to the upper basin, which are in part avoidable and are not currently thought to be intolerable.

(*a*) The four upper basin States of Colorado, Utah, Wyoming, and New Mexico are now losing about 8 million acre-feet per year because of irrigation methods—more water than they stand to gain by this storage project. If but 2 percent of this could be salvaged, Dewey's extra loss would be more than compensated for. It is recognized that the cost of linking irrigation canals is beyond the means of the private farmers, so perhaps this is a service which—like building storage reservoirs—might well be performed by the Federal Government.

(*b*) Salt Lake City and Los Angeles, major cities in upper and lower basin States, discharge their sewage effluents into Great Salt Lake and the Pacific Ocean respectively a total of nearly half a million acre-feet per year. The decision to do this is apparently a public relations rather than an engineering one, for according to the Bureau—

> this water could be treated and used for irrigation or municipal purposes if the users were willing to pay the relatively high price involved.

The relatively high price, whatever it is, should be compared to the price of getting extra water in other ways in the same area.

(*c*) This storage project will of itself lose an estimated 850,000 acre-feet per year through reservoir evaporation, enough water for 8½ Denvers, and the upper basin, which must pay for this loss, does not find it objectionable. Holdover storage is, of course, necessary if the upper basin is to use its full allocation of water and still meet its obligations downstream so some evaporation is inevitable. However, the 36 million acre-feet of active storage, plus the 10 million acre-feet of dead storage, called for here is considerably more than necessary for compact requirements (20 million acre-feet are needed according

to Hoover, 23 million according to the Bureau) so the evaporation is more than necessary by perhaps as much as 300,000 acre-feet annually. The extra storage, is of course for the purpose of producing power, which as Mr. Tudor pointed out in a similar connection could be produced in other ways. I do not object to multiple purpose projects, but isn't the choice here between altering the method of producing power, or the irreplaceable loss of enough water for 3 cities the size of Denver? And if so, how did evaporation ever become the fundamental issue at Echo Park?

(*d*) Lake Mead evaporates nearly a million acre-feet annually. I have heard rumors, as yet unsubstantiated, that this is approximately 100,000 acre-feet per year more than would be the case if its water were released from near the surface rather than the cool depths.

In view of the number and the magnitude of these other wasteful losses currently thought to be acceptable, the evaporation argument sounds specious. In any event, it is obvious that Dewey's extra loss can be more than made up in other ways.

6. THE TOTAL RESOURCE

The upper basin's share of the Colorado River, which this storage project is supposed to make available, is 7.5 million acre-feet per year, leaving out treaty obligations and the question of compact interpretations. The Bureau's plan will reduce this to about 6.6 million acre-feet per year because of reservoir evaporation. Whether Dewey is substituted for Echo Park or not will change this amount by only about 1½ percent—a teaspoon and a half difference in every pint of water.

Or to look at it in another way: If the proposed project is authorized the upper basin will theoretically have enough water for 66 Denvers—if we borrow the Bureau's statistic—which, incidentally, amounts to about 20 percent of the present population of the United States. If, on the other hand, Dewey is substituted for Echo Park there will still be enough water for 66 Denvers. Even if the total water resource could be guaranteed to such precision, what is it that makes water for 66 Denvers acceptable but water for 65 Denvers intolerable? Is the difference really too high a price to pay to preserve a priceless heritage?

Interior's evaporation argument seems to me to be academic indeed if not even trivial.

7. THE ULTIMATE NEED

The upper basin presently uses about 2 million acre-feet per year of Colorado River water. After the initial stages of the project are completed this figure will increase to over 3.5 million. Holdover storage becomes necessary if the use is to exceed 4.3 million. No one predicts with certainty when the full allocation will be needed, but the Bureau's estimate is "65 years or more." Therefore, the first time the upper basin can use that last 120,000 acre-feet per year which Echo will save and Dewey will not is going to be in about 65 years according to the best estimates.

Long range planning is laudable, but Echo Park Dam is, after all, a contentious matter and a great many people living today have ob-

jected to the dam. It seems to me that the Bureau's decisive factor and the Department's fundamental issue amount to denying the Nation the opportunity to enjoy this area in its present natural state from now on and forever, in order to provide a benefit which cannot be provided by a substitute site but which could be provided in other ways, that is by lining the irrigation canals, a benefit to start some 65 years or more in the future and permitting an ultimate population growth only 1½ percent larger than otherwise. And the final crowning irony, it seems to me, is that even if that last 120,000 acre-feet per year were to be squeezed out, the upper basin, according to the Interior Department, would still find itself far short of its full economy—whatever that may mean. So Echo Park Dam, apparently, would solve no full economy problem. As long as the full economy is out of the question in any case, can we be sure that the people in that far distant future date would not prefer to have the park? Present indications are that the future will need more, not fewer, parks.

8. SUMMARY

My opposition to the upper Colorado storage project centers about the proposed Echo Park Dam—I take no part in the interbasin conflict. In fact, I do not understand it, and I do not try to understand it—and I hope this committee will not see fit to authorize the project as long as it contains this dam. The Interior Department has based its recommendation for this dam on a low evaporation rate as compared to substitute sites. I have questioned the importance and the validity of this argument for the following reasons:

(*a*) If it is true, as other witnesses have asserted, that Echo Park's storage is not essential either for compact requirements or for power, then the evaporation argument is entirely meaningless and there can be no necessity at the present time to build either Echo Park Dam or a substitute.

(*b*) If, however, its storage is necessary for the project, then it could be put behind a High Glen Canyon Dam without an appreciable extra evaporation loss.

(*c*) If High Glen is not feasible, then the storage could still be put behind a Dewey Dam. The increased losses in this case:

1. Would have no effect on the upper basin economy for 75 years, according to the best estimates.
2. Would reduce the total resource, and hence the ultimate population, by only 1½ percent.
3. Could be more than compensated for by reducing other losses in the same area.

Thank you for the opportunity to present this statement. I hope I have been able to demonstrate why I believe these evaporation loss estimates have been given an exaggerated importance and do not constitute sufficient justification for sacrificing this unit of our national park system, Dinosaur National Monument.

Thank you.

Mr. ASPINALL. Thank you, Mr. Bradley. You will be with us this afternoon?

Mr. BRADLEY. Yes, sir.

Mr. ASPINALL. The next witness is Dr. Harold Bradley, of Berkeley, Calif. We are very glad to have you with us. I presume these other two Bradleys are your sons. Is that correct?

Mr. HAROLD BRADLEY. I am delighted to say they are, Mr. Chairman. It is not often you get so large a family delegation, I suspect.

Mr. ASPINALL. That is right. You may proceed.

STATEMENT OF HAROLD BRADLEY, BERKELEY, CALIF.

Mr. HAROLD BRADLEY. Chairman Aspinall and members of the committee, thank you for giving me this opportunity to present my views.

My name is Harold Bradley, emeritus professor of physiological chemistry, Medical School, University of Wisconsin, where I taught for 42 years. My home is now in Berkeley, Calif.

I come as a private citizen, officially representing no organization. I come on my own time and at my own expense to plead with you respectfully and very earnestly not to permit the destruction of the Dinosaur Monument, with dams and powerplants as proposed by the Bureau of Reclamation. I come because I would forever regret failing to do my utmost to leave my grandchildren, and yours, this uniquely beautiful reservation. I look on myself as representative in the broader sense the many millions of American citizens, the little men and women, who visit and love our national parks. While we are often too busy or preoccupied, or too uninformed, or maybe just too lazy, to write our views and our wishes to our Senators and Congressmen in time to be of any use to you in making decisions, we do usually vote. We shall appreciate very sincerely your effects to preserve for us and our offspring, unspoiled, those souvenirs of the best of our vanishing wilderness, which you and your predecessors so wisely set aside under the legislation of 1916, the National Parks Act. If the Dinosaur were to be sacrificed for local or regional economic advantage now, the same arguments and the same logic would apply with equal cogency to other dedicated areas. It would be hard to refuse similar treatment to equally deserving appeals from other regions.

At the outset I should like to make two points clear. First, I am for the conservation of every drop of water that falls on our western empire. I believe I am as keenly water conscious as any citizen of Utah or Colorado. But I have yet to hear a valid reason why a national park unit must be sacrificed to accomplish this objective. Secretary Payne once said when a dam was proposed for Yellowstone: "We do not hold the water in the national parks. Use it outside of them."

Second, I am in favor of a sound upper basin project, if and when the Bureau of Reclamation produces one. The present proposal in my opinion is completely unsound, because in addition to the cost of this great project in hard cash, which we the taxpayers will have to provide, we are called upon to make an initial downpayment of this exquisite park unit, whose value cannot be estimated in terms of dollars. As taxpayers we are told that the tax dollars which we will furnish, is an investment. Some of it, at least, will be returned eventually to the United States Treasury. Most of us do not understand the details of the repayment plan, nor are we competent to decide the validity of cost versus benefit formulae, and similar details. But one thing is perfectly clear to us. Once the Dinosaur goes under water—and later mud—it is gone for good and there is no possibility of repayment. We see no reason for the hurry.

It is our opinion that if these dinosaur canyons did not exist either on the land or on the maps, that reclamation engineers could still come up with a perfectly sound and feasible plan for developing the upper basin resources without them. It is our opinion that the reservation of the Dinosaur Monument for park purposes was tantamount to erasing those canyons from the Bureau's maps. At the same time it placed them on the maps of the national park service. We wonder why the Bureau—we men and women of the street who are not up completely on everything that goes on have just what we read in the papers and what we hear to make our minds up on—we wonder why the Bureau wastes its time and our money, since we pay the salaries, and your valuable time as committeemen, in preparing and advocating a solution, that ignores the act which you passed in 1916. In proposing that you reverse your stand of 1916, and in effect rescind it for this area today, they are providing, whether they know it or not, a blueprint of the techniques, the arguments, and the logic to be used tomorrow in securing entry to other parks in which good dam sites exist.

When the proposed Dinosaur dams first came to my attention, I confess to a feeling of regret that a controversy appeared to be in the making. The impressions I had of the monument were from pictures taken from the air and from the accessible overlooks, down into the canyons. So far as I was concerned they were very unimpressive. It looked to me like a drab desert plateau country, of which we have plenty in the West. I wondered if a mistake had not been made in giving this slice of grey desert, status as a monument. Maybe the very best use that could be made of it would be to store water and generate power there. Then I thought I might as well see the place before anything happened to it. And so in 1952 I floated through from Lilly Park to the western boundary near Jensen. My doubts disappeared at once as I realized that here indeed is an exquisite souvenir of the very finest canyon scenery, unlike anything I had ever seen or seen pictures of. It provided 6 days of semi-primitive living of the most delightful sort, in the most charming and often thrilling surroundings. Here was an experience quite unlike that available in any other national park or monument. So far as I was concerned this was a priceless jewel, to be kept for all our people to see and enjoy. To be kept because of its own intrinsic value, as well as for the continuing safety of our other parks. Since then I have been through twice more.

You cannot appreciate the Dinosaur Monument from the air, any more than you can from the topographic map. From the air you cannot even see the things we are talking about. If you have not seen it from the natural trail through, which is the river, you have not seen it. You might just as well try to appraise the value of Leonardo De Vinci's Last Supper, which is one of the great paintings of the world, by flying over Milan in a helicopter or riding the streets in a taxicab. All the talk of danger on this trip is nothing but wishful thinking by the proponents of the dams. There is danger of course wherever there is water over 6 inches deep. People continue to drown in bathtubs. Under the reasonable supervision which park service officials can provide, this trip is without danger.

Again I would like to dramatize myself for you as being the man in the street, expert in nothing, not engineering and legal matters, perhaps expert in parks to a certain extent because I have spent a good deal of my, say 60 years, visiting the parks.

It disturbs me—and my friends on the street—that so few of those who will determine whether this piece of public property shall be kept for what it is, or given away for what can be made out of it, have ever seen it. Many days have been spent here by you on figures of acre-feet, evaporation, operating levels, interest components, but no time on seeing what the property really looks like. Three days from Washington could be arranged providing most of one day on the river, in some of the best of the Yampa Canyon scenery, say between Charlie Mantle's ranch and Echo Park; in and out again to the highway by car. It is disturbing, that so much time should be given to these tangible engineering and economic figures, when the fundamental values involved in the proposal are intangibles, where the only possible evaluation comes from the experience itself.

I continually ask myself the question—and I am sure you do—"Why must we sacrifice the Dinosaur, in 1955?" Last year we were told officially that the Dinosaur dams must be built because they saved so much loss of water by evaporation. Specific figures were presented. Errors were discovered. New figures presented, smaller figures. Step by step the evaporation issue diminished. From an original estimate of 350,000 acre-feet in 1952, it had dropped to 25,000 in 1954. And because of the inherent errors in the best estimates for nonexistent reservoirs, that 25,000 acre-feet may be either plus or minus. In any event the major reason for invading the Dinosaur has now disappeared.

Whatever the final figure may be, it turns out to be insignificant when compared to other losses that evidently are not considered intolerable. Compared to the total volume predicated in the project—say 7,500,000 acre-feet per year, it is still more insignificant—about 0.3 percent. It will be difficult to persuade us, the little men in the street, that this insignificant loss, which may very well be a saving instead, can justify the sacrifice of the Dinosaur. The argument nevertheless is still advanced by those in high places, at least as late as November last year. And certainly there is no slackening of the pressure to get the Dinosaur finished up, right now.

If there is no longer a major reason—and I am assuming that evaporation no longer exists as a major reason—what are the minor reasons for the sacrifice of the Dinosaur? Power has been mentioned, though I recall that Mr. Tudor has stated that the power needs were not determining since power could be provided by steam. Storage certainly has been given prominence in the press. If power is not a determining factor, then storage for power can be eliminated. Storage can be reduced to that required for irrigation and community use—and here I assume that Glen Canyon Dam will provide the storage necessary for compact delivery—and this is all to the good since it will reduce the overall waste of water by evaporation, which storage entails. But Mr. Tudor has pointed out that none of the Dinosaur water is to be used for irrigation—which seems to me, the man in the street, to dispose of these minor reasons for impounding water in the monument.

I think you can appreciate why millions of interested citizens like myself find ourselves thoroughly confused by the shifting grounds

that have been advanced for including the Dinosaur dams at all in the project. We have still to hear any reason suggested for putting it in now, at the start of a project which is going to take 65 years to build and accurately appraise. And because we are confused and frustrated in trying to get any satisfactory answers to some of these questions, we probably have grown suspicious and resentful, perhaps. Our faith in the reliability of reclamation figures has dropped, of course, as we discovered that some of these figures were in error—repeatedly in error—pointed out by laymen, and finally admitted. Do not blame the citizen if he begins to wonder how sound the whole big project is if the reasons for depriving him of the item he is most interested in are found to be so flimsy and so full of errors.

Again I come back to the question for which I have found no answer: Why the hurry to build Echo Park Dam now? Why should it not be considered as the last item on the program, to be decided two generations hence, whether it is needed or not? Why should we not have that 70 years in which to use and enjoy the monument in the way intended when it was reserved? Why must millions of potential users be deprived of this opportunity which the 70 years ahead would provide?

I would repeat, do not blame the citizen, given this continuous runaround in the way of reasons, if he finally comes up with some answers of his own. They may be cynical, but they do make a kind of sense. Maybe the Bureau would like to operate in a number of parks, as it obviously does in the Dinosaur. There are many good dam sites in many of our parks, but there is no park unit in the system so new, so little known, and therefore so vulnerable. If its boundaries are ever going to be broken it will have to be right now—before too many people have seen it and understood its high value. It makes sense. It explains the haste.

Thirty millions of our people are said to have visited the parks last year. More are expected this year. That means that one-fifth of our entire population will be enjoying them this year. With our expanding population, the increased use of cars and travel facilities, increased leisure, the increased mechanization and tempo of our lives, the need for parks grows steadily greater. It is reflected in the mounting figures of use. I see no evidence of waning interest or appreciation of the parks, which would justify the beginning of their reduction. It seems to me to be clear-cut evidence that our people appreciate the parks, appreciate your wise legislation of 1916, and your 40 years of unswerving guardianship of their sanctity. In that period there has been no breakthrough in the name of local or regional economic advantage. It is a splendid record—and there have been many threats.

In my opinion, the only ground for a reversal of the policy of 1916, for the giving up of a park unit, is the imminence of some national emergency of catastrophic proportions where the sacrifice of a park will clearly meet the emergency and assure survival of the Nation or our way of life. There is no such emergency now, so far as I can see. There is none foreseeable in the immediate future. None has been mentioned in the press so far as I know, nor by the proponents of Dinosaur dams.

There has been some debate as to precedent. The Secretary has stated that this will not constitute a precedent. Since the word simply

means "that which has gone before," or in the dictionary terms "a preceding instance, or case, which may serve as an example for, or a justification, in subsequent cases," I wonder just what he means. If he means that there are and will be no more similar threats, I would remind him that there are some 20 filings for water and reservoir sites which adversely affect 11 of our national parks right now. If he means that each case will be determined on its merits, I have no doubt that that is true. But the very fact that one park has been abandoned, will encourage other communities or groups to seek similar local advantage at public expense. You may well anticipate more business of this character on your docket in the future if the Dinosaur is lost. Furthermore, the fact that economic arguments have led you to abandon one park unit will make it much more difficult to deny some other group which appears with similar arguments.

Your problem will remain simple so long as you continue to firmly deny park property for uses incompatible with park purposes and law. You will strengthen the law by such reiteration.

A number of suggestions have been offered to so alter the design of the upper basin project that we may conserve all the water for its highest uses, provide power as needed, and still retain the monument. It would be presumptuous for me to offer anything more than the briefest suggestion, since I am neither an engineer, an economist, or a lawyer. However, millions of our citizens do think on matters which concern them deeply. Sometimes these thoughts are valuable. If the upper basin needs power, and cannot find the capital to finance it, I see no reason why the Government should not provide the capital for steam plants comparable in capacity to the Dinosaur on a long repayment basis. We are doing essentially that for some of our foreign friends. Water storage and use could then be entirely divorced from power needs, and would save both water and tax money, at a time when we are desperately trying to balance our budget. As a taxpayer myself I would be willing to go along with a project of this sort, worked out of course on a sound basis. The depressed coal industry would benefit and so the whole economy of the region. Development of abundant raw materials could get started right away—the oil shale, phosphate ores, the great uranium resources. Broad industrial developments would follow, and with them population and the regional economy would rise. The steam plants, when amortized, could then subsidize the agricultural participating projects much as planned now. The generating plants might well be designed as our modern private plants are now in California, for the oncoming changeover to atomic energy.

I am confident that some such alteration of the basin project can be worked out for genuine public benefit, while we continue to use and enjoy the inspiration of the Dinosaur Monument in increasing numbers.

In concluding I would call your attention to one minor point, which comes up frequently as an argument in favor of Dinosaur dams. The so-called improvement of the monument by flooding it. Secretary McKay spoke enthusiastically of Lake Mead as the sort of thing he had in mind for the Dinosaur. I share his enthusiasm for Lake Mead and Hoover Dam. It is a miracle in the desert. Before the dam, this was one of the most drab, hot and unattractive areas of

desert land you would wish to find. The magnificient reservoir, the dam and the powerplant draw thousands of visitors. Every effort and much money has been spent to develop recreational facilities. Everything you see there is all to the good—including the whitewashed cliffs, the mud flats and the abandoned bathing beaches. Nothing was sacrificed, in creating Lake Mead. The financial investment was the entire bill—and that bill will be repaid. In the case of the Dinosaur the situation is quite the reverse. There, we are urged to throw in the exquisite values of the Dinosaur gratis, and at the very start, in addition of course to the financial outlay. Instead of creating something good out of literally nothing, as we did at Lake Mead, here we destroy something very precious in order to create something very far short of what was sacrificed.

Here for example are some pictures of the present draw-down at Lake Mead—120 feet (showing pictures). It is a bit startling when you first see it—sure. But what of it? The great distances at Lake Mead soften the strange effect. You get used to it because you remind yourself of what the place was like before. In the Dinosaur there are no great distances. You float along almost elbowing the walls. There, they will remind you of that which has been lost.

Consider the bathing beaches, and the boat and bathhouses, at Lake Mead. Now you run into a more difficult problem. Here, for example, is a bathhouse for women. Half a mile away across the caked mud and stones, rusty cans, broken bottles and abandoned moorings, is the lake. If you are determined to get there you can reach the slimy junction of mud and water. Here is a glimpse or two [indicating] of what you have to traverse to do so. I would say there is very little temptation to a swim, when you get there. And as a matter of fact the beach has been officially closed to swimmers, as you will see in this picture. This is the most popular swimming beach on the whole lake—or I should say it was the most popular. Close to Lake Mead Lodge, Boulder City and the highway. There is no swimming allowed there now, and no temptation to break the law.

Up at the far eastern end of the lake, where the river comes pouring through the Grand Wash Cliffs from Grand Canyon, there is today a vast empty desert of caked mud instead of the lake. You camp at what was once the edge of the lake, where swimming and boating was available, and there were great plans for recreation. Today, the miles of sand and mud flats stretch away into the hazy distance, completely empty and desolate. You cannot get near the water, even if you wish to try to walk there. Quicksands and quicker mud block your way for miles. I know from experience.

These are the characteristic features of the fluctuating power reservoir. They would be duplicated in the Dinosaur, just as you find them today at Mead, Shasta Lake, and Millerton—all of the fluctuating power reservoirs you may wish to visit. Since Hoover Dam is a link in a main north-south highway, many people pass that way automatically. They are counted as visitors. Others stop because of genuine interest in the dam and powerplant. They stay a half an hour or an hour—and are on their way again. Fishermen, who bring their own boats with them, can reach the water without difficulty at 1 or 2 places, and do so. Their number is not large. Those who patronize the boat-rental services and take the organized boat rides are surprisingly

limited in number. What I am saying is that of the millions who come to Lake Mead and who are counted as visitors, a considerable number are motorists just passing through. The recreational use of the area can hardly be predicated on the through traffic. God forbid that the exquisite values of the Dinosaur should become extinct in such mediocre circumstances.

"Altered but not destroyed," is a phrase used to describe what is proposed for Dinosaur Monument. The Taj Mahal—said to be the most beautiful building of its kind in the world—could be torn down and its blocks of marble rebuilt into a movie theater or a supermarket. It would indeed be altered. The stone would all be there, but the beautiful thing we call the Taj Mahal would have been destroyed. It would be just so with the Dinosaur.

Thank you for your patience and your courtesy.

Mr. ASPINALL. Thank you for your statement and your cooperation.

Mr. HAROLD BRADLEY. Thank you.

Mr. ASPINALL. The Chair recognizes as the next witness, Mr. Charles H. Callison, conservation director of the National Wildlife Federation. We are glad to have you with us this morning, Mr. Callison.

STATEMENT OF CHARLES H. CALLISON, CONSERVATION DIRECTOR, NATIONAL WILDLIFE FEDERATION

Mr. CALLISON. Mr. Chairman and members of the committee, my statement will be very brief. I want to thank you again for the very great privilege of appearing before you in connection with this important issue.

For the record, my name is Charles H. Callison, and I am conservation director of the National Wildlife Federation, which is a national association of State organizations, State wildlife federations, and sportsmen's leagues. The national federation is presently composed of these affiliated organizations in 47 of the 48 States and in the Territory of Alaska and the District of Columbia, representing through their affiliated regional and local associations and clubs a total membership of approximately 3 million persons.

It is my privilege, Mr. Chairman, to be able to present here some very fresh evidence of the point of view of the National Wildlife Federation in connection with the issue of whether or not a power and reclamation dam should be built at the Echo Park site in Dinosaur National Monument. Our annual convention was held week before last, March 11 to 13, in Montreal, at which time all of our State and Territorial affiliates were represented in person, with one exception, the State of Louisiana, whose delegate became ill upon the eve of his departure for Montreal, and the Lousiana Wildlife Federation was represented by proxy.

During our convention the matter of Echo Park Dam was discussed at length and with considerable spirit, with both points of view being presented in considerable detail by their capable spokesmen, at the end of which the convention assembly adopted this resolution, which we have passed around to members of the committee, opposing very firmly Echo Park Dam.

The vote on that resolution was 30 to 12, with each State federation having 1 vote under our constitution and bylaws. Three of the States represented voted in favor of this resolution which puts us very firmly

on record as opposed to Echo Park Dam; 12 of the State representatives voted against it; and the others were either abstaining in their votes or not present, as this particular vote came late Sunday afternoon when our meeting was supposed to have adjourned by noon, and some of them had already departed as a result of travel reservations for their homes.

I should like simply to read this short resolution into the record.

Where as the national park system, established by law, is urgently needed and is increasingly being supported and enjoyed by millions of people, and

Whereas progressive losses of recreational facilities in the various States apparently cannot be stopped, and recreational lands increased for the use of all of the people, and

Whereas such continuing loss in the light of increased use of outdoor recreational opportunities makes this condition alarming, and

Whereas any legislation that would authorize the construction of the proposed Echo Park Dam in the Dinosaur National Monument in northwestern Colorado and northeastern Utah would open the way for further destruction of other recreational areas in our monuments and parks, and

Whereas the alternatives that have been offered have never been adequately studied by the Bureau of Reclamation, and have never been proven inferior, and

Whereas the necessity for Echo Park Dam has never been fully demonstrated; therefore be it

Resolved, That the National Wildlife Federation, in line with its policy of fighting for increased recreational opportunities for all of the people, take every action possible to oppose the construction of Echo Park Dam and to preserve the Dinosaur National Monument as it is now constituted, and to do everything possible to see that our national park system is not needlessly invaded or despoiled.

Mr. Chairman, that completes my statement. Thank you again for the privilege.

Mr. ASPINALL. Thank you, Mr. Callison. Please bear in mind that you and representatives of your organization are always most welcome to appear before this committee.

Mr. CALLISON. I shall be happy to be here this afternoon in case there are some questions.

Mr. ASPINALL. If you will, please.

The Chair next calls Mr. David Bradley of the New Hampshire Legislature. We are glad to have you again before this committee. The Chair recognizes you from last year, and we will be glad to listen to your statement.

STATEMENT OF HON. DAVID J. BRADLEY, A REPRESENTATIVE IN THE NEW HAMPSHIRE LEGISLATURE

Mr. DAVID BRADLEY. Thank you, Mr. Chairman. If you get weary of Bradleys, let me warn you there are four more in reserve if anything should happen to the ones here.

Mr. ASPINALL. What I want to know, do you have any on the other side? Are you all boys or do you have some girls?

Mr. DAVID BRADLEY. My father did his best, but time after time things went wrong. [Laughter.]

Mr. ASPINALL. We shall be glad to welcome any of the Bradleys at any time.

Mr. DAVID BRADLEY. Thank you, Mr. Chairman.

My name is David Bradley. I am a medical doctor living in Hanover, N. H. I appreciate this opportunity to speak, once again, against

the proposal to build dams and reservoirs in Dinosaur National Monument.

A year ago I appeared before you as an ordinary citizen to make the same plea. Having camped and climbed in many of our national parks, having known these places intimately, I would still make this journey from New Hampshire as an ordinary citizen and at my own expense to oppose this unwarranted misuse of our parks.

As you say, Mr. Chairman, I am a representative in the legislature at Concord.

I may say, parenthetically, Mr. Aspinall, it is a pleasure to come here from the kind of operations we have been dealing with in Concord. We have been trying university professors on the assumption what they think and what they teach is subversive, and that is a destructive and debilitating process. It is a pleasure to come here and talk about the proper use of water and the proper preservation of parks because, surely, that is a good and constructive thing to be engaged in.

In a small way—my colleagues think it is a very small way—I am responsible for the welfare of the people of my State. So, while formerly as a citizen I was content simply to oppose the inclusion of Echo and Split Mountain Dams in this upper Colorado project, I must now raise objection to the entire project as presently conceived. Some things just don't make sense. Take for example the power. Up my way in Littleton, N. H., on the Connecticut River a private power concern is building a big new dam, which will generate 150,000 kilowatts. Up there we have to build a dam five-eighths of a mile long and flood a lot of farmland in order to get a 180-foot head of power. Yet the Littleton Dam is contracted to cost $60 million, or $400 per kilowatt. Expensive as this is it is less than one-half the kilowatt cost of Echo Park Dam and there is no 50-year subsidy paid by the taxpayers of Utah or California or Illinois to get the Littleton Dam built.

Or take irrigation. According to Mr. Leslie Miller, former Governor of Wyoming, the Federal subsidy involved in this project amounts to $2,700 per acre (p. 527, Senate report, S. 1555, 1954) of irrigated land—or roughly $67.50 per acre per year. Now I ask you how can I, a member of our State's governing body, possibly support a fantastic handout like that?

You know it is said that our principal crop in New Hampshire is rocks. It is. Rocks sprout right up out of the ground every spring even after two centuries of cultivation. Farming is a tough meager hardscrabble business. But nobody is subsidizing our acreage. Nobody is guaranteeing to our farmers their water or sunshine or fertilizer to the tune of $67.50 per acre per year. Yet if this bill should pass New Hampshire people would pay almost as much as the people of Utah for this Colorado River project—and for land that would produce the crops that are already grown in massive surpluses, heaped up and rotting in Government grain elevators or in World War II cargo ships.

Let me add that we, of course, would not oppose a reasonable development of the Colorado River. But to pour several billions into an area that now has only 325,000 people living there (Senator O'Mahoney in Collier's, February 18, 1955)—not much more than half the population of little New Hampshire—doesn't make sense to us.

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I think a lot of people, east and west, have been taken for quite a ride by this Bureau of Reclamation. A lot of honest, trusting people, people who take pride in a great works at Hoover Dam and Grand Coulee. Their pride is not narrow, selfish or provincial; they have shown their willingness to pay out in taxes for such projects although they may be built thousands of miles away. It's the pride of being an American and backing up what is generally good for America.

But this project on the upper Colorado is a different sort of proposal. It is a gargantuan deception that is being played upon the people of this country, people in Utah and people in New Hampshire. From where we stand it looks like a not very skillful attempt on the part of the Bureau of Reclamation to write itself a 75-year meal ticket and get it signed before the people of this country wake up and realize what is happening.

I have read with interest the report of this committee last year and of its Senate counterpart. I must say, Mr. Chairman, that the democratic process for all its stumbling fumbling ways is still an impressive instrument. It has shown up unerringly not only the philosophy behind this project but also some of the disorderly housekeeping practices of the Bureau of Reclamation.

II.

Now the subject I wish to raise for your consideration today, Mr. Chairman, has to do with atomic energy. It has been mentioned before but no one, as far as I know, has treated it in any detail. This committee will want to explore all reasonable alternatives to Echo Park and Split Mountain Dams, since both involve the sanctity of the national park system. Alternatives are particularly apropos in this case, for these dams do not purport to irrigate so much as a single cactus plant. Both are for power and storage, and since storage within Dinosaur is not an immediate but only a predicted necessity these dams must stand or fall on whether they will produce power so irreplaceably, and so economically as to justify the inundation of a national park unit.

Let me say at the very outset that I am not an engineer. My training has been medical. Yet by good luck my Army service included a considerable period spent in the Manhattan District climaxed by 6 months in the Radiological Safety Section at the original Bikini atomic-bomb tests of 1946. Those of you who remember back as far as those now prehistoric days may recall a small book I wrote on the subject: No Place to Hide.

There is no need for me to point out to you gentlemen that we are stepping across the threshold into an era which few can clearly comprehend, still fewer make firm promises or predictions. I have no wish to exaggerate or to overstate the case, yet I believe that within 10 years we will see nuclear energy being used for municipal and industrial power. I would remind you, while we look ahead a moment, that it is only 23 years since the discovery of the neutron, less than 13 years since the demonstration of the first self-sustaining chain reaction. You might, also, ask yourself whether you could have predicted in 1905 the changes that were to come to our civilization as the result of the invention of the internal-combustion engine. This same half a century

look ahead is what you are being asked to take in approving the 50-year payback period of these proposed hydroelectric power dams.

The day of uranium-steam generation of electricity for special and limited purposes is already here. You read of the launching of our first atomic submarine, the *Nautilus*, on January 17 of this year, and of the reports of her successful maiden cruise. The *Nautilus* is powered by nuclear energy: its engine is a "reactor." The heat generated by the chair reaction in that reactor is mediated through a complicated mechanism called a heat-exchanger where water is converted into steam. The steam drives turbines and generates electricity. This is the latest thing in submarine engines.

Such a revolutionary change in ship propulsion has a military significance which need not concern us here; the point I wish to make is simply that this kind of powerplant is the same machine, in principle, that we are talking about when we speak of atomic power for peacetime industrial use.

Whether this special use for nuclear fuels grows into widespread general use in industry in our lifetime depends upon technologic advances in reactor design, in technologic advances in the use of the competing fuel, coal, and in the willingness of industry to risk capital expenditures on atomic energy. No one can give you a sure bet about this at this time.

There are various modifications of this submarine engine. Some use boiling water to extract the heat developed by the fission of uranium. Some use water at high temperature and under great pressure. Some use liquid sodium. Then there is the quite different and promising device called the homogeneous breeder where the motor itself is no longer a complex network of uranium slugs, graphite bricks, cooling pipes, and control rods—the homogeneous breeder is a proper mixture of fuel and moderator which in the course of operating creates more fuel than was originally present.

Whatever the details of these atomic engines—and of course they are secret—the end process is approximately the same: Heat converts water into steam, steam drives turbines, turbines generate electricity.

Now what are the economics of this source of electric power? Needless to say these various powerplants mentioned above are still experimental. Which type will prove the best cannot now be said. We have recently begun to build in this country the first land-based nuclear powerplant. It will be in operation, I understand, in 1957. Nuclear physicists and engineers are generally agreed that that type of atomic engine which is the most economic today—the boiling water reactor—may well prove to be the least efficient ultimately, and that the most costly type—the breeders—may ultimately, prove to be the best type.

But even now—and this is what concerns this committee—we can begin to see the cost-per-kilowatt relationship of nuclear energy and compare it with hydroelectric or coal-steam power.

Our first big test case was Hanford, Wash. This gigantic installation was built just prior to the end of the last war for the purpose of converting the slowly reactive form of uranium into the bomb material, plutonium. At Hanford there were three reactors—or piles as they were then called. They were large prototypes of what will some day be modern industrial reactors. And what was the power potential of these three big cubes of uranium, graphite, and cement?—

the equivalent of 600,000 kilowatts. As one Austrian authority has written:

At the very least the piles were of 600,000-kilowatt capacity.

You need not fear, Mr. Chairman, that I am giving away secrets. What I have told you was written in a little book printed in Vienna in 1945 which anyone in Europe could buy for about 25 cents. It has been in the Library of Congress since 1946. It is of course written in German but it might surprise you how many people can read German. Indeed I may add that often the best way to find out what is going on in atomic energy is to read the European publications.

At the very least 600,000 kilowatts—or roughly three times the power potential of the proposed Echo Park Dam. And at what cost? Well, we know that the full bill for Hanford at the end of 1945 was about $342 million. Thus we find that at the very dawn of the atomic age this trio of reactors—built at the height of our war extravaganza, with all the haste and waste of a massive and urgent experiment, could produce the power equivalent of three Echo Park Dams for twice the cost.

Let me add of course that I know they did not and could not generate kilowatts. They were not designed to do so. I refer simply to the power potential inherent in the three machines.

But there are many more recent signposts to guide us. For example, consider the studies of the Nuclear Power Group under the direction of Mr. Titus LeClair. They concern two pressurized water reactors—not yet under construction—one of 50,000-kilowatt capacity, at an estimated cost of about $38 million; the other of 150,000 kilowatts at an estimated cost of about $60 million. In other words if these nuclear powerplants should cost twice what is estimated they would still produce power as cheaply as Echo Park Dam—if Echo Park Dam should cost what the Bureau claims it will cost.

Dr. James A. Lane, of Oak Ridge, Tenn., has set down considerable data on nuclear-power costs in an article that appeared in the January 1955 issue of Nucleonics, this is a kind of trade journal for engineers and businessmen interested in atomic power. I have extracted for you, Mr. Chairman, the table which appears below. The first column of figures deals with what Dr. Lane considers to be the present cost of nuclear power by three of the most likely methods. The second column deals with the cost which he believes we may expect in the not-too-distant future as a result of what he calls foreseeable technologic improvements:

Nuclear power costs

[Mills per kilowatt-hour]

	Present	Expected
1. Pressurized water	6.8	6.0
2. Boiling water	6.4	5.75
3. Homogeneous thermal breeder	8.75	6.1

I am not in a position to comment on the above figures. Dr. Lane is generally known to be conservative. Interestingly enough those physicists and engineers with whom I have discussed this matter, while feeling that the figures concerning present-day costs were somewhat

optimistic, nevertheless felt that the "expected costs" in column 2 were not out of line considering those "foreseeable" advances.

Now what does all this mean? It means, Mr. Chairman, that we can make a reasonable comparison between the kilowatt costs of hydro, coal-steam, and uranium-steam power. As you all know, a hydroelectric plant, having no fuel bill to pay, can be built at twice the cost per kilowatt of a steam plant and still be a good investment.

Littleton, N. H., dam goes to almost three times the kilowatt cost. Modern high-pressure, high-temperature steam plants are now being built for less than $150 per kilowatt. Ex-Governor Miller of Wyoming has mentioned 2 plants, 1 in Denver, 1 in Salt Lake City, whose costs were under $170 per kilowatt.

Nuclear-steam power cannot yet compete with coal. The most recent estimates I have seen range between $175 and $225 per kilowatt, although figures run considerably higher in some instances.

But suppose these estimates for nuclear power should double, Mr. Chairman—the way the Bureau of Reclamation's estimates have a habit of doing (Representative John Saylor, p. 136, 1954 House report on H. R. 4449, H. R. 4443, H. R. 4463: "The average over those years is that the cost of the projects that the Bureau of Reclamation has built has doubled.)"—they would still be way under the cost-per-kilowatt of Echo Park Dam.

$883 per kilowatt for Echo Park Dam. Really, Mr. Chairman, I wonder that there is any debate at all over this part of the project. Do you believe that the people of the upper basin States know this? Have ever read such facts in the Salt Lake Tribune or the Denver Post? Can you say indeed, with any confidence, that Echo Park Dam will not turn out in fact to cost $1,000 or $1,600 per kilowatt? If you do your optimism will be way beyond anything that can be attributed to the nuclear engineers quoted here.

I am well aware that the Bureau of Reclamation may not be interested in atomic power, except conceivably for rendering seawater into fresh water for irrigation of coastal flatlands. Nevertheless it is the proper concern of this committee to examine all reasonable alternatives to Echo Park and Split Mountain Dams in order not to saddle the taxpayers of this country with unnecessary Federal power installations, and particularly not to do so when two of these proposed installations would invade and liquidate one of the fine natural beauty spots and playgrounds of which you are the trustees for the American people.

As one last piece of information concerning atomic energy, let me call your attention to the report of the Atomic Products Division of General Electric as printed in the July 1954 issue of Nucleonics. (General Electric, I think you will agree, is not a corporation noted for wild predictions and harebrained schemes.) After detailing some of their own plans they conclude with the following significant statement:

> We believe that:
>
> (*a*) Electric companies will be owning and operating a number of atomic powerplants within the next 10 years;
>
> (*b*) Some of these will be full-scale and will generate electricity at competitive costs, probably within 5, certainly within 10 years;
>
> (*c*) This will be accomplished without Government subsidy for production-plant construction or operation, and with Government-supplied fuel priced at cost-of-production levels.

III

There is of course much more to be said against Echo Park and Split Mountain Dams than that they are extravagant ways to get kilowatts. What about these parks as parks? What will their worth be to vacation-minded Americans 50 years from now? Our national parks are a uniquely American institution. They were founded by men of vision; they have been protected, year after year, in now unremembered battles, by men of vision. If you have any doubt as to what I mean let me ask you: Have you ever heard tell of the national parks of England, or of France, or of Russia?

This brings me back for a final word about Dinosaur. Mr. Chairman, it is time that somebody reviewed the life history of this miserable, blundering project. It seems to me to have been a heavyfooted scheme to bamboozle innocent trusting taxpayers, both westerners and easterners, on the part of a powerful and once fine and respected Government Bureau.

You think, perhaps, I have merely come down here for the pleasure of throwing words around. Believe me, Mr. Chairman, it is no pleasure. I can only feel a deep sense of shame, personal shame, as an American, that such things have to be said in America.

Consider how many faces has this project masqueraded behind so far. First it was national defense. That was 5 years ago. A defense plant was to be built in this region, Echo Park Dam would supply essential power. Secretary Chapman said that while he was reluctant to approve the invasion of the national park system he felt he was "confronted with the one valid reason for such action—the requirements of national security" (House Hearings, 1954, p. 802). Then the defense plant was located elsewhere and this same Secretary of the Interior openly declared that Echo Park and Split Mountain Dams were not necessary.

Masquerade No. 2 came in January, a year ago—Evaporation. Under Secretary of Interior Tudor said, as you all know (House Hearings, 1954, p. 26):

> In the final analysis the increased losses of water by evaporation from alternative sites is the fundamental issue upon which the Department has felt it necessary to give any consideration to Echo Park Dam and Reservoir.

You all remember what happened: Errors, errors, errors, errors—dub out and exposed by amateurs. Three times M. Tudor's final analysis had to be reanalysed downward. What had been 350,000 acre-feet excess evaporation in 1950 became 165,000 acre-feet in January 1954—70,000 acre-feet by March 1954—25,000 acre-feet in May 1954.

In that humiliating letter of May 13 to the former chairman of this committee Mr. Tudor says:

> I realize that this must cast doubt on the reliability of all estimates.

Surely that is the understatement of the age. Are we to accept in blind faith, Mr. Chairman, the estimates prepared for us in 1955, when in 5 short years the estimates prepared by this same Bureau of Reclamation have been shown to be off by 1400 percent?

You are a committee, I as a taxpayer, we all as American citizens have a right to expect better.

This brings us to masquerade No. 3—electric power. The details have already been thoroughly explored by this committee. It appears that only if Echo Park Dam can be built for the $176 million estimated for it—or for less—and only if Split Mountain Dam is not built at all can the destruction of Dinosaur Monument be justified economically. And then only if you rate this national monument itself as utterly valueless.

Having failed three times to prove their various alleged fundamental reasons why this monument should go, what do the proponents of this scheme conjure up for their latest disguise? Recreation. Believe it or not, recreation. These resourceful people—and I think you will agree from this brochure [indicating] they have plenty of resources—have the effrontery to claim that Echo Park Reservoir will be "tomorrow's playground for millions of Americans."

The front page and last page, Mr. Chairman. in order to justify their claims is Yampa River as it stands, not as it would if it were flooded. That is only to make an obvious point, sir.

Last year the cry was "Utah's last waterhole," and the picture of that poor emaciated hardpan miner eating sand on the burning wastes of Utah—this year it is cheesecake on water skis.

From national security to evaporation to power to recreation—really, sir, could any smokescreen be more transparent? It could only have been devised in utter desperation by people contemptuous of the intelligence of the American people.

It is no wonder, therefore, that one Western Senator felt constrained to say—as reported in the Salt Lake Tribune (December 16, 1954):

> If we are ever to get legislation of this type we must get it now. If we don't succeed we probably will not see the bills passed in our lifetime.

There is surely a need for water development in the West. And certainly no reasonable man would oppose a reasonable plan. But this present plan which gives priority to Echo Park Dam is not it, I believe. Mr. Chairman, I am not too young to know about or too old to remember Teapot Dome. The party (of which I am a member) with one such scandal to its everlasting shame can scarcely afford another. The party (of which you are a member) which has avoided such evil practices can scarcely afford to begin now.

Thank you, Mr. Chairman.

Mr. ASPINALL. Thank you very much. You will be here this afternoon?

Mr. DAVID BRADLEY. Yes, sir.

Mr. ASPINALL. The next witness is Mr. Fred M. Packard, executive secretary, National Parks Association.

STATEMENT OF FRED M. PACKARD, EXECUTIVE SECRETARY, NATIONAL PARKS ASSOCIATION, WASHINGTON, D. C.

Mr. PACKARD. Mr. Chairman, I would like to express the appreciation, not only of myself but of everyone who is testifying today, for the extreme courtesy with which you very kindly set this date so that some of us might attend meetings in Montreal and in California. It was indeed very gracious of you and we appreciate it very much.

The National Parks Association has presented testimony about the importance of safeguarding the national park system from adverse effects of present plans for the upper Colorado River storage project,

especially from the impact of Echo Park Dam on Dinosaur National Monument, at previous hearings before Congress. We have also analyzed in earlier testimony some of the values that are endangered, and we have discussed particular aspects of the problem in some detail. This testimony, with supplementary documents, is published in the reports of the hearings of the House Committee on Interior and Insular Affairs on H. R. 4449, 83d Congress, and of the Senate Committee on Interior and Insular Affairs on S. 1555, 83d Congress, and S. 500, 84th Congress. The present discussion is designed to summarize the salient points under debate.

OBJECTIVES OF THE OPPOSITION TO ECHO PARK DAM

At a meeting called by the National Parks Association in November 1954, more than 20 national and regional organizations agreed on the following statement of their objectives:

(1) The national park system, established by law, is urgently needed and is increasingly being enjoyed and supported by millions of people. The conservationists represent the public interest in the preservation of these areas. That is what brings us together in this crisis.

(2) We are opposed to any legislation that would authorize building the proposed Echo Park Dam in the Dinosaur National Monument in northwestern Colorado and northeastern Utah—or any other dam that would flood any portion of any national park or monument.

(3) We are mindful of the extreme importance of water in the West. And we are sincerely interested in any sound upper Colorado water development that can effectively utilize the water without threatening the national park system. We point out that the necessity for Echo Park Dam has never been demonsrated. It has only been asserted. We also point out that the alternatives to Echo Park Dam have never been adequately studied by the Bureau of Reclamation, and have never been proved inferior.

(4) We invited all citizens to join with us to make sure that areas set aside for preservation in the national park system are not needlessly invaded or destroyed.

This is signed by:

The American Museum of Natural History
The American Nature Association
The American Planning and Civic Association
The Conservation Department, Yale University
The Conservation Foundation
The Council of Conservationists
The Dartmouth Outdoor Club
The Emergency Conservation Committee
The Garden Club of America
The General Federation of Women's Clubs
The Izaac Walton League of America
The National Audubon Society
The National Conference on State Parks
The National Council of State Garden Clubs
The National Life Conservation Society
The National Parks Association
The National Wildlife Federation
The North American Wildlife Foundation
The Outdoor Writers Association of America
The Sierra Club
The Wilderness Society
The Wildlife Management Institute

It is clear that our protest is registered only against those features of the present plans that threaten the national park system. We have not expressed a position with regard to the overall Upper Colorado River storage project, since we do not believe ourselves qualified to analyze its economic, engineering, or practical feasibility, and consider such analysis to be the responsibility of others directly concerned with such matters. We simply ask that if the Congress deems it proper to authorize the project, it insure the plans be revised to eliminate the undesirable features affecting the national park system.

FEATURES AFFECTING THE NATIONAL PARK SYSTEM

1. Glen Canyon Reservoir, as now designed, would flood part of Rainbow Bridge National Monument. An agreement recently concluded between the Bureau of Reclamation and the National Park Service provides that if feasible this national monument shall be protected by 1 of 2 methods. Both involve a retaining dam built below the monument boundary. One method proposes a pumping station at this dam to perpetuate the flow of Bridge Creek through the monument; the other would divert Bridge Creek through a tunnel upstream from the monument boundary and into Glen Canyon Reservoir. It appears none of the promised engineering studies have yet been made to determine whether such a project will work, and no report has been issued as to its cost or feasibility. The necessity and height of such a retaining dam depends on the height of Glen Canyon Dam, if built, and other witnesses have presented documentary evidence that some of the engineering features of Glen Canyon Dam require further study.

If Congress should approve Glen Canyon Dam, we urge that appropriate provision be included in the authorization directing the Bureau of Reclamation to provide complete safeguard for Rainbow Bridge National Monument.

Some citizens of Utah have proposed Glen Canyon be made a national park. Since Glen Canyon has not been so reserved, its use as a reservoir would not constitute an invasion of the national park system, and cannot be objected to on that ground. However, the area is reported to be fully qualified for national park status, and consideration should be given to this potentiality in appraising the relative value of use of the site for water storage purposes.

2. The potential New Moab Reservoir would affect Arches National Monument. This site is not being seriously considered at present and does not represent a problem now.

3. Echo Park and Split Mountain Dams and Reservoirs would have a drastic undesirable effect on Dinosaur National Monument. Split Mountain Dam is proposed for second-phase construction, and so has not been the subject of much discussion. It would be smaller than Echo Park, but it is equally undesirable as a threat to the national monument and the national park system.

Decision whether to approve present plans for the upper Colorado River storage project rests with this committee and the Congress, and will be based on a wide range of evidence. If it is decided to authorize it, the national conservation organizations have unanimously recommended that Echo Park Dam be deleted from it. We also request

proper safeguard be given Rainbow Bridge National Monument, and, to avoid similar controversy arising at such time as the second phase is considered, that specific provision be included in the legislation before the committee prohibiting construction of any structures or reservoirs as part of the project that would invade an established unit of the national park system.

The remainder of this statement deals with specific questions relating to Echo Park Dam.

VALUE OF DINOSAUR NATIONAL MONUMENT IN ITS PRESENT NATURAL STATE

Many witnesses who have explored the canyons of the Green and Yampa Rivers, who have taken the exhilarating boat trips down the rivers with their families, who have camped and hiked and photographed the wild beauty of Dinosaur National Monument, have attested the incomparable quality of the area. It was reserved because it is unique, unlike other canyons in Utah, as different in its way as is Zion or the Grand Canyon. The brilliant canyons with their living rivers, are what make it so. It is to protect these canyons, and to prevent the obliteration of their quality by reservoirs, that we have protested Echo Park Dam. At previous hearings, proponents of Echo Park Dam derided the beauty of these canyons, asserting they offered little of inspirational or recreational importance. Now, however, these same proponents describe the canyons as "one of the greatest wilderness playgrounds and some of the most beautiful scenery in the world." Time is not sufficient to describe this wonderland in detail, and other witnesses have done so; but there appears to be agreement now that Dinosaur National Monument is a full partner of all of the great national parks and monuments.

There are also important scientific values that should be preserved. The famous fossil quarry would not be affected by the reservoir, and no witness for the conservation organizations has ever said it would be. The widespread belief that the quarry would be endangered is a result of misrepresentation of our objective, which is to defend the canyons. The quarry is being developed as an interesting exhibit of an unusual aspect of nature, but it is not an issue in the debate.

The canyons have long been noted places for geological study, and many important structures would be inundated by the reservoir. They contain valuable archaeological relics, most of which would be flooded. There are also botanical and wildlife values endangered. Assertions have been made by proponents of the dam that fishing would be improved, but these appear to be generalized assumptions, not based on field studies. Mr. Joseph Penfold, western representative of the Izaak Walton League, who has more concrete information about what may be anticipated than anyone else, has testified to this committee that fish resources could not be expected to benefit, and would probably suffer seriously.

National parks are not resorts, but are designed to provide those deep inspirational values derived from close contact with unspoiled nature so urgently needed amid the tensions of modern mechanized civilization. They contribute to the fundamental health and well-being of our people, and instill in them an appreciation of the magnificence of the natural creation of our land. In doing so, they give enjoyment and refreshment; but titillating entertainment or super-

ficial recreation is not their purpose. There is a basic difference in evaluation between a quiet camp beside a flowing stream and a roaring speedboat towing a water-skier at breakneck speed. Both have their proper place in our culture; but they do not both belong in our national parks.

One of the unique attributes of the monument is its provision of safe but fascinating boat trips down the rivers, an activity available nowhere else in the national park system and in few other places in America. Last year, nearly 1,000 people, aged from 4 years to over 70, took these trips, enjoyably and without danger. Their experience was so enjoyable that they have inspired more people to follow their example this year. This committee has heard from many who have had this pleasure, and they are agreed about the value of the experience. Were Echo Park Dam to be built, this extraordinary recreational resource would be destroyed forever.

ALTERED RECREATIONAL POTENTIALITY IF ECHO PARK DAM IS BUILT

Proponents of the dam have asserted recreationl values would be improved by substitution of a reservoir for the free-flowing rivers, and have summarized their contention in a brochure entitled "Tomorrow's Playground," published by the Upper Colorado River Commission in 1954. Extolling the beauty of the canyons, the argument is presented that scenic and recreational values would be enhanced by the reservoir. Most of the photographs show present natural conditions with the live rivers; for example, the reservoir at the point shown on the back cover, Tiger Rock, would completely cover this scene. In place of the magnificent escarpments shown, would be a lake, fringed and dotted with the tops of now-towering cliffs, possessing little beauty, in no way comparable to the superb spectacle that now exists. The lake would be the duplicate of almost every reservoir in the West, providing no special inducement to visitors. The delightful river trips of today—erroneously described as hazardous—would be gone. Most scientific values would be lost deep under water.

Camping, swimming, and most use of the water for public enjoyment would be virtually impossible. The brochure speaks of "picnic areas to accommodate 2,000 picnic groups, beaches, boat harbors, cabins and lodges, and campgrounds for 4,000 camping groups." It does not mention the National Park Service's efforts to secure funds to provide more reasonable and realistic facilities, nor does it note that were such facilities to accompany the reservoir, they would be separated from the water by a morass of mud and debris, since drawbacks at periods of low water would extend 25 miles on the Green River and 13 miles on the Yampa, creating 35,000 acres of ooze and stained shorelines devoid of vegetation or usefulness. Recreational use at any time the reservoir was not full—and it is expected to be full once every 30 or 40 years—would be virtually impossible.

The dream of the proponents is to duplicate conditions produced at Lake Mead, in the belief that reservoir represents an ideal situation. Actually, Lake Mead is a vivid example of the futility of endeavoring to justify a power reservoir on recreational grounds. Although the counters record a large number of people visiting Hoover Dam as an excursion from Las Vegas, few people go there for other reasons. Fishing is still fairly good there, at least for some species, but gen-

erally it is deteriorating. Fewer than 1,000 people rented boats there last year. Several beaches were developed—but present drawback of more than 120 feet has isolated them from the waterline and bacterial conditions in the morass of muck has forced them to be closed as unsafe to health. Boat wharfs are unusable unless they have special facilities for extension over the mud. Camping is a minor use of the area. The area provides little of fundamental value for recreation, and only slightly more superficial entertainment.

Lake Mead, unlike Echo Park reservoir, covered an unreserved area of no special significance, and is the only body of water in thousands of square miles of desert. It did no damage, and its justification was economic. Echo Park Dam cannot be justified on the basis of an unrealistic assertion of hypothetical potential recreational use.

ASSERTED JUSTIFICATION FOR ECHO PARK DAM

A basic question is whether Echo Park Dam is necessary to the project, or whether the project, if desirable, cannot be modified to avoid this damage. The original justification, in 1950, was that a certain amount of power was urgently needed in that vicinity to serve a defense installation. It was this consideration, not then public knowledge, that led Secretary Chapman to authorize the Bureau of Reclamation to continue its plans for the dam. Subsequently, this plant was relocated in another State. Secretary Chapman then held the matter on his desk for months, while he investigated the feasibility of eliminating Echo Park Dam from the project. Before his term of office expired, these studies had progressed to a point that convinced Secretary Chapman that Echo Park Dam was not necessary to the overall project, and accordingly he recommended to the President on December 4, 1952, that the benefits desired from the Echo Park unit be obtained by means of structures at other locations than within the national monument.

The second justification presented was the now notorious evaporation loss factor. Originally pegged at a loss of 350,000 acre-feet to be expected by any other construction program, an error in the calculations dropped the estimate to 200,000 acre-feet. Secretary McKay was advised that even this loss was so serious as to require Echo Park Dam to be built, and he stated that he would have given no consideration to this dam except for this advice. Then, at last year's hearings before this committee, evidence of additional serious errors in the calculations was demonstrated, and these errors were admitted by Under Secretary Tudor. The estimate at this point was 25,000 acre-feet. It has since been revised again to 120,000 acre-feet; but this figure seems as unsubstantial as the earlier ones. Without laboring the point, which other witnesses have analyzed thoroughly, it is enough to point out that any basis as ephemeral as the evaporation loss factor has proved to be certainly does not justify construction of so expensive and elaborate a project, nor one that would do such damage to other values and the national park system.

The most recent attempt to justify this dam is the argument it is needed to firm up power produced at other sites. We are not qualified to analyze relative cost factors, as others have done, but evidence has been presented that there are vast coal reserves in the region, and that they can be used efficiently to achieve this result.

Echo Park Dam, by the Bureau's reports, is not designed to contribute irrigation benefits. It is for power and storage. There appear to be several ways by which additional storage can be provided within the framework of other included projects, and Herbert Hoover and others have questioned the need for the amount of storage anticipated from the overall project.

Echo Park Dam has been described repeatedly as a key element in the overall project; but this has merely been asserted. Studying the mass of testimony now available, we can find no concrete evidence to prove it is necessary to the project or to the Nation. In the absence of such evidence, there is no justification for authorizing it.

Conservationists have not simply opposed Echo Park Dam. They have suggested possible ways to revise the project to secure the desired benefits without this feature. General Grant has analyzed one method; objections to his proposal have been assertions for the most part, rather than pragmatic. A change in the height of Glen Canyon Dam has been suggested, and engineering studies of this possibility seem far from adequate to dispute it. Lake Mead or other reservoirs might be adjusted for increased storage, and this should be explored. Instead of complete dependence on hydroelectric power unnecessary and extravagant.

There may be yet other alternative approaches to the problem. The forthcoming report of the Hoover Commission, which should be studied before a final decision is made on this project, may present other considerations. We have never insisted any one or another of these solutions is the best answer. We ask they be considered, that thorough study be made of them before further consideration is given to Echo Park Dam. We have confidence that if the Federal engineers will undertake such studies in an objective spirit, to ensure their project will not do avoidable damage, a sensible solution will be found.

ECHO PARK DAM AS A PRECEDENT

Conservationists are perturbed not only by the damage Echo Park Dam would do to Dinosaur National Monument, but also because its construction would be the first step toward construction of similar projects in other national parks. In spite of assertions by proponents of the dam to the contrary, Echo Park Dam would be a real and serious precedent. It would be the first such violation of the sanctity of the national park system since the National Park Service was established in 1916. A precedent is a fact. Allegations an action is not designed as a precedent does not alter the fact it is one. Echo Park Dam, if approved, would threaten not only the other national park system areas in which dams have been proposed, but would weaken their defense against other kinds of exploitation.

At the hearings last year, we presented a list of actively proposed projects that would be located within or flood parts of units of the national park system. There are more than 16 of them, all in the advanced planning stage, and several have been presented to Congress. None has been built. Among the parks directly affected are the Grand Canyon, Glacier, Yellowstone, Yosemite, Kings Canyon and Mammoth Cave National Parks, as well as several national monuments. If one is built, it will be easier to secure approval for the others, and

the protection afforded by national park policy will be so weakened as to destroy the national park system in the end.

PROVISIONS OF THE PROCLAMATION OF 1938

The argument has been presented that the proclamation of 1938, enlarging Dinosaur National Monument, by reserving the right to build the Browns Park project within its boundaries set a pattern of precedent that makes authorization of Echo Park proper. It is necessary, then, to analyze this specific provision of the proclamation.

In order to protect homesteaders and public and private enterprise in the development of the West, after the reclamation laws were enacted reclamation withdrawals were made that covered almost every existing and potential site for water development. Prior to 1938, a number of such withdrawals were applied to lands now within Dinosaur National Monument. I am referring to the ones Senator Watkins mentioned earlier.

The proclamation canceled and superseded all but one of these withdrawals. It retained that of 1904, covering the Browns Park site 4 miles south of the boundary above the Gate of Lodore. The Commissioner of Reclamation helped draft the proclamation, and he was careful that it be explicit, that the right to build the Browns Park project, and that one only, was reserved. However, this was actually a legal matter because the Bureau of Reclamation had advised the National Park Service the dam could not be built because of defects in the geological structures, and it was abandoning its plans for the Browns Park project. The question at issue was whether to draw the northern boundary below this site to exclude the project, which would have been done if the project was going to be built. Knowing, however, no dam would be built there, the Park Service believed it safe to include the lands involved in the enlargement, since it could not constitute a precedent for dam-building in the national park system. The procedures of abandoning a project involves time and red-tape, and the Park Service did not want to delay the proclamation; so it agreed to comply with technical legal requirements with full knowledge that there was no danger to the monument in doing so.

The other related provision of the proclamation applies the Federal Power Act, as amended, to the monument. The amendments of 1921 and 1935 provide that no power licenses shall be issued in any existing or new national park or monument. Therefore, the reference to that act further emphasizes the proclamation is intended to make no provision for any project except the Browns Park project on lands added to the monument. The intent and meaning of the application of this act, as amended, to the question is analyzed thoroughly in a legal brief by the noted attorney, Mr. Manly Fleischmann, published on pages 557 through 563 of the Senate hearings on S. 1555, 83d Congress. Nothing in the proclamation can properly be construed to support the contention that it implies approval of any project other than Browns Park. The proclamation means exactly what it says.

AGREEMENTS MADE BY THE NATIONAL PARK SERVICE

It has been widely asserted that during the process of adding the canyons to the monument, the National Park Service promised Echo Park Dam could be built there. Testimony has been presented that

such assurances were made at the hearings held in Utah in 1936. The National Park Service is scrupulous about adhering to agreements it makes, and it is important to determine exactly what was agreed to, and by what authority.

The major concern of local residents in 1936 was that certain grazing rights be respected. The Park Service did make commitments on this subject, and has respected them. This was in accordance with instructions Secretary Ickes issued to govern those hearings. His memorandum of June 8, 1936 to Director Cammerer is printed on page 555 of the hearings on S. 1555.

With regard to potential water developments within the enlarged monument, Secretary Ickes issued orders that subject should be left to Congress, that no commitments be made. He directed that—

> the future development of potential mineral, water and power resources, if and when it should prove economically feasible, would be determined by the Congress.

Under this directive, no employee of the National Park Service was empowered to make commitments on the subject.

Mr. David H. Madsen, who conducted the hearings, has stated that he assured the people then that enlargement of the monument would not interfere with future irrigation or power projects (affidavit of March 27, 1950, hearings on H. R. 4449, p. 732). Director Wirth, commenting on this affidavit, expressed his belief that after an interval of 14 years Mr. Madsen's recollection was faulty (hearings on S. 1555, pp. 555–557). If Mr. Madsen did make such a statement as representative of the National Park Service, he exceeded his authority in doing so. Furthermore, he did not report such a statement to the Director. I have read his official report of the hearings, and it deals with grazing matters; not one word is said about dams or water development. Even had he advised the Director of such statements, the Director would have had to refer the matter to the Secretary of the Interior for confirmation. Both Director Drury and Director Wirth have stated their view no such commitments were made, and there is no official record of any such commitments.

The proclamation clearly states the content and intent of the agreement between the National Park Service and the Bureau of Reclamation, as confirmed by the Secretary of the Interior. Secretary McKay himself has stated frankly that nothing in the proclamation can be construed as approval of Echo Park Dam, and has further declared no official of the Department of the Interior had made contrary assertion or was empowered to do so.

THE POSITION OF THE NATIONAL PARK SERVICE

The National Park Service has been consistently opposed to construction of Echo Park Dam. In 1943, Director Drury vigorously protested the Bureau of Reclamation's application for a new withdrawal covering the Echo Park site, on which he had not been consulted (hearings on H. R. 4449, pp. 735–736). With completion of the survey of the recreational resources of the Colorado River, in 1946, the Park Service's position became of public record. One full chapter of the report is devoted to strong opposition to this invasion of Dinosaur National Monument. There is no question whatever that the Park Service has not and does not approve violation of the monument by this dam; and it has not violated any agreements it has made in taking that position.

The controversy over Echo Park Dam as an element of the Colorado River project has now raged since 1949. Originally, it was the only seriously controversial issue of the project. Had the proponents been willing to support our recommendations that a sincere effort be made to revise the overall project to eliminate this undesirable feature—and, in spite of many assertions, it has yet to be demonstrated it cannot be so revised—it is probable progress would have been made in securing permission to start work on it. As it is, the 5 years' delay has caused closer scrutiny of other aspects, its economic and engineering feasibility, the lack of benefit to Colorado, and other questions which we who are concerned with the preservation of our national park system are not qualified to discuss thoroughly. It is perhaps regrettable that production of the desired water benefits has been so delayed; but if the outcome is a sound, better balanced, and less expensive program, the results will be in the interest of the upper basin States and of the Nation as a whole.

Thank you.

Mr. ASPINALL. Thank you very much, Mr. Packard. You will be here this afternoon?

Mr. PACKARD. Yes, sir.

Mr. ASPINALL. The Chair recognizes for his statement Mr. Howard Zahniser, executive secretary of the Wilderness Society. We are glad to have you again before our committee, Mr. Zahniser.

STATEMENT OF HOWARD ZAHNISER, EXECUTIVE SECRETARY, THE WILDERNESS SOCIETY, WASHINGTON, D. C.

Mr. ZAHNISER. Thank you, Mr. Chairman.

Mr. Chairman, ladies and gentlemen of the committee, my name is Zahniser, my first name Howard. I am the executive secretary and editor of the Wilderness Society, a national conservation organization with headquarters here in Washington, D. C., at 2144 P. Street NW. In behalf of the Wilderness Society I wish to express appreciation of the invitation to appear before this subcommittee on Irrigation and Reclamation to present a statement on these bills for an upper Colorado River storage project and comment on the way in which these proposals are related to our national program for wilderness preservation. I trust that I may be helpful to this subcommittee in its efforts to deal with the problems involved, helpful also to the people of the upper Colorado region who are so deeply concerned with the measures here proposed and likewise helpful to the entire Nation in trying to represent the public interest in preserving and protecting our national park system and our other areas of wilderness and park lands that have been set aside for preservation.

So long as any project includes a proposal to use an area of the national park system in a way that is inconsistent with its purpose as defined by Congress—

> to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations—

so long would the recommendation of The Wilderness Society be against its approval. Yet I do not wish to be considered an opponent of the upper Colorado River storage project except as it does threaten

areas dedicated for preservation. It is rather my purpose to urge that any bill reported out by this subcommittee be one from which all such threats have been carefully excluded and in which provision is made for the protection of national parks and monuments. It is my belief that such a bill can be prepared that will adequately meet the needs for a sound upper Colorado River storage project, and after 5 years of deep concern with the problems we are here discussing I can assure you that I should welcome such a bill with great eagerness.

Summer before last, on a trip through Colorado and Utah, my wife and I, with our then 15- and 7-year-old sons and our 12- and 10-year-old daughters, camped at the mouth of Split Mountain Canyon, in the Dinosaur National Monument, motored and hiked out to Harpers Corner, and then returned and motored on down into Echo Park.

A beautiful park it is, too, so named by Major John Wesley Powell, who camped there on his now historic expedition in 1869 and described Echo Park itself as "the size of a good farm."

There, along the Green River, in that lovely grassy park, with its beautiful cottonwood trees, across from Steamboat Rock, my wife cooked hamburgers and made a meal for us, while the children climbed on the rock slopes of the canyon wall and I wandered about, exhilarated, and overawed—and perplexed, as I tried to understand the dam-building proposal that has focused so much controversial attention on this area of our national park system.

Then, as I stood there along the Green River, a ways away from the others, I shouted across the river:

"Should we build a dam here?"

The echo came back with my question still in it:

"Dam here?"

That question is still echoing, in the corridors of the Department of the Interior, in the White House, in the Halls of Congress, and indeed throughout the country.

That is the question that we face here today in our concern for the preservation of our national park system. It is one of the great questions that face us all in our efforts to cherish and use wisely the natural resources on which our own, our children's, and our children's children's welfare depends.

Again and again we conservationists who have been compelled to oppose so earnestly the proposed Echo Park and Split Mountain Dams have insisted and have sought to emphasize that we do not object to dams, or to reclamation, or to water storage or hydroelectric power production, but to the proposal to use a particular site, or sites, in the Dinosaur National Monument for the Echo Park and/or Split Mountain Dams.

This Echo Park question that conservationists all over the United States are asking, and answering so earnestly, is a question that challenges the very principle on which our national park protection policy is based. That is the principle that once an area has been set aside for preservation it should be held inviolate and used for commodity purposes only in the case of extreme national need.

Secretary of the Interior Julius A. Krug once stated this principle, in its application to dams, as follows:

> Large power and flood-control projects should not be recommended for construction in national parks, unless the need for such projects is so pressing that

the economic stability of our country, or its existence, would be endangered without them.

It is with this principle of the integrity of the national park system that we conservationists are most deeply concerned as we face this Echo Park question. The proponents of the Echo Park (Split Mountain) Dam construction seem also to be deeply conscious that the controversy is in large measure over this principle, for it is hard indeed to escape the conclusion that the persistent advocacy of the Echo Park Dam is intended to modify this principle, reverse the national policy for park preservation, and secure for those who are responsible for impoundment projects the freedom to use any national park system site that seems advantageous.

It is not the building of a dam or dams that is at issue but rather the choice of a site or sites. The Echo Park question is not whether to build a dam but, "Shall we build a dam here?"

And my deep conviction, my most earnest persuasion is that this is indeed no place for a dam.

This is one of the great places of the world, a place of so great natural grandeur that it should most assuredly be protected with great respect.

I wish I could somehow express here something of its grandeur and wonder.

If we could raise the venetian blinds at those windows over there, Mr. Chairman, and look across the mall of this beautiful Capital City we would have in view the Washington Monument and in its nobleness we might find a measure of a sort of the magnificence with which we are here concerned—the magnificence of the natural features which we cherish in the Dinosaur National Monument.

Think of standing at the base of the Washington Monument and looking up at its grandeur. Imagine again the respect and admiration, the aspiration and noble inspiration which we feel as we place ourselves before its 555-foot thrust into the sky.

Think then again of a solid natural rock a hundred feet and more still higher than the Washington Monument, towering above you like the prow of a great boat a mile long, its hidden mast a thousand feet high—a monolith of natural rock, golden and brown—Steamboat Rock. Imagine the awe and wonder you feel as you place yourself before its massive stand against the time and the elements.

Think, too, of the river flowing against the side, winding around the prow of this great rock—the Green River that has come through the Canyon of Lodore and at Steamboat Rock has found its confluence with the Yampa—waters which have flowed through canyons which surpass, in the scenic superlatives of those who have known them, even this marvel of Steamboat Rock.

Then realize again that you and this high rock more than a mile long, with the river moving around it, and the park where you stand—all are deep in a wild canyon, and behind you as you turn are sheer walls of rock that sweep even higher than Steamboat Rock.

Climb out of these canyons onto the great plateau land in which they are cut. Walk out along the edges of the chasm, on Harpers Corner. Stand on this tongue of solid rock that holds you 2,000 feet above the river. And see the abyss to the right and left and straight ahead of you.

Turn right and see far below you Steamboat Rock that awed you in its presence. See the river flowing around it. Trace its course on up the stream, and the course of the Yampa River's canyon as it winds to its confluence with the Green there in Echo Park.

Turn to your left. Find yourself looking straight downstream between the narrow walls of Whirlpool Canyon, and rough river, deep in the chasm, so apparently quiet from your height.

Try to tell yourself that there before you, deep below you, the United States Bureau of Reclamation—our Bureau of Reclamation—wants to build a dam 525 feet high above that river. The Echo Park Dam. And up to its concrete foot would come the reservoir waters eventually of another dam—Split Mountain—inundating those whirlpool rapids.

Turn again to your right and imagine the reservoir waters impounded by that dam. Imagine Echo Park inundated. See nothing of Steamboat Rock but a stone island in a storage basin deep almost as the Washington Monument is high.

Think of the rivers and the canyon-bottom riverside camp spots above Echo Park, buried in the waters of that basin—along the Green's marvelous Canyon of Lodore, and along the deep meanders of the Yampa—that great gorge twisting through colored rock around its sequence of bends, loops, and curves. Think of the unique wild, river-running recreation in these canyons, the like of which is nowhere else, flooded out forever by miles and miles of a storage reservoir.

It seems to me, Mr. Chairman, that you thus have as good an idea as I can give you here of what I believe is the essential reason why the Congress should not authorize this proposed dam building at Echo Park:

It would destroy one of the unique, irreplaceable, scenic wild wonders of the world.

This great beautiful area that you view from Harpers Corner and wherein you stood at Echo Park—this marvelous wild scenic area in our national park system is what the Bureau of Reclamation's director for this region calls, with an admiration of his own, "the remarkable storage vessel at Echo Park."

As you turn then in imagination from Harpers Corner and make the hike back to your parking place, and the long wild-road drive back to the transcontinental highway (U. S. 40), you realize that you are within the Dinosaur National Monument—part of America's national park system, a system of a few superlative parts of America dedicated for preservation while all the rest is free for all man's purposes. You begin to feel a profanity in this dam proposal, a threat posed to all such areas you hold sacred, a challenge to the very idea of holding sacred any part of the natural earth.

Driving through the plateau land within the national park area that surrounds these canyon chasms, and sensing the violence that would be done to all this wilderness by the very construction itself—$200 million of sand and gravel and concrete, roads and trucks, men and materials, steel, and the noise of drills and dynamite, man's mighty power in bulldozer and all his great tools—you begin to realize that you are in the midst of a great debate over the very idea of preserving natural parks.

Will you dam the scenic wild canyons of the national park system? That is the question.

The proponents of the dam tell you that it was understood when the area was established that such a dam could be built, but you look at the proclamation establishing the monument and read that—

the administration of the monument shall be subject to the Reclamation withdrawal of October 17, 1904, for the Brown's Park Reservoir site in connection with the Green River project.

You find that the Brown's Park site is far up the Green River near the northern edge of the monument, many miles up the river from the now proposed Echo Park site. You understand why the possible construction of this Brown's Park Dam could have been allowed, and you understand, too, that this proclamation can never be distorted into a true justification for constructing the Echo Park and Split Mountain Dams in the heart of the monument, creating reservoirs along practically all of the area's scenic canyons which it was set aside to preserve. You recognize this new proposal as clearly an encroachment on a duly designated national park area.

You hear the proponents of these dams in the monument claim that the reservoirs will themselves provide recreation and attract many people, but you know that such recreation will anyhow be afforded by other reservoirs outside the monument, while the wild-canyon experiences of the unspoiled wilderness cannot be duplicated.

For finally (I trust), you realize that these national park sites are not needed for reservoirs. The reservoirs can be built elsewhere, with all their advantages to the people of the Colorado River Basin and indeed to the people of the Nation, which we all appreciate. You hear an alternative program outlined, see its feasibility, hear its various features debated.

You see the proponents of the Dinosaur dams, nevertheless, build pretexts into arguments, and you realize after all that not necessity but supposed advantage tempts these would-be dam builders into the national park system.

Evaporation differences at various sites are pointed to in the 83d Congress as a compulsion to build dams in the Dinosaur National Monument, a compulsion that is yielded to reluctantly because it would do damage to an area that would preferably be preserved in its natural condition but for these evaporation-loss differences.

Then as the evaporation-loss differences appear in some cases at least to be much less than estimated earlier, the evaporation-loss argument seems itself to have been dissipated in thin air. Yet a new argument arises to prominence—and the reservoir anticipated by the proponents of the Echo Park Dam is urged not reluctantly because it would do damage to this marvelous area but because (and I am quoting from the brochure "Tomorrow's Playground for Millions of Americans" published by the Upper Colorado River Commission):

*** * * Only by storing and putting to beneficial use the river waters which run through it, by approval of a combined reclamation-power project like the one proposed, can Echo Park and surrounding country truly become a park.**

Thus the very nature of our preservation effort in the national park system is threatened. Those with contrary concepts that better suit their other purposes are urging upon us a policy that would not leave our national park system unimpaired as envisioned by Congress when

this system was established but would rather develop and improve and adapt these areas to purposes that Congress after Congress and administration after administration have considered inconsistent with national-park principles.

The challenge is a challenge to the concept and integrity of the national park system.

I do wish, Mr. Chairman, to be understood as being interested in the welfare and prosperity of this great upper Colorado region of our country and its people. Just as I have come to value the privilege of visiting this region and breathing a little deeper in its outdoors, so also I have valued the privilege of knowing the people who live there. I value highly their hospitality and friendship. I share their aspirations, and wish accordingly to be understood as approaching this controversy with hope and confidence that it will be so resolved as not only to preserve the areas which have been set aside for preservation but also to provide for the wise development of the region.

I have been particularly sensitive to the claim that we who oppose the Echo Park and Split Mountain Dam proposals are in danger of breaking faith with the people of this region.

I have read with deep interest David H. Madsen's March 27, 1950, affidavit regarding the June 11, 1936, and June 13, 1936, public meetings at Vernal, Utah, and Craig, Colo., at which, he testified, he then authoritatively stated "as a representative of the national park service"—

> That in the event it becomes necessary to construct a project or projects for power or irrigation in order to develop that part of the States of Colorado and Utah, that the establishment of the monument would not interfere with such development.

I have read also with deep interest the March 27, 1950, affiidavits by J. A. Cheney, Joseph Haslem, Leo Calder, H. E. Seeley, and B. H. Stringham regarding one or both of these meetings, at which they said, each with the same words, that—

> The National Park Service representatives assured the residents of these areas that if the Dinosaur National Monument were enlarged, that the National Park Service would not prevent or stand in the way of future reclamation projects on the Green River or the Yampa River within the boundaries of the Dinosaur National Monument, for irrigation or power purposes.

It has been pointed out by others that such assurance could not have been given responsibly and authoritatively, because the letter of instructions from the Secretary of the Interior of June 8, 1936, expressly prohibited the National Park Service from making commitments on the subject of water development at the hearings. Nevertheless, I have still been disposed, personally, to have a regard for these discussions testified to by Mr. Madsen and these other residents of Utah, to try to look at this situation from the viewpoint of these people's own understanding, and to feel a moral responsibility to respect such agreements as were understood.

Yet I am without any belief whatever that any such "agreements" justify approval of the Echo Park or Split Mountain Dams.

The outcome of the discussions and considerations of which these meetings and so-called agreements were a part was the proclamation establishing the Dinosaur National Monument as we know it today.

We have in this country what I believe is an excellent democratic process of discussing extensively (and intensively) all aspects of any

proposed public action. Then we resolve our various points of view in some definite action. We adopt a Constitution. We enact a law. We have a Presidential proclamation. And then we pass on to future discussions of other problems with our past discussions and agreements made formal and finally resolved in writing—for our clear understanding not only at the time but in the future.

Such was the Presidential proclamation of 1938. Some two years after the 1936 public hearings and following various governmental considerations, this proclamation enlarged the monument and at the same time included and defined the public understanding regarding reservoir projects, as follows:

> This reservation * * * shall not affect the operation of the Federal Power Act of June 10, 1920 (41 Stat. 1063), as amended, and the administration of the monument shall be subject to the reclamation withdrawal of October 17, 1904, for the Brown's Park Reservoir site in connection with the Green River project.

There is no evidence of any dissatisfaction with this statement—no evidence at all that provision for the Brown's Park Reservoir site was not an adequate recognition of such assurances as were understood. The proclamation's reservation is specific. It applies to a site and an area many miles up the river from the sites now being argued. And Congress by appropriating for and providing for the administration of the monument has in effect, repeatedly endorsed this proclamation. I can only conclude that we have in this respect no obligation to the people of this region other than our obligation to respect this proclamation's provision that the administration of the area is subject to a prior withdrawal for the Brown's Park Reservoir site. As Secretary of the Interior Douglas McKay himself said, in my hearing, tapping the edge of his desk with his index finger, "Just because I give somebody permission to do something at this desk, it doesn't mean that he can do it anywhere in the room." Wrong as Secretary McKay is, in my opinion, in supporting the Echo Park Dam proposal, he does recognize that it is not authorized in the proclamation that establishes the national monument.

I also have been deeply interested in the implications of the proclamation's provision that—

> this reservation * * * shall not affect the operation of the Federal Power Act of June 10, 1920 (41 Stat. 1063), as amended.

I am aware that in a memorandum published on page 719 and the following pages of the hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, 83d Congress, 2d session, on H. R. 4449, H. R. 4443, and H. R. 4463, Mr. George W. Abbott, counsel for the committee, concluded that the Federal Power Commission, in accordance with this provision of the proclamation, has the authority to license the construction of a dam in the canyons of the Dinosaur National Monument. Yet after a careful study of this contention I am persuaded that, on the contrary, only Congress has the authority to authorize such a dam and furthermore that such an authorization by Congress would be a departure from a policy in protection of national parks and monuments which Congress set in 1921, renewed and strengthened in 1935, and has ever since respected.

Here are the facts and my understanding of them that lead me to this conclusion:

The Dinosaur National Monument, in eastern Utah and northwestern Colorado, established on October 4, 1915, by proclamation of President Woodrow Wilson (39 Stat. 1752) for the protection of the dinosaur quarry, was originally only 80 acres in size and did not include the canyons of the Green and Yampa Rivers until the monument was enlarged by 203,885 acres on July 14, 1938, by proclamation of President Franklin D. Roosevelt for the protection of these canyons (Proclamation 2290, 53 Stat. 2454).

The Federal Water Power Act of June 10, 1920 (41 Stat. 1063), in section 4 (d) authorized the Federal Power Commission "to issue licenses * * * for the purpose of constructing * * * dams * * * upon any part of the public lands and reservations of the United States * * *" and in section 3 defined "reservations" to include "national monuments" and "national parks."

By an act of March 3, 1921 (41 Stat. 1353), however, Congress amended the Federal Power Commission's authority under this Federal Power Act of 1920 to the effect—

> that hereafter no permit, license, lease, or authorization for dams, conduits, reservoirs, powerhouses, transmission lines, or other works for storage or carriage of water, or for the development, transmission, or utilization of power, within the limits as now constituted of any national park or national monument shall be granted or made without specific authority of Congress, and so much of the Act of June 10, 1920 * * * as authorizes licensing such uses of existing national parks and national monuments by the Federal Power Commission is hereby repealed.

By this 1921 amendment Congress established a fundamental national policy from which it has never departed—providing an immunity for national parks and national monuments from the construction of dams.

The legislative history leaves no doubt as to the purpose of the 1921 amendment. In Senate debate on the amendment, Mr. Walsh of Montana said:

> I understand that (the bill) was introduced by the Senator from Washington (Mr. Jones) for the purpose of eliminating national parks from the jurisdiction of the Water Power Commission.

Mr. Jones of Washington replied, "That is correct" (50 Congressional Record 2002).

It is true, as Mr. Abbott points out, that the 1921 amendment was confined to "existing" national parks and monuments, and to the areas "as now constituted." A reasonable interpretation was that the Federal Power Commission's authority would extend to any national parks or monuments enlarged or created in the future—unless Congress decided otherwise at the time.

The proponents of the 1921 amendment reluctantly made this concession to the Federal Power Commission in order to assure passage of the bill (60 Congressional Record 3789, et seq.; 4204, et seq.). They recognized that it was more important to assure the establishment of the national policy as to the parks and monuments as then constituted, and fight out the issue again, when new parks were created or present ones enlarged, than to risk delay in amending the 1920 act.

In House debate, Mr. Alben Barkley of Kentucky said:

> As the bill passed the Senate and as it was reported to the House, it limited its effect to existing national parks only, so that hereafter, if more national parks shall be created, or those already in existence shall be enlarged, we must fight

out on every individual bill creating a new national park or enlarging one already in existence the question whether the water power in the national park shall be used. It was my thought that we ought to make this provision apply to all parks that exist now as well as those that may be created in the future; but if the House feels that such an amendment would endanger the passage of this bill and thinks it is better to get what we can under this bill than to try to get more, I have no disposition to offer an amendment. I do desire, however, to register my objection to the provision that limits it to existing national parks instead of including all that may hereafter be created (60 Congressional Record 4205).

Mr. Barkley proved to be farsighted; the policy established by the 1921 amendment has never been abandoned.

By an act of August 26, 1935, the Federal Power Commission's authority to license the construction of dams on "public lands and reservations of the United States" was significantly amended once again. This time the definition of "reservations" was changed, to provide specifically that the term "shall not include national monuments or national parks."

This unequivocal language restricting the Federal Power Commission's fundamental authority would seem to leave no room for interpretation. Its purpose was made doubly clear in House Report No. 1318, 74th Congress, 1st session, which stated at page 22:

The definition of the former term ("reservation") has been amended to exclude national parks and national monuments. Under an amendment of the act passed in 1921, the Commission has no authority to issue licenses in national parks or national monuments. The purpose of this change in the definition of "reservations" is to remove from the act all suggestion of authority for the granting of such licenses.

It may be emphasized that the only suggestion of authority to be removed was in the phrase "as now constituted" and the word "existing" of the 1921 amendment.

As clear as the 1935 amendment is in language and purpose, Mr. Abbott argues in his memorandum that the new definition of "reservations" does not mean what is says. He argues that the language "shall not include national monuments or national parks" really means "shall not include the parks in existence on March 3, 1921, as then constituted." This conclusion is reached by a strained interpretation of a further provision in the 1935 act, section 212 of title II, which provided:

Nothing in the (Federal Water Power) Act, as amended, shall be construed to repeal or amend the provisions of the amendment to the Federal Water Power Act approved March 3, 1921 (41 Stat. 1353), or the provisions of any other Act relating to national parks and national monuments.

The purpose of this provision in the 1935 act was stated as follows by its author, Mr. Crosser of Ohio, who said in the House debate:

The national parks organization wants to make sure that the bill does not infringe upon their preserves, so to speak. We are offering this at their request (79 Congressional Record 10575).

The provision, offered at the request of the national parks organization, is construed by Mr. Abbott in a way that nullifies the plain meaning of the language that redefined "reservations" so as to exclude national parks and monuments. The purpose of the provision submitted by Mr. Crosser, of Ohio, certainly was not to preserve any authority of the Federal Power Commission to license the building of dams in parks or monuments, past or present. On the contrary, its purpose

was to make it doubly clear that Congress subscribed to the policy of protecting national parks and monuments from invasion by dams.

Mr. Abbott contends that the purpose of the Crosser provision was to continue the effect of the language "as now constituted" and "existing," which actually was eliminated by the 1935 act. It is inconceivable that this was the purpose of the Crosser provision. To construe it so against the interests and purposes of its sponsor, the national parks organization, would be ironical indeed. The redefinition of "reservations" removed any suggestion of Federal Power Commission authority over national parks or monuments. To argue that the Crosser provision was designed to reinsert such a suggestion is surely a distortion of legislative intent.

Thus the provisions in the Presidential proclamation of July 14, 1938, that "this reservation shall not affect the operation of the Federal Water Power Act of June 10, 1920 (41 Stat. 1063), as amended," could not possibly give the Federal Power Commission authority to license construction of a dam in the enlarged area of Dinosaur National Monument. Any such authority of the Federal Power Commission may be conferred only by Congress, and Congress determined in 1935 that the Commission could not license the construction of dams in any national monument. To deviate from this well-established national policy would set a dangerous precedent.

It should be noted that this same conclusion as to the effect of the 1935 amendment was reached in two opinions by the Solicitor of the Department of the Interior. These were the Solicitor's opinions M-29936 of August 19, 1938, and M-30471 of December 5, 1939.

I am confident, therefore, both with regard to reclamation and power withdrawals, we are in no sense breaking faith with the people of Utah and Colorado and the other States of the upper Colorado region in urging that the preservation of this area be continued by Congress, and strengthened.

In emphasizing this I should like also, in as friendly a fashion as possible, to remind the people of Utah and Colorado that all of us from all parts of the country share with them the public ownership of this unit in our national park system. I would appeal to them to recognize that they share also a responsibility to all of us for its protection.

I recognize that our national welfare depends on the welfare of this region, and I feel that my own personal welfare is related to the personal welfare of fellow citizens in Utah and Colorado. I am interested in the national importance of the Upper Colorado River program for the benefit of this region and its people. At the same time I would urge all of them to keep faith with all of us throughout the Nation, and with those of future generations, by cherishing these scenic wild canyons and helping to preserve them unimpaired.

It is important, I believe, in discussing these so-called agreements and our various obligations, regional and national, to recognize that the Dinosaur National Monument was created out of lands that already belonged to the Nation, public domain that belonged to all of us. In some parts of our country private lands have been purchased for, and State lands have been turned over to the Federal Government for the creation of national parks. Those who have lived near these areas have given such parks to the Nation. Here, the Nation, already in owner-

ship of this public domain, merely dedicated it for a special use of all the Nation, including the people of Utah and Colorado who indeed are in a preferred location, as one of the superbly beautiful parts of the land to become a part of the national park system.

The purpose of the enlarged Dinosaur National Monument, it is clear, is to preserve the marvelous wild canyons of the Green and Yampa Rivers. The shape of the monument, as readily seen on the map, shows that this is the purpose, its size being that which is necessary to preserve and protect properly these canyons. Only so much as was needed for this purpose was thus reserved, out of our own public domain, and set aside from the normal commodity uses that are made by local residents of other parts of the public domain or of the private lands which they own or rent.

During the public debate that followed the Bureau of Reclamation's proposal of this Echo Park Dam some 5 years ago, it has been clearly shown, I believe, not only that (1) the scenic wild canyons of the Dinosaur National Monument are superb and unique, a wilderness resource irreplaceable, invaluable, and increasingly popular, but also (2) that it is not necessary to destroy this national monument in order to realize the purposes of the upper Colorado River project. Others have spoken, and will yet speak, in greater detail and with better understanding of alternative programs. All of us conservationists have shown real interest in them. Far from wishing to enforce any denial of water storage or power potential on the people of the region, we have extended ourselves to demonstrate that there can be a program that will serve all public purposes, including national park preservation. Neither evaporation loss, which was once officially described as the fundamental issue, nor any other supposed sacrifice, I am sincerely convinced, will ever become any severe penalty on the people of Utah and Colorado for the preservation of the Dinosaur National Monument. I am confident that in no way will they eventually regret joining with all of us in its preservation.

In The Living Wilderness, the quarterly magazine which I edit for The Wilderness Society, we have devoted earnest attention during the past 5 years to the presentation of information about the Dinosaur National Monument and its preservation within a successful program for the upper Colorado River storage project. In addition to numerous news items with maps and photographs we have published a number of articles of feature length. In our Autumn 1950 magazine we published General Grant's definitive discussion with the title "The Dinosaur Dam Sites Are Not Needed." In this same magazine we published Margaret E. Murie's appreciation of the national monument entitled "A Matter of Choice," which concluded:

> Water, yes, for those dry States. By all means. But, what if it can be had in some other way than by damming up the beautiful canyons of the Green and the Yampa in this particular "convenient" spot.

Mrs. Murie quoted Robert Browning:

> Oh, if we draw a circle premature
> Heedless of far gain,
> Greedy for quick returns of profit, sure
> Bad is our bargain.

In the Autumn 1950 magazine we also included Mildred E. Baker's Lifelong Inspiration, recalling her 1940 trip on the Green River. These Autumn 1950 articles were combined later in a special reprint

entitled "The Dinosaur Dam Case," a copy of which is herewith submitted for the committee's files and additional copies of which will be gladly supplied. There similarly is submitted a reprint of Philip Hyde's article Nature's Climax at Dinosaur which we were privileged to publish with a selection of Mr. Hyde's brilliant photographs and a special map by W. Frederick Freund in The Living Wilderness for Autumn 1952.

We have sought to emphasize, not only that the upper Colorado River program can be realized along with the preservation of the Dinosaur National Monument, but also that our only way of preserving any such areas throughout our land is by dedicating them and not allowing any destruction.

Our whole American policy for preserving some of our wilderness is, in fact, based on two understandings that are here involved.

On the one hand is the understanding that our land and water resources are great enough and varied enough to make possible the preservation of a system of wilderness areas without sacrificing the commodity production and other uses that make it necessary to develop most of our areas.

On the other hand, our wilderness preservation program is based on the understanding that our civilization is such that no lands will persist unexploited except those that are deliberately set aside and faithfully protected.

For this policy to prevail we must be faithful in respecting our dedications, for otherwise the dedicated areas will inevitably disappear one by one as it seems profitable to exploit them. We cannot merely set aside an area until we get to it with some kind of exploitation project without defrauding both our own and future generations.

To permit the would-be exploiters of Dinosaur National Monument to build the Echo Park and Split Mountain Dams would certainly jeopardize this public policy of national park preservation. Rather than place this great and brilliant policy of the American people in such jeopardy let us instead strengthen it by reasserting our adherence to it and our determination that it must be respected. If we turn back now this threatened invasion, by reaffirming the sanctity of the areas which the Nation has dedicated for preservation, we can be sure that the whole national system of parks, monuments, wildlife refuges, wilderness, wild, primitive, and roadless areas will, indeed, be safeguarded more surely than ever.

We cannot avoid setting precedents. We can only do our best to see that the precedents which we do set are sound.

I would, therefore, recommend, Mr. Chairman:

(1) That the Echo Park Dam be deleted from any of the bills now under consideration which the subcommittee may consider for approval and that the Echo Park Dam be omitted from any authorization recommended for approval;

(2) That any bill recommended for passage by Congress include a provision that the Glen Canyon project be so constructed that it shall not impair the Rainbow Bridge National Monument, a protection that we are assured by the Bureau of Reclamation and the Department of the Interior can be provided, but one that should be specified by Congress as a requirement; and

(3) That any bill authorizing an upper Colorado River project should include a provision that no project constructed under the

authorization of this act shall be built within, or impair any of the natural features within, any area within the national park system.

Thus, Mr. Chairman, not only does it seem possible to see authorized a sound project for the development and conservation of the water resources of the upper Colorado River region, but also, by reaffirming here in Congress the sanctity of the areas that the Nation has dedicated for preservation, we can resolve this long controversy in such a manner as to make more secure than ever our great American policy for preserving some areas of our land forever wild and unspoiled in their natural beauty and grandeur.

It will be an achievement that I am sure will bring us the gratitude of American citizens during a long, long future, an accomplishment that all of us, I am sure, will be will satisfied to share. As I said before, we cannot avoid setting precedents. We can only do our best to see that the precedents which we do set are sound.

As long as I have referred to certain documents in my statement, I will present them for your files.

Mr. ASPINALL. Thank you. They will be received for the files unless there is objection.

Hearing none, it is so ordered.

(The documents referred to will be found in the files of the committee.)

Mr. ASPINALL. The next witness is Richard H. Pough, representing the American Museum of Natural History.

STATEMENT OF RICHARD H. POUGH, REPRESENTING THE AMERICAN MUSEUM OF NATURAL HISTORY

Mr. POUGH. Mr. Chairman and members of the committee.

I do not intend to take much of your time. Most of these points have been very well presented this morning.

I speak for a natural history museum, for biologists and naturalists for whom these national park areas are becoming increasingly important as outdoor laboratories.

Natural history is a science dealing with living things. All we can do in our museum is to bring in some token of these living things, and we must continue to rely on undisturbed communities of wild plants and animals for our studies, for our research into genetics, evolution, and for all of our work that we are uncovering about antibiotics and so forth, new uses for obscure organisms. So we are concerned about this simply as a threat to the integrity of the whole national park system.

This article, As Dinosaur Goes So Go the Others, I would like to leave with you, and this statement on living museums and natural history will, I believe, explain to you, without having to do it in detail now, while we view this dam in Echo Park in Dinosaur National Monument as a matter of grave concern to all biologists. We ask your committee to see whether you cannot arrange to approve this apparently quite worthy project without the inclusion of a dam which would destroy a unit in this essential system of living museums and natural history, which is what the national park system is to the biologists of the country.

Mr. ASPINALL. Thank you very much. Unless there is objection, the articles referred to will be made a part of the file.

Hearing none, it is so ordered.

(The documents referred to will be found in the files of the committee.)

Mr. ASPINALL. The next witness is the western representative of the Izaak Walton League, a close personal friend of mine, Mr. Joseph Penfold of upper Colorado. We are very pleased to have you here this morning.

STATEMENT OF J. W. PENFOLD, WESTERN REPRESENTATIVE, IZAAK WALTON LEAGUE OF AMERICA, INC., WHEATRIDGE, COLO.

Mr. PENFOLD. Thank you very much, Mr. Chairman, my name is Joseph W. Penfold. I am western representative of the Izaak Walton League of America. I live in Wheatridge, Colo.; my office is in Denver. I appreciate very much the privilege of appearing before this committee to make a few comments about the upper Colorado River storage project on behalf of the Izaak Walton League. In line with the request of the chairman, I shall avoid repetition of testimony which the league has presented to your committee previously.

The Izaak Walton League is a nationwide membership organization dedicated to the protection and wise use of our Nation's soil, woods, waters and wildlife. During our more than three decades of organization we have sought always to be objective, and that has motivated our position in this matter now before your committee.

The upper Colorado project and one proposed unit of it—the Echo Park Dam—presents a very real and complex problem which the West and the Nation must face and one which the league must face also.

We have expressed ourselves many times before as emphatically opposed to Echo Park Dam. We reemphasize that same position here. This position stems from the firm conviction that the kind of future we all wish to bequeath to our descendents is composed of many elements—among them the opportunity to enjoy and receive the full value of examples of God's handiwork modified as little as possible by man's activities. Clearly your distinguished predecessors had that thought in mind when they provided for the national park system and dedicated it to that principle of use for all time. Clearly this committee over the years has maintained that principle inviolate.

In our opinion, Dinosaur National Monument fully measures up to the high quality set in all our fine national park areas. We believe it, and they should be preserved for the purpose for which they were established.

We are also mindful that the Nation must utilize its material resources to meet the demands of an ever-increasing population. Izaak Walton League members must earn their living, raise families, and pay taxes like everyone else. League members in the arid and semiarid West are just as conscious of the water resource problem as any other group of citizens. They have to live with it, too. So we have endeavored to look at the Echo Park controversy and the upper Colorado project from as broad a base of understanding as we can. We recognize that our future requires development of our water resources, and we know our future will need national parks more than we possibly imagine today.

We in the league have not been convinced that our choice lies between a decision to retain Dinosaur Monument and a decision to proceed with sound water development in the Colorado Basin. However, every effort seemingly has been made by proponents to convince the

public that such is our choice. They tell us that if we retain the admittedly spectacular and irreplaceable canyons of Dinosaur the West and Colorado will be doomed to a future of drought and economic desiccation.

Actually, we do not have to make that "either one or the other" choice. We can save our priceless water and we can at the same time save our priceless national park unit. There have been several very promising suggestions as to how this can be accomplished. I would like to mention briefly just one which seems to us to make a very great deal of sense.

Gov. Edwin C. Johnson of Colorado made the suggestion early this year when he met with the governors of the other upper basin States in Cheyenne.

Governor Johnson proposed a very simple plan—as an alternative to the plan you are now considering—that Congress at this time authorize the Glen Canyon Dam alone with the provision that its power earnings be earmarked for the construction of participating projects when and as they are determined to be desirable, necessary, and to meet the required standards of financial feasibility.

The proposal is beautiful in its simplicity and would fully meet for a long, long time the major objectives of the upper basin States—to provide sufficient holdover storage for downstream delivery and so protect the rights of the upper basin States to utilize consumptively their full share of Colorado River waters.

Glen Canyon Dam will store 26 million acre-feet and alone without any other holdover storage facilities would provide sufficient capacity to guarantee our downstream commitments. This storage requirement has been estimated by the Bureau of Reclamation at 23 million acre-feet.

Glen Canyon Dam also is the great power producer in the overall plan. With installed capacity of 800.000 kilowatts it would produce power at a low rate and in huge quantities. It is likely the only major dam in the whole proposed system which would produce enough revenue to pay out its own costs and earn substantial sums to assist in the construction of participating projects.

In other words, this plan, if authorized, now, would implement the most vital requirement of the whole upper Colorado development program—protect the upper basin States' rights in the river and start earning income to effectuate those rights through the construction of water-use projects as they are found to be sound and so approved. With Glen Canyon authorized and underway the pressure will be off, and the fear that we shall lose our water to the demands of downstream users will be eliminated. We can then proceed with further planning for development without the sense of desperate haste that seems to have characterized things the past few years.

I believe this proposal is conservative, makes sense, is reasonable, and will be seen as reasonable by the rest of the country whose approval of our western water plans is a necessity.

Other major storage dams can follow along in orderly fashion, Curecanti, Cross Mountain (or Juniper), Flaming Gorge, etc., when and as they become essential.

A further word on sound planning without haste.

Even now in Colorado, for example, there are discussions of a State-financed program for the construction of hundreds of small dams, to

catch spring runoff, hold it at high elevations of low evaporation and low sedimentation, until released for immediate use. Such dams, costing $200,000 or less eventually would enable Colorado to store and use most efficiently all the water allotted to it by Compact. Such a program, involving a maximum of local planning and participation unquestionably would lend itself to the most effective protection and preservation of fish, wildlife, and recreation resources. It would minimize the sacrifice of productive bottom lands to the larger type reservoirs. At the same time it would be most flexible in meeting changing economic and agricultural conditions. It would be logical that the upper Colorado project provide for inclusion of this type of program in utilization of power earnings.

Once Glen Canyon is authorized, the pressure will be off—there will be time and the opportunity to plan wisely and proceed sanely with ultimate values uppermost in mind.

With Echo Park eliminated from the plan the project would receive firm support where before it has had opposition. But even that decision is not irrevocable. The Echo Park Dam site will still be there, 100 or 1,000 years from now, if we ever find its use essential to the safety and security of the Nation.

With elimination of Echo Park the Nation can proceed with long overdue activity to develop Dinosaur National Monument as the great national park unit it is. It can be made accessible and usable for millions of people at a minimum of cost. So developed it will quickly become of vast economic importance to the great three-State area around it. Independent studies of Yellowstone by the State of Wyoming, and of Glacier by Montana, demonstrate beyond a shadow of a doubt that these values are very real and very substantial.

While your committee at this time is dealing specifically with plans and programs for construction of water facilities, it is not possible to separate construction from all the other elements that go into a whole water-management program. In the Colorado drainage the water we are talking about for use in major portions of seven States originates on lands totaling but a small fraction of all concerned. These watershed areas comprise the West's most precious possession. In our zeal for this, that or the other water-use project we are prone to forget that our ability to put water to beneficial use is determined in the last analysis on the quantity and quality of the water delivered to us by the watershed mechanism. May I give one quick illustration, on the other side of the divide but fully as applicable throughout the Colorado drainage.

Experts have estimated that in the fine irrigation areas of the South Platte River, north of Denver, that the annual cost of silt in lost reservoir capacity, the out-of-pocket expense in removing silt from canals and laterals totals at least 50 cents for each acre of watershed furnishing the water. On each of those watershed acres we are spending now about 3 cents each year on all activities and programs related to protection of those watersheds.

We are doing far too little in the manipulation of watershed cover for the production of greater water yield. We are far too complacent about the damage to watersheds in our heavy water producing areas from continued overgrazing by livestock, and in some areas by big game animals. We have neglected the relationship between alpine

sods and permafrost and their importance in storage and releasing of late season streamflow.

We are too complacent about water loss from seepage and from inefficient and wasteful irrigation practices, and the deterioration of good agricultural lands from the same causes.

All of the foregoing problems affect every use and value of our water resource provides, including of course fish, wildlife, and recreation, such an important part of our western economic and social setup.

In conclusion, may I urge that the Congress in its wisdom determine that an initial phase of water development in the upper Colorado be authorized, including Glen Canyon as the essential element, excluding Echo Park Dam, and that we all recognize the even larger and more difficult job that lies ahead of us on the watersheds that comprise the basic resource with which we shall build our future.

Thank you, Mr. Chairman, for the privilege of appearing.

Mr. ASPINALL. Thank you very much.

When the committee recesses it will recess until 2 o'clock this afternoon with the understanding that we shall be in session as much of the time as is possible under the House rules and that the witnesses will hold themselves in readiness to meet with us whenever we can meet.

The Chair has received a letter from Roland C. Clement, chairman of the resolutions committee of the Rhode Island Wildlife Federation, accompanied by a resolution relative to this project, with the request that it be made a part of the record. Is there any objection?

Hearing none, it is so ordered.

A statement by the General Federation of Women's Clubs, legislative division, concerning this legislation, with the request that the statement be made a part of the record. Is there any objection?

Hearing none, it is so ordered.

A letter from our colleague, Frank C. Osmers, Jr., with a letter attached signed by Daniel A. Roser, conservation chairman of the Hackensack Audubon Society, with the request that the letter of transmittal and the letter from the society be made a part of the record. Is there any objection?

Hearing none, it is so ordered.

A letter from the Adirondack Mountain Club, signed by Arthur E. Newkirk, president, with a statement concerning the legislation and the request that it be made a part of the record. Is there any objection?

Hearing none, it is so ordered.

A statement from the Florida Wildlife Federation, signed by Mrs. Helen Sullivan, chairman, with the request it be made a part of the record. Is there any objection?

Hearing none, it is so ordered.

A statement by the American Forestry Association, signed by Executive Director-Forester Lowell Besley, together with a personal request that the statement be made a part of the record. Is there any objection?

Hearing none, it is so ordered.

A statement from the National Reclamation Association concerning reclamation in the West and their position on the same, and request that it be made a part of the record. The statement consists of eight pages and is signed by William E. Welsh. Is there any objection?

Hearing none, it is so ordered.

(The documents referred to follow:)

THE AMERICAN FORESTRY ASSOCIATION,
Washington, D. C., March 22, 1955.

Hon. WAYNE N. ASPINALL,
United States Representative from Colorado,
Chairman, Subcommittee on Irrigation and Reclamation,
House Office Building, Washington 25, D. C.

DEAR CONGRESSMAN ASPINALL: On January 21, 1954, I had the privilege of appearing before the House Committee on Interior and Insular Affairs of the 83d Congress on behalf of the American Forestry Association. Copy of my statement at that time is enclosed herewith. You will notice that the American Forestry Association strongly recommended that the Echo Dam proposal in bills H. R. 4443, H. R. 4449, and H. R. 4463 be not authorized.

Now being considered by your subcommittee of the 84th Congress are bills H. R. 270, H. R. 2836, H. R. 3383, and H. R. 3384, all of which propose the erection at Echo Park in the Dinosaur National Monument the same dam to which the American Forestry Association objected in the earlier bills before the 83d Congress.

In our testimony last year the American Forestry Association requested that a careful, objective study of all possible alternative sites be made before any action should be taken on the Echo Park proposal. The association requested that a sincere search be made for an alternative which does not encroach on existing national parks and monuments, and that pending such a study and report the Congress should not authorize the building of the dam at Echo Park.

Although spokesmen for the Bureau of Reclamation and the Secretary of the Interior have made numerous statements concerning the proposed Echo Park Dam and the rest of the Colorado River storage project, we have yet to see any report indicating a new careful, objective, and unbiased study of the whole project with a view to searching earnestly for possible alternative sites which would make it unnecessary to invade a national park or monument. Until such a study is made and is fully reported to the public, the American Forestry Association reiterates its statement of January 21, 1954, and strongly recommends to your subcommittee and to the Congress that the Echo Dam proposal in bills H. R. 270, H. R. 2836, H. R. 3383, and H. R. 3384 be not authorized.

Your subcommittee is respectfully requested to make this letter and the enclosed statement of January 21, 1954, a part of the record of the March 28, 1955 hearings on these bills.

Respectfully yours,

LOWELL BESLEY,
Executive Director-Forester.

P. S.—Sufficient copies of this letter and enclosure are enclosed for the clerk of the committee to supply all members of your Subcommittee on Irrigation and Reclamation.—L. B.

STATEMENT OF LOWELL BESLEY, OF WASHINGTON, D. C., REPRESENTING THE AMERICAN FORESTRY ASSOCIATION

My name is Lowell Besley and I am representing the American Forestry Association, of which I am the executive director-forester. Organized in 1875, the American Forestry Association is a national organization whose more than 25,000 members are public-spirited men and women all across the United States and in every walk of life, whose common interest is the conservation of our great natural resources. The association is dedicated to the intelligent management and use of forests and related resources of soil, water, wildlife and outdoor recreation. Our headquarters are in Washington, D. C.

In considering H. R. 4443, introduced by Representative Wayne N. Aspinall of Colorado; H. R. 4449 by Representative William A. Dawson of Utah; and, H. R. 4463 by Representative Douglas R. Stringfellow of Utah, we should like to state first of all that the American Forestry Association is in full sympathy with the need for developing the water resources of the West. More specifically, we are in accord with the broad outline of the Colorado River storage project to provide water for the irrigation, power and industry, and municipal use in five Western States. The West needs this water if it is to advance. And it needs this overall storage project.

As set up in the plan of the Bureau of Reclamation and approved by the Department of the Interior these bills would provide for the construction, operation and maintenance of a number of initial units of the Colorado River storage project consisting of dams, reservoirs, powerplants, transmission facilities, and appurtenant works. The main projects are listed as Echo Park in the Dinosaur National Monument, Flaming Gorge, Glen Canyon, Navaho, and Curecanti.

I appear before you today in connection with the proposal to erect a dam at Echo Park. As an organization that regards the national parks and forest systems the two greatest conservation achievements of the century, the American Forestry Association is gravely concerned over this proposal. The national parks and monuments have been set aside for the health and enjoyment of all the people of the United States and most of them preserve scenic values and other attractions which could not be duplicated if once destroyed or severely modified. The Dinosaur National Monument is no exception. It was approved for establishment by an exacting historical board, created by Executive order and was described by the former National Park Service Director Newton B. Drury as "unique."

It has two special attractions. One of these is the quarry of dinosaur fossils, for which the monument was named. It is understood that this area would not be disturbed by the proposed dam. The other attraction consists of the deep river canyons of wild and rare beauty, such as in the opinion of some is not rivaled even by the more famous Grand Canyon of the Colorado River. It is these canyons which would be partially filled by water backed up by the proposed dam so that their appearance would be greatly modified.

These are the facts in the case as we have it. The American Forestry Association does not claim to be expert in matters of great engineering works, but because of the values at stake has made an earnest effort to consult those who are experts in this field and who are familiar with this whole project. With us it is not a question of whether there shall be a water storage project for the benefit of the people of Arizona, Colorado, Utah and Wyoming or not. Instead, it is a question of whether it is necessary to invade a national monument and to severely modify its scenic values in order to provide this water. We believe that this is an extremely serious matter in itself and that in addition, regardless of what the proponents of the Echo Park installation say, it would establish an extremely dangerous precedent affecting the whole national policy on national parks and monuments. Consequently, the building of a dam in the Dinosaur National Monument should be avoided if there is any reasonable way of doing so.

Proponents of this bill would lead us to believe that the Echo Park Dam is essential to the success of the Colorado River storage project. Opponents of the bill, on the other hand, have indicated that a judicious selection of alternative sites could accomplish substantially the same objective without going into the monument at all. It is a case where the experts do not agree. We do not feel competent to judge between them but it does seem to us that there is a reasonable doubt as to the necessity of building a dam in the Dinosaur National Park. Furthermore, it does not appear that a thorough study of all possible alternatives has as yet been made by the Bureau of Reclamation. Until a careful, objective study of all possible alternative sites has been made, no action should be taken on the Echo Park proposal. A sincere search should be made for an alternative which does not encroach upon existing national parks and monuments. Pending such a study and report, other phases of the overall Colorado River project which are not in dispute, could proceed.

The American Forestry Association strongly recommends that the Echo Dam proposal in this bill be not authorized.

FLORIDA WILDLIFE FEDERATION,
COMMITTEE ON NATIONAL AFFAIRS,
St. Petersburg, Fla., February 28, 1955.

In re H. R. 270, H. R. 2836, H. R. 3383, H. R. 3384.

Hon. WAYNE N. ASPINALL,
Chairman, House Subcommittee on Irrigation and Reclamation,
House Office Building, Washington, D. C.

DEAR MR. ASPINALL: The Florida Wildlife Federation, in executive session, February 6, 1955, voted unanimously to sustain their recommendations of last year concerning the above captioned bills. These recommendations follow.

RESOLUTION

Whereas the Projects of the Bureau of Reclamation and of other federal bureaus and agencies, designed for the conservation of America's water resources, is an absolute necessity; and

Whereas the irrigation and reclamation projects as outlined in House bills 270, 2836, 3383 and 3384 contain many beneficial features for the conservation of water supply; and

Whereas from the examination of the plans, there appears to be adequate facilities for such irrigation and reclamation projects to conserve water supplies without invading our National Parks; Now therefore, be it

Resolved, That the Florida Wildlife Federation request of the subcommittee considering these bills, H. R. 270, H. R. 2836, H. R. 3383, and H. R. 3384, that they eliminate Echo Park from any construtcion plans for the said Colorado River storage projects.

In witness whereof, the president, for the executive committee, herewith attests to the authority vested in the undersigned to transmit this resolution to the chairman of the subcommittee concerned with the disposition of the aforementioned bills.

FLORIDA WILDLIFE FEDERATION,
COMMITTEE ON NATIONAL AFFAIRS,
Mrs. HELEN SULLIVAN, *Chairman*.

Attest:

H. R. WILBER, M. D.,
President
(For the Executive Committee).

THE ADIRONDACK MOUNTAIN CLUB, INC.,
Schenectady, N. Y., February 28, 1955.

Re H. R. 270, H. R. 2836, H. R. 3383–4.

Hon. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington 25, D. C.

DEAR CONGRESSMAN ASPINALL: We understand that a number of bills have been introduced to authorize the upper Colorado River storage project, and that these include as part of the project the Echo Park Dam in the Dinosaur National Monument. On behalf of the Adirondack Mountain Club, Inc., I urge your committee to act adversely on these bills insofar as they would permit the construction of the Echo Park Dam.

Many of our members have spent vacations in the National Parks and Monuments. They are keenly aware of the great esthetic, scenic, and inspirational values of our National Park System, and are equally aware that there are many shortsighted and selfish people who would destroy these values.

We are dismayed at the proposal to construct the Echo Park Dam in the Dinosaur National Monument, especially so this year since the testimony last year revealed that alternate sites were available, alternate sites that were essentially of equal value as reservoirs, but of definitely less value as a national monument.

While we sympathize with the desire of our fellow countrymen in the West to solve their important water-supply and power problems, we do not feel the solution should be sought at so great a cost to one of the most beautiful parts of our country. We also feel that this project may well serve as a precedent for destructive dams in other parts of our national parks system. We see a parallel between this proposal and the many proposals, which the Adirondack Mountain Club has been fighting for over a third of a century, to use the lands of the New York State forest preserve for power development. Men need natural beauty and wild areas as well as power. Surely it is foolish to destroy the beauty to obtain power readily available elsewhere.

We should appreciate having this statement included in the record of the hearings of the Subcommittee on Irrigation and Reclamation on this project.

Sincerely yours,

ARTHUR E. NEWKIRK, *President*.

STATEMENT OF MRS. A. PAUL HARTZ, CHAIRMAN, LEGISLATION DIVISION GENERAL FEDERATION OF WOMEN'S CLUBS, WAVERLY, VA.

ECHO PARK DAM IN DINOSAUR NATIONAL MONUMENT

I am Mrs. A. Paul Hartz, chairman of legislation for the General Federation of Women's Clubs. Our organization of 5 million in the United States was chartered by Congress in 1901 and since the beginning has been deeply interested in programs which seek to promote and preserve the conservation and wise use of our natural resources.

The legislative policy of the General Federation of Women's Clubs is based on resolutions passed at the national convention. These resolutions are submitted by State federations, the executive committee, national committee chairmen, or the policy committee—all are then submitted to State federations for consideration and action and finally to the delegate body at the annual convention. A favorable majority vote means that the resolution becomes a part of the policy of the general federation. If there is a minority opinion that fact is recorded, thus fully protecting the democratic process. Because of this procedure we believe our policy reflects the grassroots opinion of our membership as clearly as is possible in a large organization. We mention this procedure because one of our State federations—one out of 48—is not in accord with the expressed policy of our organization on this controversial subject of Echo Park Dam.

The General Federation of Women's Clubs opposes the building of Echo Park Dam in Dinosaur National Monument for the following reasons:

1. The congressional act of 1916 creating the National Park Service says in part: "To conserve the scenery and the natural and historic objects and the wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The basic philosophy of national parks is that they are set aside to provide for coming generations the handiwork of God in its original beauty, without the manipulation of man. In a description of the National Park Service, the Encyclopedia Britannica (Vol. 16, P. 158, Par. 4), there is a statement pertinent to the question under consideration. It says, "Although not reserved for economic reasons and not open to commercial development, the national parks, and to a lesser extent, the national monuments, have a very decided value to the United States and this value lies in their complete protection from commercialization."

2. An amendment to the Federal Power Act prohibits the granting of permits to private enterprise for any development in national parks or national monuments. It seems contradictory to the spirit of the law, if not the letter, to permit Government such privilege.

3. The building of Echo Park Dam would establish a precedent, which if followed in other national parks or monuments of great power potential, would completely abrogate the purpose of our national parks.

4. There are other sites available outside the Dinosaur National Monument but in the same area, where dams could be built to provide as much power and at no greater cost. In the interest of supporting the development of the upper Colorado River storage project, data has been prepared by reputable engineers showing the feasibility of alternate sites, and using the Bureau of Reclamation files for research and figures.

5. As we see it the Echo Park Dam is not in the interest of national defense which is the only reason for which the General Federation of Women's Clubs would approve the desecration of any of our national parks or national monuments.

The General Federation of Women's Clubs recognizes that the development of the upper Colorado River Basin is essential to water-thirsty lands of the west and that the use of its rivers for power and irrigation is essential to meet the demands of the rapidly expanding population of the United States, but we urge this committee and other Members of Congress to study carefully all alternate sites for dams before a decision is made on the building of Echo Park Dam.

RHODE ISLAND WILDLIFE FEDERATION,
Providence, R. I., February 23, 1955.

Hon. WAYNE N. ASPINALL,
Chairman, House Subcommittee on Irrigation and Reclamation,
New House Office Building, Washington, D. C.

DEAR CONGRESSMAN ASPINALL: Attached is a resolution of this federation which we would respectfully request you include in the testimony of your hearings on the Colorado storage project, including Echo Park Dam, beginning March 9.

Respectfully,

ROLAND C. CLEMENT,
Chairman, Resolutions Committee.

A RESOLUTION ON THE UPPER COLORADO STORAGE PROJECT

Whereas it is the consensus of all the principal conservation organizations in this country that Dinosaur National Monument in Colorado has unique scenic values which would be needlessly destroyed by the erection of a proposed Echo Park Dam; and

Whereas the United States Bureau of Reclamation, President Dwight D. Eisenhower, and all others who now favor this dam have never satisfactorily answered the criticisms directed again the Bureau's plans by conservationists, nor demonstrated that an alternative site which would not damage the values of Dinosaur National Monument is incompatible with the water needs of that mountain region; Now, therefore, be it

Resolved, That the Rhode Island Wildlife Federation, at its 18th annual meeting held in East Providence, R. I., on this 12th day of February 1955, go on record as opposing the erection of Echo Park Dam in the upper Colorado storage project and urge Rhode Island's Representatives in the United States Congress to do everything in their power to make this opposition effective, and direct that the House Subcommittee on Irrigation and Reclamation be advised of this opposition in time for the public hearing to be held in Washington, D. C., starting on March 9 next.

HOUSE OF REPRESENTATIVES,
Washington, D. C., March 9, 1955.

Hon. CLAIR ENGLE,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington, D. C.

DEAR COLLEAGUE: Attached is a letter from my constituent, Mr. Daniel A. Roser, of Bergenfield, N. J., who is conservation chairman of the Hackensack Audobon Society, in opposition to the Colorado River storage project.

I will appreciate it if this letter can be made a part of the hearings on the project.

Sincerely yours,

FRANK C. OSMERS, Jr.

HACKENSACK AUDUBON SOCIETY,
Bergenfield, N. J., March 4, 1955.

Congressman FRANK C. OSMERS,
Washington, D. C.

HONORABLE DEAR SIR: The entire membership of the Hackensack Audubon Society, of Hackensack, N. J., are greatly interested in H. R. 270 and H. R. 2386, Colorado River Storage project. The membership opposes the bill for the following reasons and sincerely hopes that your committee will concur:

1. Conservationists, outdoor, garden, and women's groups throughout the Nation in favor of sensible water-reclamation projects are united in opposition to Echo Park Dam.
2. It is totally unnecessary invasion of a national park area.
3. Opposition to Echo Park Dam has mounted as a devious means used by the proponents to prove that it is necessary and to confuse the issue.
4. The supporters want to get into the national park system for other purposes once the barriers are down.

5. There are only a few wilderness areas left in the Nation, and this one must be protected at all costs for sound conservation purposes as well as for aesthetic reasons.

6. Reclamation engineers want to set a precedent for invading national parks and monuments, and it has been established that 17 specific invasions in 9 national parks and monuments have been planned.

7. The entire project is badly planned, it is not the best way to utilize their water and there is not the slightest chance that it can even repay any part of its cost, and also it is largely a pork-barrel project for purely political purposes.

We hope that your committee will take appropriate action against the bill.

Sincerely yours,

DANIEL A. ROSER, *Conservation Chairman.*

P. S.—This statement is to be submitted for the record.

NATIONAL RECLAMATION ASSOCIATION,
Washington, D. C., March 21, 1955.

Congressman WAYNE ASPINALL,
Chairman, House Subcommitttee on Irrigation and Reclamation,
House Office Building, Washington, D. C.

DEAR CONGRESSMAN ASPINALL: The sponsors of the upper Colorado River storage project have requested that I submit for the record a statement on behalf of the National Reclamation Association showing the benefits of reclamation to the West and to the Nation.

I would appreciate it very much, therefore, if I may have the privilege of filing such a statement to be included in the record of the upper Colorado storage project hearings.

Sincerely,

WILLIAM E. WELSH,
Secretary-Manager.

STATEMENT BY WILLIAM E. WELSH, SECRETARY-MANAGER, NATIONAL RECLAMATION ASSOCIATION

My name is William E. Welsh. I am secretary-manager of the National Reclamation Association, a position which I have held for the past 6 years. The National Reclamation Association is a voluntary organization with active membership in each of the 17 Western States. It was organized in Salt Lake City in 1932.

I have been requested by the upper Colorado River Commission to submit for the record in these hearings a statement setting forth the position of the National Reclamation Association with respect to continued reclamation development in the western half of the United States. This I am indeed glad to do. I appreciate, Mr. Chairman, the privilege granted to me to present such a statement.

RECLAMATION ADDS TO NATION'S WEALTH

History will record the enactment of the National Reclamation Act signed by President Theodore Roosevelt on June 17, 1902, along with the passage of the homestead law signed by President Abraham Lincoln on May 20, 1862, as two of the greatest legislative enactments for the building and development of our Nation ever adopted by the Federal Congress.

The reclamation program is constructive and forward-looking. It adds to the strength and the wealth of our Nation. It creates homes and opportunities for our people. It will assist materially in maintaining our present high standard of living and at the same time meet the requirements of our rapidly increasing population. The millions of acres of arid land which have been developed and brought under irrigation throughout the West as a result of the Federal reclamation program will continue to contribute to the wealth of the Nation for centuries to come. The substantial reclamation communities with their beautiful homes and surroundings will be there for the enjoyment of generations yet unborn.

NRA EMPHASIZES IMPORTANCE OF RECLAMATION

The deep feelings on the part of the members of the National Reclamation Association from every State in the West regarding future and continued reclama-

tion development are set forth in resolution No. 1 adopted at the last annual meeting of the association held in Portland, Oreg., November 8, 9, and 10, 1954.

Resolution No. 1—Authorization and appropriations for continued reclamation program

Whereas it is an indisputable fact that water is the lifeblood of municipal, agricultural and industrial existence; and

Whereas remaining undeveloped water supplies are limited in amount, erratic in availability, requiring major storage for control, and located long distances from necessary points of use; and

Whereas continuous conservation, development, and utilization of the water resources of the States of this Nation are necessary to the growth of the Nation and must keep pace with the increase in population and with the needs of the Nation; and

Whereas the reclamation States will provide expanding markets for eastern goods and be called upon to absorb a large share of the increase in population in the United States for years to come because of the location of needed and newly discovered raw materials in the area and the ever present necessity for the decentralizing of industry in the interest of national defense; and

Whereas the Federal Government, since its inception, has recognized its responsibility in support of improvements resulting in public benefits, including the Reclamation Act of 1902 and subsequent legislation relating to the development and construction of major multiple-purpose water use projects; and

Whereas planning and construction of projects for such conservation, development, and utilization must be carried forward in keeping with the increasing needs of the Nation; and

Whereas the development of plans and the construction of basinwide projects for the full use of a water resource is a difficult, complicated, time-consuming process, sometimes requiring decades of effort; and

Whereas basinwide multiple-use projects frequently involve many States having common interests in interstate streams; and

Whereas the magnitude and necessity of multiple-use, basinwide developments require joint action by the States involved and the full unanimous support of all reclamation States; and

Whereas if the great local, regional and national benefits from reclamation are to be realized, those interested in sch benefits must make every effort to resolve any differences in the interests of the full development of the national water and power resources; and

Whereas opposition even exists to the basic principles of reclamation development in many areas and there is a demand on the part of some to bottle up the remaining undeveloped resources of the West: Now, therefore, be it

Resolved, That:

1. The National Reclamation Association vigorously reaffirm its position in support of the basic principles of reclamation accepted as national policy for more than 50 years, namely, the use of interest-free money for the irrigation features, the use of power revenues to help pay the cost of reclamation and the inherent right and obligation of the people of the reclamation States to develop fully their water and power resources.

2. The reclamation States, through the directors of the National Reclamation Association, be urged to maintain closed ranks and vigorously nad unanimously support a reclamation program designed to fully develop the land and water resources of the reclamation States within the limit of available water supplies.

3. The National Reclamation Association bring to the attention of the President and Congress the extent to which the national welfare and available expanding markets will be impaired and curtailed if the Federal reclamation program is not expanded.

4. The National Reclamation Association bring to the attention of the President and the Congress the urgent need for authorization of new projects which will develop, control, conserve and utilize the water resources of the reclamation States.

RECLAMATION REPAYS

In addition to the added wealth created, reclamation repays its costs many times over, directly and indirectly. The water users on reclamation projects continue each year to repay in a substantial amount. In addition to that, the power users make a very substantial contribution to the repayment costs of the

project. The total amount paid by water users to date is $114 million, while the total power repayments are $265 million. Most of the power repayments have been made during the last 10 years. In the fiscal year 1954, power repaid a gross of $50 million and a net of more than $30 million into the Federal Treasury. By far the largest return to the Federal Government, however, is in the form of income taxes and other taxes paid by the people who are living on reclamation projects and in communities and areas which are supported and maintained by these projects. It has been estimated that the total income-taxes paid into the Federal Treasury in this manner will repay the total cost of reclamation to the Federal Government about every 5 or 6 years. The estimated total income-tax receipts from Federal reclamation projects to date exceed the total cost of reclamation to the Federal Government.

The value of crops grown on Federal reclamation projects to date is about three times the cost of reclamation to the Government.

The following tabulation is based upon statistical information from the Department of the Interior and the Bureau of Reclamation.

Cost of reclamation to Federal Government (including fiscal year 1954)	$3,094,000,000
Return to Federal Government to date (1954 inclusive):	
By water users	114,000,000
By power users	265,000,000
By Federal taxes	4,000,000,000
Total return to Federal Government, 1954 inclusive	4,379,000,000
Cumulative crop values to 1953 inclusive:	
New lands (100 percent Federal)	5,491,638,747
Supplemental	4,213,510,246
Total crop value to 1953 inclusive	9,705,148,993

RECLAMATION IS NEEDED

The country needs reclamation: (*a*) to meet the needs of our growing population; (*b*) to provide a balanced economy in the West; (*c*) to maintain our present high standard of living.

To meet the needs of our growing population

The census report for February 1 shows our population to be in excess of 164 million people. It is increasing at the rate of 2,800,000 per year or 235,250 every month. That means 7,700 more mouths to feed every day. We have plenty of food today but our agricultural surpluses, although a menacing problem now, are only temporary.

Dr. B. T. Shaw, Administrator, Agricultural Research Service, Department of Agriculture, in testifying before the House Subcommittee on Agricultural Appropriations on February 1 of this year, pointed out that by 1962, and in all probability earlier, we will have reached a balance between production and consumption. He further stated that "the excess of farm output over population requirements was probably on the order of about 6 percent overall in 1953. It was less than 6 percent in 1954 and will probably be even less in 1955."

"As you know" Dr. Shaw continued, "the surpluses are concentrated in a few important agricultural commodities; namely, wheat, cotton, corn and food fats and oils * * *. The accumulation of further surpluses was not as great in 1954. as it had been in 1953 and it is estimated that in 1955 the accumulation will be very much less and probably will not add to our stocks."

Then, in discussing the possible shifts away from crops which are in surplus, Dr. Shaw continued: "In considering what the shifts ought to be and what possibilities we would have in making shifts that may be profitable to the farmers, I think the greatest single factor that has an influence on the use of substantial acres of land is the meat consumption of the United States population." Dr. Shaw then pointed out that the national consumption of red meat had increased from 16 billion pounds in 1930 to 25 billion pounds in 1954. He stated that "If we were to have per capita consumption at the average of the last 3 years, or 151 pounds, by 1962 it would require 27 billion pounds of red meat." He pointed out that that would require feed from an additional 20 million acres.

He further pointed out, however, that "If we were to consume 156 pounds of red meat, which was the consumption in 1954, it would require in 1962 some 35 million acres more land to grow feed than was used in 1953." That would provide an opportunity for the use of 17 million acres now growing surplus wheat and cotton, and at the same time, leave a deficit of approximately 18 million acres.

Continuing, Dr. Shaw stated: "The only thing I was trying to do was to indicate what we are likely to be up against with current programs and when we are likely to achieve a balance. You can look at the apparent deficit of 18 million acres in two ways: (1) It would provide considerable opportunity for yield increases between now and 1962; or (2) what is more likely if yields stay what they are, it would cut down the period required to reach balance about in half. In other words, instead of taking to 1962 to come to balance, only half that time, about 3½ years, would be required. Probably it will be a combination of the two, some little yield increase and a shorter period. We may be in balance by 1959 or 1960."

The annual loss of farmland is another problem which should be considered along with that of meeting the needs of our growing population and agricultural surpluses. In the report on land facts by the Soil Conservation Service for November 1953, it is shown that the annual loss of soil originally suitable for crop production is 400,000 acres per year. The annual loss of additional acreage to cultivation as a result of other causes such as water logging, salting, sediment deposition, etc., amounts to 100,000 acres per year. But officials in the Department pointed out, however, that losses of good farmland through other causes amounts to several times the loss of soil erosion. These causes include land being taken over for suburban development, airports, military establishments, industrial developments and especially new highway construction. The Soil Conservation Service expects to make a survey of the soil losses through these causes in the very near future but it is estimated that the total losses will amount to at least 2 million acres annually.

To provide a balanced economy in the West

Some Western States are increasing in population at a tremendous rate and also making rapid gains in industry while those States which are dependent upon an agricultural economy cannot go ahead without further reclamation. Further conservation of water is extremely important to the interior and mountainous States for municipal as well as agricultural growth. A number of cities in the area are already concerned about a future water supply, including Albuquerque, Pueblo, Denver, and others. The following tabulation illustrates what is taking place in the area.

State	Total population			
	July 1, 1954	Apr. 1, 1950 (census)	Increase Apr. 1, 1950, to July 1, 1954	
			Amount	*Percent*
Montana	628,000	591,024	37,000	6.3
Idaho	615,000	588,637	27,000	4.5
Wyoming	312,000	290,529	21,000	7.3
Colorado	1,456,000	1,325,089	131,000	9.9
New Mexico	781,000	681,187	100,000	14.7
Arizona	993,000	749,587	244,000	32.5
Utah	757,000	688,862	69,000	9.9
Nevada	218,000	160,083	58,000	36.3
Washington	2,540,000	2,378,963	161,000	6.8
Oregon	1,639,000	1,521,341	118,000	7.7
California	12,554,000	10,586,223	1,968,000	18.6
Total, United States [1]	161,195,000	150,697,361	10,498,000	7.0

[1] Estimated total population of the United States, including Armed Forces overseas for July 1, 1954, is 162,414,000.

The preceding tabulation shows the rapid increase in population in most Western States and particularly along the Pacific Coast. There cannot, however, be a balanced economy in the West unless there is an increase in agricultural production in order to meet the needs of that area. If it is necessary to transport all of the agricultural products needed for this large increase in population in the West, then a tremendous transportation problem is involved—a

problem which could become serious in time of war. We will be in a much stronger position if the agricultural needs of the area can be produced in the area. The only way that can be accomplished is through reclamation.

To maintain our present high standard of living

The diet of the average American family has changed tremendously within the life time of one generation. Today we are enjoying a higher standard of living than perhaps any other nation on earth. Included in our diet are many green vegetables and fresh fruits now available the year round, a large percentage of which comes from the irrigated West. These fresh fruits and vegetables contribute a great deal to the vitamins required. The following tabulation shows the surprisingly large percentage of these foods which come from the irrigated West.

Crop production

Year	Crop	Total for United States	17 Western States	
			Total	Percentage
		Pounds	*Pounds*	
1954	Asparagus	307,000,000	189,000,000	62
1954	Carrots	1,550,000,000	1,108,000,000	72
1954	Celery	1,496,000,000	837,000,000	56
1954	Lettuce	2,834,000,000	2,527,000,000	89
1954	Peas	851,000,000	329,000,000	39
1952	Olives	114,000,000	114,000,000	100
1954	Tomatoes	7,390,000,000	3,766,000,000	51
1952	Apricots	354,000,000	354,000,000	100
1954	Cantaloups	1,322,000,000	1,101,000,000	83
1954	Cherries (sweet)	200,000,000	170,000,000	85
1952	Grapes	6,347,000,000	6,028,000,000	95
1952	Plums	122,000,000	106,000,000	87
1954	Strawberries	428,000,000	265,000,000	62

The average American family is inclined to take for granted the year around—winter as well as summer—availability of lettuce and other green vegetables. These green vegetables, all high in vitamins, are now a part of our everyday diet. The younger generation of today will grow up to be healthier and stronger men and women because the irrigated West is making these vegetables available in sufficient quantity to meet the needs of the entire country.

The following tabulation shows the surprisingly large percentage of our lettuce supply which comes from the West throughout the year except the late spring.

United States lettuce production, by seasons

[1954: Showing total for United States. Also total and percent for 17 Western States]

Season	Total United States (in pounds)	Western States	
		Total (in pounds)	Percent of United States
Winter	792,750,000	766,010,000	96.63
Early spring	495,040,000	474,880,000	95.93
Late spring	140,280,000	27,510,000	19.61
Summer	699,860,000	574,700,000	82.12
Early fall	572,740,000	550,130,000	96.05
Late fall	133,770,000	133,770,000	100.00

SUMMARY

In summarizing I would like to emphasize that the national benefits from reclamation will continue as long as the projects remain in operation; that the national benefits greatly exceed the cost of interest-free money; and the reclamation repays the cost to the Federal Government in many ways. Today the waterusers are less than 1 percent delinquent on current payments due. And perhaps more important, I would like to emphasize that we need reclamation

to assist in meeting the food requirements of our growing population and that reclamation makes available foods that are essential to our diet.

Mr. CALLISON. Mr. Chairman?

Mr. ASPINALL. Mr. Callison.

Mr. CALLISON. If you will excuse me, when I was on the stand I forgot to request that there be included in the record a short statement that was mailed to me by a group of students from Utah State Agricultural College.

Mr. ASPINALL. Unless there is objection, the statement will be made a part of the record.

Mr. DAWSON. Reserving the right to object.

Mr. ASPINALL. While the gentleman is looking over the resolution, does the gentleman from Arizona, Mr. Udall have a request?

Mr. UDALL. Yes, I do. I have a prepared statement I would like to have made a part of the record. It concerns a matter that was discussed at the last hearing when the California attorneys were here. I have documented certain matters in previous hearings, particularly on some parts of the project, and this statement concerns those matters, and wish to have that made a part of the record.

Mr. ASPINALL. The gentleman has the right, but we will reaffirm the authority given to the gentleman to make his statement a part of the record. It will follow the testimony and the questions and answers given at the time that the opposition from California appeared before this committee. (Mr. Udall's statement appears on p. 1051.)

Mr. DAWSON. I have no objection, Mr. Chairman, except to make this comment: They do not request that this be made a part of the record. I am wondering, are we going to open this up to letters from anybody who happens to write.

Mr. CALLISON. Mr. Chairman, I am requesting it be made a part of the record.

Mr. DAWSON. That is the point I am making—if all of us start putting in letters——

Mr. ASPINALL. The Chair will suggest, Mr. Callison, that it be made a part of the file and we will not set the precedent to which the gentleman from Utah refers. With that understanding, it will be made a part of the files.

(The document referred to will be found in the files of the committee.)

Mr. ASPINALL. At this point I would like to insert in the record the statement of C. R. Gutermuth, vice president of the Wildlife Management Institute. Without objection it is so ordered.

STATEMENT OF C. R. GUTERMUTH

Mr. Chairman, my name is C. R. Gutermuth. I am vice president of the Wildlife Management Institute, one of the oldest national conservation organizations in North America. The institute is dedicated to the better management and wise utilization of all renewable natural resources in the public interest, and its nonprofit activities have been continuing since 1911.

We appreciate this opportunity to present a brief statement on the pending legislation that would authorize the Secretary of the Interior to construct, operate, and maintain the upper Colorado River storage project. Mr. Chairman, we understand that you want the testimony restricted as much as possible to new information supplementary to that recorded in previous hearings—and that means that this statement can be brief. In fact, it might really be ended here by stating again, emphatically—there is no justification for Echo Park Dam.

There has been no change in the attitude of the Wildlife Management Insti-

tute in respect to the upper Colorado River storage project. While we recognize that some features of the overall project may be needed, we still are unalterably opposed to the inclusion of Echo Park Dam in the initial phase of this program. We feel that Dinosaur National Monument is an invaluable part of the National Park system. The proponents of Echo Park Dam never have given adequate justification for the selection of this dam site over availble sites outside the national monument that could provide comparable storage facilities.

Nothing has happened in the past year to cause us, and the majority of other national conservation organizations, to alter our views in this regard. The only new development in the picture has been an organized campaign on the part of the proponents of Echo Park Dam to throw up a smokescreen in an effort to deceive the public into thinking that the proposed reservoir will become an outstanding recreational area.

An extremely attractive and lavishly illustrated brochure, printed and distributed widely by the Upper Colorado River Commission, contains propaganda that is as deceptive as it is flowery. It promises a future "playground for America's millions" with superb bass fishing, bathing beauties, and all of the other features of a mass recreation area. Its major objective is to create the impression that their plan is consistent with the laws and policies under which the National Park Service was created and operates.

The brochure conveniently overlooks many facts. Those ruinous fluctuating water levels, and their resulting miles of unsightly and foul-smelling mud flats, are not mentioned. Moreover, the cold water in that proposed high-elevation reservoir will not afford either good fishing or good bathing. That ill-conceived publication still contends that the conservationists are interested only in preserving the dinosaur quarries, when the authors themselves know that no representative of any national conservation organization ever made such a statement before this subcommittee, nor any other congressional committee that has considered legislation affecting that area. The repeated reference to that misconception, in view of the fact that the quarries lie well downstream from the proposed dam site, is made for no other reason than to deceive and confuse the public.

To build Echo Park Dam in that national monument definitely would pose a threat to the entire national park system. The Bureau of Reclamation, by its own admission, never has made an adequate evaluation of the alternate dam sites outside the monument. Competent engineering authorities have shown repeatedly that those sites are feasible and, by the belated admission of the Bureau of Reclamation itself, reservoirs outside would have no more than a slightly larger evaporation loss than the particular one that the Bureau insists upon having. It was on the basis of evaporation loss that those alternative sites were ruled out by the Bureau of Reclamation, before its estimates were revised downward so drastically.

The repeated insistence of the proponents upon retaining Echo Park Dam in the upper Colorado River storage project appears to be based entirely upon a desire by the Bureau of Reclamation to get its foot in the national parks. To one who has been close to this problem for many years, few other conclusions can be read into the refusal of a public agency to consider alternative sites after being forced to admit a 700-percent error in its own calculations of evaporation-loss differential.

As to the recreational opportunities available in the Dinosaur National Monument, even in its unimproved state—well, the scenery and boating attracted many thousands last year and nearly 1,000 made the long float trip through the superb canyons of the Green and Yampa Rivers within the monument. This happened in spite of the fact that the roads to the monument are poor and the existing facilities are woefully inadequate.

As an added inducement to get permission to destroy those scenic wonders, the Secretary of the Interior said that if Echo Park Dam is built it is proposed that $21 million will be spent to attempt to make it a "playground for millions." That is something, coming from the one who is supposed to preserve our national park system for us and those to follow. The fact is, only a small fraction of that amount spent in building roads would make the monument as it exists today accessible and attractive to millions of cross-country tourists. We believe that this can and should be done without building the dam, which will cost the taxpayers of every State at least $176 million. If that dam is built, as a part of that billion-dollar project, the scenic canyons will be destroyed along with the unique character of the area, its attraction to tourists, and its value as a potential national park.

Mr. Chairman, it is amazing that the residents of Colorado and Utah cannot realize that they could have both the extraordinary attractions of that fascinating wonderland and a dam at another location.

Mr. ASPINALL. The committee now stands in recess until 2 p. m.

(Whereupon, at 11:55 a. m., the subcommittee recessed until 2 p. m. the same day.)

AFTERNOON SESSION

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will be in session for further consideration of the upper Colorado River legislation.

Messrs. Richard Bradley, Harold Bradley, Charles Callison, Dave Bradley, Fred Packard, Howard Zahnizer, Richard Pough, and Joe Penfield will please take chairs at the witness table.

The Chair at this time recognizes the gentleman from Utah, Mr. Dawson, for such questions as he desires to ask.

Mr. DAWSON. Mr. Chairman, I am a little reluctant to take advantage of these witnesses without more of our colleagues being present. However, I assume that they will come in later on.

I would first like to ask Mr. David Bradley some questions concerning the figures he has presented in regard to atomic energy.

I notice, Mr. Bradley, that you come to the conclusion that we are on the verge of early development of atomic energy for the production of electrical energy.

QUESTION PERIOD OF RICHARD BRADLEY, CORNELL UNIVERSITY, DEPARTMENT OF PHYSICS, ITHACA, N. Y.; DR. HAROLD C. BRADLEY, BERKELEY, CALIF.; CHARLES H. CALLISON, CONSERVATION DIRECTOR, NATIONAL WILDLIFE FEDERATION; DAVE BRADLEY, NEW HAMPSHIRE LEGISLATURE; FRED H. PACKARD, EXECUTIVE SECRETARY, NATIONAL PARKS ASSOCIATION; HOWARD ZAHNIZER, EXECUTIVE SECRETARY, THE WILDERNESS SOCIETY; RICHARD H. POUGH, AMERICAN MUSEUM OF NATURAL HISTORY; AND JOE PENFIELD, IZAAK WALTON LEAGUE

Mr. DAVID BRADLEY. That is right, sir.

Mr. DAWSON. Do you not feel that the best information on that subject would come from the Atomic Energy Commission itself?

Mr. DAVID BRADLEY. Yes, sir, there is no question about that. Or from nuclear specialists in General Electric, or something like that. That is right.

Mr. DAWSON. Now, have you seen the letter which was directed by the Senate committee to the Atomic Energy Commission in connection with this very project, in which they asked their opinon as to whether or not it would be advisable to go ahead and construct these dams in the upper Colorado project, in view of the imminent development of atomic energy for electrical energy? Have you read that letter?

Mr. DAVID BRADLEY. No, I am sorry, Mr. Dawson. I haven't.

Mr. DAWSON. For your information and comments, I would like to read it. Now, this letter was directed to the Atomic Energy Commis-

sion just this month. And in reply to that inquiry, they stated as follows, among other things:

> In reply to your letter of February 17, wherein you asked for an expression from the Atomic Energy Commission as to how soon we estimate that the goal of producing electrical energy utilizing atomic energy might be competitive in costs to other fuels, and also our views as to the time period which might be involved before electric energy could be produced direct from atomic energy, and whether or not we feel that hydroelectric or even conventional fuel plants will soon become obsolete * * *

And they go on to make this statement:

> Generation of electricity from nuclear fuel should first become competitive with conventional fuels in areas of highcost electricity. We feel this could happen during the 1960's. However, regardless of this fact, it is our feeling that hydroelectric plants which can be economically justified at this time probably will not become obsolete during the useful life of the plants.

Which, in this case, is approximately a hundred years.

Would you care to comment on that statement, bearing in mind what you have told us in your written statement?

Mr. DAVID BRADLEY. I would be glad to, sir.

You remember I said I didn't wish to overstate or overemphasize the case, because, after all, my training in atomic energy has been medical rather than engineering. And what they say here is generally in line with what you read in the literature.

Whether or not Echo Park power at 5.9 mills is what they mean when they say "economically justifiable," I couldn't say.

Mr. DAWSON. Let us not confine it to Echo Park. Let us take Glen Canyon as an example. I understand you are opposed to Glen Canyon, if I read your statement correctly.

Mr. DAVID BRADLEY. I didn't single out any other part of the project, did I?

Mr. DAWSON. If I remember, you went on even further than your father and your brother and said that the whole project, in your opinion, was a mistake.

Mr. DAVID BRADLEY. As presently conceived. I mean by that the proposal as now before the House. But is this not a side line? Would you like to stick on this one subject and let me finish?

Mr. DAWSON. Yes. Let us assume a price of 6 mills per kilowatt. That is the price on this project.

Mr. DAVID BRADLEY. I wonder if their statement does not apply more truly to a TVA or Grand Coulee or some of other projects, where the power is being produced at roughly one and a half to two and two and a half mills.

Mr. DAWSON. No, they were directly asked concerning the upper Colorado project, and they wrote this letter to the Senate committee in regard to their inquiry as to the upper Colorado.

Mr. DAVID BRADLEY. Yes. Did you specify a difference between Glen Canyon at 3 mills and Echo Park at 5.9?

Mr. DAWSON. An average.

Mr. DAVID BRADLEY. I still don't see that that invalidates the general proposition that we will have a base power of hydroelectric supplemented as coal now supplements hydroelectric, with nuclear energy, at the time when nuclear energy can compete with coal. That seems to be the big problem now.

Of course, there is no law of nature that says nuclear energy ever will. It just seems like it might.

Mr. DAWSON. Of course, have you ever considered the fact that we out in the West who need the consumptive use of this water cannot get the use of the water without the use of the revenues from the hydroelectric plants to help finance us?

Mr. DAVID BRADLEY. Well, isn't it true that in Governor Johnson's proposal, you will have revenues from Glen Canyon out of which to build these other participating projects?

Mr. DAWSON. Oh, now you are on something else again. That is what I wanted to lead up to.

As I take it, you say this whole development is economically unjustified; and you are using the figures presented by Governor Miller of Wyoming, in which he takes into consideration the interest to be charged on the irrigation features, and compounds that, and comes up with a fabulous figure of $2,700, which you are using.

Well, now, with the use of the revenues from the power out there, which we purpose and we pay for out there, we can make these projects feasible. But even under Governor Johnson's theory, you could not, without the use of Glen Canyon power, have any of your participating projects; because they just could not be paid for without the power revenue. Is that not correct?

Mr. DAVID BRADLEY. That is the way I understand it. Without Glen Canyon, you could not pay for these others; unless you had something such as Mr. Miller suggests, loans to local areas under State supervision to produce their own irrigation.

Mr. DAWSON. Then I take it you are not opposed to the use of interest-free money to help finance irrigation projects; are you?

Mr. DAVID BRADLEY. I understand it is going to have to be done. I regret it, because, as I say, in New Hampshire we have land that is deteriorating. And it does look like an awful lot of money to put into land to make it suitable.

Mr. DAWSON. You say you fear it will have to be done.

It has been done since 1903. Since the Irrigation Act went into effect, there has always been interest-free money to develop irrigation projects. Do you understand that?

Mr. DAVID BRADLEY. Oh, yes; I understand that.

Mr. DAWSON. So it is not anything new.

Mr. DAVID BRADLEY. No; I grant it isn't.

Mr. DAWSON. Do you object to flood-control projects in New Hampshire, to the Federal Government being in that field?

Mr. DAVID BRADLEY. No. They are in that field, and they have done us some real good up there.

Mr. DAWSON. Do you approve of those?

Mr. DAVID BRADLEY. Oh, yes.

Mr. DAWSON. Then how can you approve of flood-control projects, when the whole business is given by the Government to those areas, and not 1 penny of it paid back; whereas on these projects all of it is paid back with interest on the power and municipal features?

Mr. DAVID BRADLEY. I think that what I am bothered by is that there does not seem to be any top level of what we will invest in a new piece of acreage to make it grow something. We could irrigate the top of Mount Washington and make it grow something, but it wouldn't be worth it. I can't sit in New Hampshire and say this land should be

irrigated and this land should not. That is certainly the province of the committee. But I say from where we stand in New Hampshire, it looks like a tremendous investment which we, as taxpayers, will have to pay.

Mr. DAWSON. Of course, you are relying on the figures of some people who have gone in with some preconceived notions which are not borne out by the facts.

Do you know what the actual cost per acre is without taking in the interest subsidy, that never has been considered in other projects? Do you know what the actual cost per acre is?

Mr. DAVID BRADLEY. I have forgotten that number. I don't remember it.

Mr. DAWSON. Well, it is under $500. And yet you are using the figure $2,700.

Mr. DAVID BRADLEY. You will understand that I had to rely on some source of information. When I find that testimony there not contradicted by any questions, I must say that it seemed to me reasonable.

Mr. DAWSON. Oh, it was contradicted, if you will examine Mr. Miller's testimony. I cross-examined him at some extent. Governor Miller, the former Governor of Wyoming.

Mr. DAVID BRADLEY. Last year? All I had was last year's record to go on.

Mr. DAWSON. We had him before the committee this year.

Mr. DAVID BRADLEY. If I am only a year behind times, that is pretty good going for me. If I have been wrong, I should be happy to be corrected on that, because I have no wish at all to appear in opposition to good, sensible projects out there.

Mr. DAWSON. Even our opponents admit that it is under $500 an acre.

Mr. DAVID BRADLEY. Gee, if we had $500 an acre——

Mr. DAWSON. So there is some difference between $500 and $2,700. But what you are doing is taking the interest, which has never been charged on reclamation projects, and compounding that over a 50-year period, to come up with that figure. And that is one of the notions that has been spread abroad by a lot of the opponents of this project.

Mr. DAVID BRADLEY. You will admit that I, as a taxpayer, will pay part of that difference between $500 and $2,700 or whatever it is. So I have at least a monentary interest in the top level.

What bothers me is that if we have to set a top level somewhere, what is efficient to irrigate.

Mr. DAWSON. Just as we in Utah will pay the total amount of the cost back or our share of it on what you get in New Hampshire on flood control projects. So we are talking about a fundamental issue here as to whether you are opposed to the Government coming into some of these areas and giving some help.

Mr. DAVID BRADLEY. I am not opposed to giving some help. It is a question of how much, I suppose.

Mr. DAWSON. In New Hampshire, you are given a hundred percent, and in ours only a fraction of a percent.

Mr. DAVID BRADLEY. Divided per capita, it would not amount to so much. Divided on a per capita basis, it wouldn't be so very big. If

you take your flood-control projects and divide by the number of people profiting by it.

Mr. DAWSON. Your population in New Hampshire is less than in the State of Utah.

Mr. DAVID BRADLEY. You have a little on us. And you are certainly growing, in spite of all the efforts of the Bradleys.

Mr. DAWSON. We are going to continue to grow, but we cannot continue to grow without some water, and we cannot drink atomic energy. We produce out in that plateau area the very atomic energy you are talking about to run these plants. And without some water out there to develop that area, you are likely not to continue to get the atomic energy that you are looking for.

Now, one more question. If atomic energy is about to blossom forth and take over the powerload, how do you account for the fact that there have been any number of applications made, very recently, by the big power companies for licenses to construct hydroelectric plants amounting to over $1 billion? Can you account for that?

Mr. DAVID BRADLEY. Will you go over that one again?

Mr. DAWSON. Well, I will read you some figures here.

The Federal Power Commission furnished just in the last week or two statistics to the effect that the private utility companies of the country have license applications before the Commission for the construction of hydroelectric plants estimated to cost $1,197,500,000.

Now, is that consistent with your claim, that we are just on the verge of going into an atomic energy development for electric energy?

Mr. DAVID BRADLEY. I didn't make that claim, did I?

Mr. DAWSON. I interpreted your statement to mean that, that there would be no need for hydroelectric plants now, because atomic energy was about to take over.

Mr. DAVID BRADLEY. I don't think I made any such statement.

I believe that hydroelectric power is going to be in many, many areas an important base power factor, and that instead of coal at some reasonable future date, we may have atomic energy coming in to give you the increased power.

Mr. DAWSON. Then you are not opposed to going ahead with hydroelectric developments now?

Mr. DAVID BRADLEY. Not to any that make a good deal of sense. Sure. I am quite in agreement with you.

Mr. DAWSON. That is all.

Now, Mr. Callison, a question for you.

I understand your vote up in Montreal was 30 to 12 opposed to Echo Park.

Mr. CALLISON. That is right; yes.

Mr. DAWSON. And the other representatives abstained from voting.

Mr. CALLISON. Yes, sir. And I wish I could give you the States, how they lined up.

Mr. DAWSON. Do you have the States who were in favor of Echo Park?

Mr. CALLISON. I do.

Mr. DAWSON. The 12? Will you read them?

Mr. CALLISON. Those were Utah, New Mexico, Arizona, Colorado, Arkansas, Delaware, Illinois, Kentucky, Oregon, Virginia, West Virginia, and Wyoming.

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Mr. ASPINALL. That shows that they were in favor of Echo Park? Or they were opposed to the resolution which you adopted up there?

Mr. CALLISON. Those were the ones that voted against the resolution.

Mr. ASPINALL. You were present at the meeting?

Mr. CALLISON. Yes; I was the secretary of the federation, and reported the vote.

Mr. ASPINALL. Is it your opinion, in their opposition to the resolution, that they stated their support of Echo Park?

Mr. CALLISON. Well, I don't know that I could make that conclusion, but at least they were opposed to a resolution that did put the federation on record against Echo Park Dam as an invasion of the national park system; however, not in opposition to the development of the upper Colorado River Basin by other means or other plans. That was made clear in the debate, that it was not a vote against the whole development, but merely against a dam in Dinosaur National Monument.

Mr. DAWSON. Do I understand, then, Mr. Callison, that it is not the position of the groups that you represent that they are opposed to the upper Colorado project, but simply Echo Park Dam?

Mr. CALLISON. That is right.

Mr. DAWSON. Now, assuming that we were to build a dam at the Brown's Park site in place of Echo Park, would your groups then be opposed to the building of the dam at that site?

Mr. CALLISON. I think not. I think some of the State organizations—of course, all of our State affiliates are free to take their own positions, and some of them might take such a position. But I think they could not consistenly oppose a dam at the Brown's Park site.

Mr. DAWSON. Then what does that do to your argument that you are breaking a precedent here and getting your foot in the door?

Mr. CALLISON. Well, I don't think it does anything to that argument, because a dam or a development at the Brown's Park site would have little effect on the most scenic part of Dinosaur National Monument.

Mr. DAWSON. But there would be a dam and the impoundment of water within a national monument, wouldn't there?

Mr. CALLISON. Yes, but a minimum of effect on the scenic values.

Mr. DAWSON. That is a question of degree, is it not?

Mr. CALLISON. Yes.

Mr. DAWSON. I see, Mr. Packard, you were shaking your head one way or the other on that.

Would you care to comment on that, as far as your group is concerned?

Mr. PACKARD. Yes; I would be happy to. I think there is one point regarding the Brown's Park project that has not been really clarified. I tried to in my statement this morning.

Mr. DAWSON. I understood what you said in your statement, that you never figured they were going to build one there. But just limiting yourself to this question, assume they did build one there now.

Mr. PACKARD. The dam cannot be built there for geological considerations.

Mr. DAWSON. Let us assume we are going to build one there.

Mr. PACKARD. I don't think you can make that assumption and come to the conclusion we are after.

Mr. DAWSON. I am asking you a hypothetical question.

Mr. PACKARD. But I don't think I can answer that question. Because the monument boundary would have been drawn differently had it not been known that the Brown's Park project could not be built. If it were possible to build that project, the monument boundary would have been dropped 4 miles or so to eliminate that particular site from the national monument. And then we could have built the project.

Mr. DAWSON. But the fact is that as it is now it is within the monument and permission is granted to build the dam now.

Mr. PACKARD. Yes.

Mr. DAWSON. Assuming now we did go up and build a dam there, would your group object to it?

Mr. PACKARD. I honestly don't know. It is hypothetical.

Let us take a different case, sir, and I can answer your question the way you want me to answer it, I think.

Mr. DAWSON. I don't care for any explanations, but I just wanted to know if they felt the word of the United States Government was not worth as much as the precedent that you are trying to protect, as far as the Park Service is concerned.

Mr. PACKARD. I wouldn't say that, either. I am thinking actually, of the Big Thompson project, which is a case in point of what you are speaking of. The law establishing the Rocky Mountain National Park did provide very specifically that it could be provided for recreational purposes. When the Big Thompson project was proposed, there was again objection that the tunnel would come out within Rocky Mountain National Park. The law provided there that it could be done. The Bureau of Reclamation stated that the project could not be revised, and they would have to do it.

However, after a hearing, Secretary Ickes instructed the Bureau of Reclamation to revise its plan, to move the exit of the tunnel outside the national park boundaries. And as an end result, in spite of that provision of the law, the project was revised to exclude its effects from the national park. And there has never been any objection to the project since.

Mr. DAWSON. Which project were you referring to in Glacier National Park?

Mr. PACKARD. There are two there, the Glacier View Dam and also the water spillway project.

Mr. METCALF. Last year, when there were rumors that a bill was going to be introduced to build an upstream storage dam in Glacier Park, I suggested that the whole problem be studied again. Because the Montana Power Co. and other power companies with downstream dams now could take great benefit from the storage at Glacier View, they were trying to start agitation in the State of Montana to revive the plans for Glacier View Dam. And my purpose in introducing the resolution that I introduced last session was to get this whole matter before the Congress, the matter of invasion of the national parks, before we were caught flatfooted.

Mr. DAWSON. If I remember correctly, when we had the hearings last year, they were referring to some other bill that I had thought my colleague was the author of, a year or two before, which would have authorized the construction of the dam in Glacier.

Mr. PACKARD. That was the Mansfield bill of about two Congresses before, I believe. We opposed it.

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Mr. DAWSON. At this point I will tell my colleague that the bill I had reference to, he says, was the Mansfield bill, which authorized the construction in Glacier of a dam which went in a few years before.

Mr. METCALF. With the same sort of opposition that this Echo Dam is meeting here today and in the past few years, I believe that it had been abandoned in Montana until last year, when some of the power companies tried to revive that storage program.

Mr. DAWSON. Now, my final question I will direct to both Mr. Packard and Mr. Callison.

Mr. CALLISON. Mr. Dawson, may I comment a little further on your previous question?

Mr. DAWSON. Perhaps some of my colleagues will have some time. I would prefer to have you bring it out with them, because I don't want to monopolize the time.

Do both of you gentlemen feel as I do, that enough money is not being spent on our national parks to keep them up?

Do you, Mr. Callison?

Mr. CALLISON. Yes; I believe that.

Mr. DAWSON. Mr. Packard?

Mr. PACKARD. I certainly do; yes.

Mr. DAWSON. Your group always advocates grabbing off huge areas of land as was done in Dinosaur, when the 2,000 acres were added to the original 80 acres and then do nothing about it as far as appearing before Appropriation Committees and getting funds to take care of these areas is concerned. Do you think that is correct, both of you?

Mr. PACKARD. If I may answer that, when I first came to Washington and became interested in and active on these matters, I asked the Director of the National Park Service whether it was advisable for me or others of our groups to appear before the Appropriations Committee in an effort to get better appropriations for the national parks. His advice was that it would not be advisable to do so, because the question of financing of the National Park Service is so complex that if we were asked certain questions we would be absolutely unqualified to answer them. All we could do is plead in more or less general terms that there be adequate appropriations.

Mr. DAWSON. Have you done that?

Mr. PACKARD. We have done that. We have done it more by articles and getting the information to the public as to what the problem is, rather than coming to Congress. I have never testified to the Appropriations Committee, if that is what you mean.

Mr. DAWSON. Have you, Mr. Callison, or any of your group?

Mr. CALLISON. I have. The record will show that the National Wildlife Federation has supported more adequate appropriations for the National Park Service.

Mr. DAWSON. Did you appear this year?

Mr. CALLISON. We attempted to before the Senate Subcommittee on Interior Appropriations.

Mr. DAWSON. For your information, I will state that I believe I was about the only witness who went before the House committee, where all of these bills originated, to plead for funds for the Park Service. And I was rather disappointed that none of you people were over there to give any support for these requests for funds.

Why did you not appear, Mr. Callison, before the House committee? Or any of your groups that you represent?

Mr. CALLISON. Well, frankly, it has been my policy to wait and see whether it was necessary for us to take the time of the committee, and when we found out that the House had cut a million dollars from the construction funds of the National Park Service, I immediately wrote a letter to the chairman of the Senate subcommittee, and asked to appear in support of restoration of those funds.

Mr. DAWSON. But you have not made any appearance before the House committee, where all of these money bills originate.

Mr. CALLISON. I haven't this year. We have in the past, sir.

Mr. PACKARD. May I comment, Mr. Dawson, that I think your question is a very good one. I want to thank you in the name of the National Parks Association for taking that step; and also I want to add that I think possibly we have been ill advised in not appearing before the Appropriations Committees. We have done it deliberately, but I think it is probably an error and we should have.

Mr. DAWSON. I think all of you will agree with me that the situation at Dinosaur is a disgrace.

Mr. PACKARD. It has been, sir, but the Park Service is now preparing exhibits there for the public, probably due to your interest, I expect. And I think that situation is going to be improved.

What they need at Dinosaur very desperately are more adequate accommodations in the canyons as well as in the quarry.

Mr. DAWSON. You cannot get any accommodations in the canyon, can you, unless you get some water down there?

Mr. PACKARD. Yes, you could put fine accommodations down there.

Mr. DAWSON. Aside from Pat's Hole and Mantle's Ranch, where else can you get off and picnic up and down those canyons?

Mr. PACKARD. May I refer the question to some of those who have been down the river? Mr. Bradley could probably answer that.

Mr. DAWSON. Mr. Bradley, you have been down there.

Mr. HAROLD BRADLEY. Yes, Mr. Dawson. I should say we should have more money spent on those roads.

Mr. DAWSON. What roads?

Mr. HAROLD BRADLEY. The roads going down to Echo Park and the roads that go into Rainbow and Highland Park.

Mr. DAWSON. There is none going to Echo Park. You mean to Pat's Hole, don't you?

Mr. HAROLD BRADLEY. Pat's Hole and Echo Park are the same thing, except that it was Mr. Powell who named it Echo Park back in 1869. Pat came in much later.

Mr. DAWSON. As a matter of fact, when you speak of a park, the only area down there you can put your foot on is just a little small area of land, isn't it, of a few acres?

Mr. HAROLD BRADLEY. Well, it depends on what you define as a few. There is a pretty good sized area that you can camp on. That is for sure.

Mr. ZAHNISER. It has been called an area the size of a good farm.

Mr. DAWSON. Out there I suppose a good farm is a few acres.

Mr. ZAHNISER. It is a beautiful park.

Mr. ASPINALL. The gentleman from Montana.

Mr. METCALF. Mr. Chairman, I have very little to ask, except that I want to ask Mr. Callison to reiterate a statement that I believe has already been made.

This resolution that was passed in your Montreal meeting related only to Echo Park and did not relate to the rest of the upper Colorado River development program.

Mr. CALLISON. That is right.

Mr. DAWSON. Will the gentleman yield?

Will you please answer that so that the reporter can get it?

Mr. CALLISON. I said "That is right." I am sorry I didn't speak audibly enough, Mr. Dawson.

Mr. METCALF. And in representing the National Parks Association and the other associations you listed in your statement that you gave this morning, you, too, are appearing in opposition to Echo Park or the invasion of the national park, and not in opposition to the upper Colorado River project or any water-resource development program that does not invade a national park. Is that correct?

Mr. PACKARD. That is correct.

Mr. METCALF. And Mr. Zahniser, I want to ask you the same question.

In appearing here this morning, I want to make it clear that you were appearing in opposition to Echo Park Dam alone and not in opposition to the upper Colorado River development program.

Mr. ZAHNISER. I sough to emphasize——

Mr. METCALF. I am sure you did. I just wanted you to reiterate that statement.

Mr. ZAHNISER (continuing). Very strongly that my concern was with the Dinosaur National Monument, wherein there are planned the Echo Park Dam in the first phase and later the Split Mountain Dam also, and furthermore that in the construction of the Glen Canyon Dam, the assured protection of the Rainbow Bridge National Monument should be required. And further I sought to recommend that the bill, if approved, include a provision that the authorization should not apply to any dam, or any dam affecting any feature within any area, of the national park system. So that this controversy which has been going on so long could result in that positive reassertion of the national park principle and that its effect would last throughout the length of the authorization which we are now making for many years to come.

Mr. METCALF. I think that is all, except that I will yield to Mr. Callison to make the statement that he was going to make to Mr. Dawson.

Mr. CALLISON. Thank you, Mr. Metcalf. I thought I should clarify for the record that in saying that the National Wildlife Federation was not opposed to the dam at the Brown's Park site I was expressing a personal opinion, and I shouldn't put the organization on record without its having gone on record. I wanted to clarify that for the record.

And also in further response to Mr. Dawson's question, I think that the reservations that have been cited as justification by the proponents of the dam or dams in Dinosaur National Monument are not actually permissions to build a dam, but rather reservations for further consideration. I think only Congress can grant a permission of authorization to construct a dam in Dinosaur National Monument; and should Congress enact such an authorization, it would be a very clear precedent, because never has Congress authorized a dam in a national monument since the creation of the national park system.

Mr. ASPINALL. Will the gentleman from Montana yield at that point?

Mr. METCALF. I yield to the chairman.

Mr. ASPINALL. You were in the room this morning when Senator Watkins made his statement, were you not?

Mr. CALLISON. I was in the room through most of his statement; yes, Mr. Aspinall.

Mr. ASPINALL. You heard his contention that there were at least 7 or 9 power site withdrawals and classifications in that area at the time of the enlargement of the monument; is that correct?

Mr. CALLISON. Yes, I heard his statement to that effect.

Mr. ASPINALL. If that statement is correct, and I have not studied it, not having had an opportunity, but if that statement is correct, and those withdrawals or classifications were in existence, and had the same status as the one at Brown's Park, then would your position be the same as to them as it is to Brown's Park reservation?

Mr. CALLISON. Well, I would say this, that my position would be, as to those reservations, granted that they are there and still in existence, that they are not authorizations for construction of a reclamation dam in Dinosaur National Monument.

Mr. ASPINALL. But you just stated that that is the status also of Brown's Park reservation.

Mr. CALLISON. No. My contention is that that is not authorization for a dam at the Brown's Park site.

Mr. ASPINALL. But neither is it for the others.

Mr. CALLISON. No, no; only Congress can grant that authorization, Mr. Aspinall. That is my point. And by that token, or for that reason, should Congress grant an authorization, it would be setting a precedent, by having for the first time authorized construction of a reclamation dam in a national park or national monument.

Mr. ASPINALL. But if it should appear to this committee that it would not be breaking a precedent, that the reservations are present, and that the policy which the conservation group calls for is not imposing upon the sanctity of the national park and national monument areas, then, if that should not be involved here, if that should happen to be the case, as determined as a result of study, then what would your position be?

Mr. CALLISON. I think that my position would be unchanged, but I would have to recognize that Congress has the ultimate authority to decide the matter.

Mr. ASPINALL. In other words, I take it that all of you who are appearing here now at the witness table are opposed to the construction of a reservoir or power facility in Dinosaur National Monument whether or not a reservation is in existence; is that correct?

Mr. PACKARD. May I comment on that, Mr. Chairman?

Mr. ASPINALL. I just wanted to ask. I will ask Richard Bradley.

Mr. RICHARD BRADLEY. If it were Brown's Park, sir, I would not be able to object, I feel. As far as the legal aspects of it, which Mr. Watkins spoke of this morning, I would rather not say. I just do not understand it.

Mr. ASPINALL. Mr. Harold Bradley?

Mr. HAROLD BRADLEY. I would say, Mr. Chairman, that I would not be opposed fundamentally to the Browns Park Dam, because as I understood it—and you remember I am just a man in the street, with-

out access to a lot of this inside information—the President's proclamation resolved all of these other questions of dam sites but left the Browns Park there for decision, and if Reclamation wished to build a dam within a certain period of years, as I recall it, they could.

Mr. ASPINALL. But that was not the effect of the President's order?

Mr. HAROLD BRADLEY. If it was not then, sir, I am simply a man in the street not fully informed.

Mr. ASPINALL. All right.

Mr. Callison has answered. Mr. Zahniser?

Mr. ZAHNISER. What is the question?

Mr. ASPINALL. The question is: If it should be finally resolved that this construction, proposed construction, of a reservoir or a dam in the national monument, Dinosaur National Monument, is not an infringement on the policy which you gentlemen stand for, would you then still be opposed to the placing of the facility in the national monument?

Mr. ZAHNISER. I can't imagine myself participating in that hypothetical conclusion with you.

Mr. ASPINALL. We have several who make that contention.

Mr. ZAHNISER. I believe I would continue to be a minority, unable to get myself to reason myself into a position of agreeing with you.

Mr. CALLISON. I believe I would have to take the same position, Mr. Aspinall.

Mr. ASPINALL. Mr. David Bradley, what is your position? Would you be in favor, if there are no trespasses upon the general policy for which you are appearing?

Mr. DAVID BRADLEY. I am glad to see that you are able to derive more direct information from that testimony than I was. I was confused by that brief.

My impression was that when one lawyer presents one set of facts there is always another one to jump up with another set of facts. I prefer to wait until I hear another one presented from the other side.

Mr. ASPINALL. Well, it is not from Senator Watkins that I take this statement, but from our own counsel's study that he made last year. And if it should appear that this is not a trespass upon this general policy for which you folks and some of the rest, as far as that is concerned, take your stand, and which you are desirous of following, would you then be in favor of erection of this facility in that monument?

Mr. DAVID BRADLEY. I think not.

Mr. ASPINALL. Mr. Packard?

Mr. PACKARD. I will have to answer that question in parts, I think.

First of all, I consulted the Solicitor of the Interior Department to ask the question: did the proclamation, by specifying the 1904 withdrawal from the Browns Park project, and by stating that it superseded certain other actions that have been taken in the past—was the effect of that to cancel and supersede all of the withdrawals other than the Browns Park withdrawal of 1904? The answer of the Solicitor's Office in the Interior Department was: I did so cancel it. Therefore, the several withdrawals that Senator Watkins mentioned this morning, except for the Browns Park withdrawal, are no longer in effect. They are invalidated. You will find in almost every national park in the West similar withdrawals that have been superseded and canceled by the establishment of those national parks. In fact, there

are only four, I believe, national parks, where it has been indicated otherwise in certain cases.

Therefore, I would not approve of building any dams in Dinosaur National Monument or any other national park on a basis of a withdrawal that had been canceled or any other withdrawal, for that matter.

Mr. ASPINALL. If the order which enlarged Dinosaur National Monument did not, in fact, establish and take a position upon this policy of not building such facilities within a national park or national monument area, then what would be your position?

Mr. PACKARD. I would say it was very badly drawn legislation.

Mr. ASPINALL. I did not ask you that.

Mr. PACKARD. I do not think they would draw legislation in that manner. If I say "yes," it would imply that I am favoring dams under certain conditions. The withdrawals were canceled, and therefore they have no validity, and therefore it is a hypothetical question about something that does not exist and cannot exist?

Mr. ASPINALL. Mr. Pough?

Mr. POUGH. I simply take the stand I did this morning, that as a biologist concerned about the future of my business, we value these areas in the West where disturbance is kept at a minimum as very essential laboratories that are going to become increasingly useful as we manage the rest of our land better, plant sagebrush, plant the better grass, and so forth, and all I would do is ask if you cannot find some way of completing this upper Colorado River storage project without stepping into one of these units that we consider very precious.

Mr. ASPINALL. Even as I said last year, although there are hundreds of miles in other areas of like climatic conditions to those in my district, you still say because this has been designated as a national monument area you think it should be retained as such?

Mr. POUGH. I would say so. And looking into the future, I think in your State as in all others land outside the boundaries of these reserved areas is going to be increasingly managed and manipulated for the management of forage or whatever it may be and will gradually in time lose the condition I know undoubtedly exists outside the monument. But I think that unit and that area is important looking ahead, and we should try to keep it intact if we can.

Mr. ASPINALL. Mr. Penfield, you understand my question.

Mr. PENFIELD. Yes, sir. I think it is just a little bit loaded, too. Let me answer it this way, if I may.

On the Browns Park site, we recognize that there seems to be an opportunity there to build a dam if they wanted to.

Mr. ASPINALL. But you would not build a dam there or have a dam built there, would you, Mr. Penfield, under the existing conditions, even though it says the reservation is there? You would not support an argument to build a dam at Browns Park, would you?

Mr. PENFIELD. Oh, I would regret very much to see a dam there.

Now, on your other question, that the other withdrawals shall be determined by attorneys, that they are valid, I think that probably the Izaak Walton League would be in here before this committee urging with all our power that the Congress set aside those and establish Dinosaur National Monument as a national park and preserve it in that condition, because in our opinion that is going to be its greatest service to the West and to the Nation, rather than as a bathtub.

Mr. ASPINALL. The Chair recognizes the gentleman from New York.

Mr. PILLION. Mr. Callison, I note that the ratio of States voting in opposition to the Echo Park project was 30 to 12, or a ratio of 2½ to 1. If this vote were transferred into membership, individual members, rather than on a statewide basis, the vote would be in a greater ratio against Echo Park than 2½ to 1; is that true?

Mr. CALLISON. I am sure that is true. I have not tried to cast up the memberships of the various organizations, tallying them up against their votes, but certainly the States with the big memberships in their State wildlife federation, such as New York State's Conservation Council and the Pennsylvania Federation of Sportsmen's Clubs and the Michigan United Conservation Clubs——

Mr. PILLION. They are only counted as 1 vote, even though their membership might be 10, 15, or 20 times greater than that of the membership of a smaller State such as Arizona or Utah; is that correct?

Mr. CALLISON. That is right, sir.

Mr. PILLION. And if it were based on population figures, if you were to take the vote of the 30 States who vote against, and multiply by the population of that State, and did likewise with the States who opposed, then the ratio of opposition might be 10 or 20 to 1 instead of 2½ to 1. Is that correct, Mr. Callison?

Mr. CALLISON. It could very well be.

Again, Mr. Pillion, I have not had the opportunity to tally up the figures.

Mr. PILLION. Anyway, that ratio does not correctly reflect the ratio of opposition either by the membership of your clubs or by the population of the States?

Mr. CALLISON. That is right.

Mr. PILLION. I yield to the gentleman from Utah.

Mr. DAWSON. Mr. Callison, do you not also feel that the fish and wildlife associations who come from the area would be in better position to know what might be best for their organizations? I am reminding you of the fact that the western association of fish and wildlife organizations voted in favor of Echo Park, did they not, in California, in a meeting held there recently?

Mr. CALLISON. I think you probably have reference to the western association of fish and game associations at their meeting at Reno last year.

Mr. DAWSON. At Reno?

Mr. CALLISON. Yes. Well. that organization is different and separate from the National Wildlife Federation and is not affiliated with us. That is an organization whose members are composed of the State game and fish administrators, such as Mr. Perry Egan, in your State, sir. He is a member of that.

Mr. DAWSON. Oh, I see. They would be in a position to know, wouldn't they, what would be best for the country? Those people?

Mr. CALLISON. I would prefer not to make a statement as to which of our various State wildlife federations would be in a position to know better than another one about these matters. Because they have very decided opinions, which were expressed at Montreal very ably, on both sides of the question.

Mr. DAWSON. Of course, in connection with the questions asked by my colleagues from New York, that the people of New York ought to be in a better position to tell us out in Utah or Colorado what we should do out there for protection of fish and wildlife, we feel that numbers do not mean as much as the information that the people in the area have.

Mr. CALLISON. I think the issue has been drawn rather clearly in Montreal, that it was a matter of the integrity of the national park system, which was the primary principle on which the vote was taken; rather than an issue as to fish and game resources.

Mr. PILLION. I do not want to misquote the gentleman who last had the floor, excepting to say that I would rephrase that by asking this question, that perhaps the States who voted for the construction of Echo Park probably know best what is best for them, rather than for the Nation. And those who voted against probably know how much it will cost them to construct this for the limited number of people whom it would serve in the West.

I might put the question that way. It might be just as fair as the question that my colleague put.

Mr. CALLISON. Mr. Chairman, I would prefer not to comment further.

Mr. PILLION. No comment is expected. It is just a little difference of opinion between my colleague and myself on the subject.

Dr. Bradley. May I address you that way? Is that your title?

Mr. DAVID BRADLEY. Which one, sir?

Mr. PILLION. You are all doctors? You are a distinguished group.

Dr. David Bradley?

Mr. DAVID BRADLEY. Yes, that is correct.

Mr. PILLION. I happened to be here this morning and listened with a great deal of attention to all the statements made here, and I was especially struck and impressed by your statement because of the fact that it treated the subject on a national, broad, and overall basis, and I wish to compliment you upon your very fine statement and also upon your conclusions. I know a great deal of work has gone into the statements.

But you express in the statement some intimate knowledge of atomic and other forms of recent energy that have been discovered. It is my understanding that the atomic-energy program was successfully included in a crash program of about 2 or 3 years. Am I correct in that?

Mr. DAVID BRADLEY. You mean during the war? The Manhattan District?

Mr. PILLION. Is that the fission or the fusion project?

Mr. DAVID BRADLEY. Fission. Not fishin' of the kind that we have mentioned.

Mr. PILLION. And the hydrogen-bomb program was completed under a crash program also in about 2 or 3 years. Is that correct, roughly? Just very generally?

Mr. DAVID BRADLEY. It took a little longer. But when they really got down to business, it was after the Russians blew up their bomb.

And then Mr. Truman said, "Let's go ahead down in South Carolina."

And in a very short time they developed a certain form of the hydrogen bomb, and subsequently, I think, have determined that a

different form is more efficient. This is only what I know from reading, but they have perhaps decided that that particular program wasn't of the best and have gone along on a different program.

But you are quite right in saying it went along very quickly when they got down to business on it.

Mr. PILLION. Yes.

Mr. DAVID BRADLEY. It went all the way from the first chain reaction to the hydrogen bomb in 10 years.

Mr. PILLION. These two types of power are rather incomprehensible. Anything can happen over the course of the next 5 or 10 years.

Is that not so, from a scientific point of view?

Mr. DAVID BRADLEY. I don't think we can make any bets on it either way, no.

Mr. PILLION. And the statement read by my good and distinguished colleague from Utah on the subject, you might say, is one man's opinion or one group's opinion, and other scientists might well disagree with that statement as to the replacement of hydropower by atomic power in the near future. It might be possible to replace hydropower in the space of 5 years or maybe 10 years or 20 years. And the idea that it cannot be replaced for 100 years would be pretty much of a flight of imagination. That is my statement.

Would you concur with that?

Mr. DAVID BRADLEY. I don't want to muscle in on your flight of imagination, sir.

Mr. DAWSON. Will the gentleman yield to me?

Mr. PILLION. Surely.

Mr. DAWSON. Having just recently returned from Nevada and having seen two tests out there, and with reference to thermonuclear energy, there is no contention so far as I know that thermonuclear energy can be used for peaceful purposes other than exploding the bomb.

Mr. DAVID BRADLEY. I believed that, too, until I read something recently that perhaps they will be able to control that in a slow pile.

Mr. DAWSON. That was the opinion of the foremost physicists out there, that that is not in the making.

Mr. METCALF. Would the gentleman yield?

Mr. PILLION. Surely.

Mr. METCALF. In response to a question put to you by Mr. Dawson, it was my understanding that you said that your contention this morning was that this atomic power from the atomic reactor was going to be supplementary to that of hydropower and would not necessarily replace hydroelectric; is that correct?

Mr. DAVID BRADLEY. I think that is correct.

Mr. PILLION. Well, may I ask this: Did you have in mind that atomic power would first be a supplementary power, owing to the fact that high-cost power is used to supplement lower cost power, and that is a general statement, that it would come in first as supplementary power, and then eventually come in as a prime source of power, if, of course, it becomes competitive with other sources of power?

Mr. DAVID BRADLEY. I think I would agree with you. It is a question of which is the economic way of producing power, is it not?

And, as I understand it, coal is the only real competitor in this general field. But coal is becoming more and more efficient, owing to

atomic competition, and I do not know when nuclear energy will overtake coal.

But some of our best scientists seem to think it will happen within 5 years in some cases, 10 years in other cases, and of course beyond.

But even then, if we developed all the hydroelectric power that is available to us in this country, as I read the scientists on this, it only amounts to 2 percent of the energy we now consume, largely from coal. We would not boost it up very much by developing every dam in the country. It is almost all coal now, anyway.

Mr. PILLION. Now, Doctor, you were talking about the economic point of view, the question of costs.

Is not the question of costs and the economic point of view the one and the great distinguishing feature between a free economy, a free society on the one hand, and the Socialist and totalitarian governments on the other?

The basic difference, besides the political freedoms, is the question of the economy and the cost of any particular product?

In a free economy, the consumer is free to choose what he wishes to buy at the cheapest cost. And the great difference is costs. In a slave state, costs don't mean anything, because you have the power of the police state, the power of arrest, the power of the slave camps, to produce goods regardless of costs.

And in that type of society costs mean nothing, whereas in our society cost is the overriding factor. Is that a fair, general statement?

Mr. DAVID BRADLEY. I am sure you know as much about Russia as I do. I am impressed with the fact that so far as I know they do not have any national parks in Russia.

Mr. DAWSON. It is all national park.

Mr. PACKARD. As a matter of fact, they do have national parks, but they have destroyed, by misuse and change of their structure, a great number of them.

I don't know how many they have in Russia, but they are not national parks in our sense at all.

Mr. PILLION. Now, Dr. Bradley, you are a member of the legislature of the State of New Hampshire?

Mr. DAVID BRADLEY. Yes, sir.

Mr. PILLION. And I presume that that State operates on a balanced budget?

Mr. DAVID BRADLEY. No.

Mr. PILLION. Pardon me?

Mr. DAVID BRADLEY. I am sorry to say they don't.

Mr. PILLION. I see. However, it has not given up hope that it will operate on a balanced budget?

Mr. DAVID BRADLEY. Every political platform intends to balance the budget; and after they get voted in, they don't.

Mr. PILLION. I see. It gets unpopular.

I note that you referred to the construction of a dam in your State, Dr. Bradley, at a cost of $60 million. Is that by private means?

Mr. DAVID BRADLEY. Yes, the New England Power Co.

Mr. PILLION. Now, that construction, when it is completed, I assume, will pay town taxes?

Mr. DAVID BRADLEY. Yes, it does.

Mr. PILLION. County taxes?

Mr. DAVID BRADLEY. Yes.

Mr. PILLION. State taxes?

Mr. DAVID BRADLEY. I think there aren't any State real-estate taxes.

Mr. PILLION. Any Federal taxes?

Mr. DAVID BRADLEY. Yes, sir.

Mr. PILLION. By the way, what is the average value of farmlands in the New Hampshire area, Dr. Bradley? Could you give us an idea what they run? A hundred dollars an acre, $200, or $300?

Mr. DAVID BRADLEY. It varies so very greatly from good farmland to bad that I couldn't give you an average.

Mr. ASPINALL. The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. I do not want to deliver a lecture here. I think you are getting enough of a lecture. But I do want to say this.

Coming from a State that has an abundance of national parks and national monuments—and I probably have more in my district than other Congressmen—I am one who feels that space and these natural wonders are perhaps the most valuable things our State has.

I want to commend you, gentlemen, on taking an interest in these conservation issues. I would like to say, too, at the same time, that I do feel that you make a most effective presentation when you present clear-cut conservation issues and do not let antireclamation arguments creep into your presentations, which we have seen in some instances before this committee. I am not necessarily referring to any of you here today. Because it is my opinion that you will get a much better reception in this committee, and I certainly speak for myself on that, if you do present conservation issues as such and do not intrude in other areas. But I would want you to recognize, too, that those of us in the West where we have a lot of these natural wonders and areas that have been set aside, do have problems, too, of developing our resources and of bringing our people along economically.

I refer particularly to the Navaho people in northern Arizona, who have a large and beautiful area in some respects and yet one which will not sustain them economically

And one of the features in this project—that is the reason I am so vitally interested in it—would give them some means of making a livelihood through a reclamation project.

I did want to direct one specific inquiry to Mr. Packard.

Judging from newspaper accounts—I have not read the hearings—you were asked a question before the Senate committee whether, since the claim was made that Echo Park Dam would set a precedent, there was any other proposed dam that would follow that precedent if it were set. And I believe you referred to the Bridge Canyon Dam.

Mr. PACKARD. As 1 of the 16; yes, sir.

Mr. UDALL. Are there more than one?

Mr. PACKARD. There are at least 16, and probably more.

Mr. UDALL. Are we talking now about power-site withdrawals, or about proposed dams?

Mr. PACKARD. We are talking about very actively proposed dams, some of which have been before Congress. I can name them if you would like, just out of the air.

Mr. UDALL. Have you made a study of the Bridge Canyon unit, to determine what the invasion would consist of?

Mr. PACKARD. Yes, I have read 3 of the 6 volumes of hearings. The invasion would be that the dam would be built to an elevation of 977 feet below the Grand Canyon National Monument above Lake Mead. The waters would back up to that elevation the entire length of the Grand Canyon National Monument and 18 miles into the national park. The national monument is the narrow part of the canyon, the Great Gorge, the broad expansion.

Mr. UDALL. I want to ask you this. We have in the law what is known as the de minimis doctrine, which means that the law does not recognize or take cognizance of trifling invasions. Is it your feeling, as a representative of your organization, that minor invasions, for instance, let us say if the water backed up a few feet in a national monument where the dam was built outside, that is something which you would object to?

Do you object to any invasion, or are you willing to overlook trifling invasions or small invasions?

Mr. PACKARD. I wouldn't say overlook them, but I think one has to use commonsense in such matters.

Mr. UDALL. That would be my thought, too. In other words, we are trying to conserve these places of beauty on the one hand. We are trying to develop our areas and solve our economic problems on the other. And I would hope that all of these organizations would take such a point of view when these problems arise. Because, obviously, I think we are going to have more meetings of this type.

Thank you, Mr. Chairman.

Mr. ASPINALL. I recognize the gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. Mr. Chairman, I have looked over all the statements of the gentlemen who presented statements here this morning, and are now here for questioning. I would like to call the committee's attention for a portion of the statement which was presented this morning by the Honorable Arthur V. Watkins. I will not take too much time on it, but I think it is very important to the issue which was being discussed by Mr. Dawson. And I think it is particularly important because Mr. Watkins saw fit to supply the emphasis in a number of places, but he did not see fit to supply the emphasis in places which did not point up the opposite position to that which he would like to have taken. And on page 3-A of the Solicitor's opinion, dated December 5, 1939, I find this:

> It follows that if a land is affected by the power-site classifications included within a national monument, the Federal Power Commission will be without authority to grant licenses affecting them. Any attempt to preserve this authority in the Commission by specific provision in the national monument proclamation will be ineffective, since the authority of the Commission has been prescribed by the Congress and cannot be extended by the provisions in an Executive proclamation of this character.

Then he goes on to say some more and then ends up with this:

> The Federal Power Commission will thereafter be without authority to grant licenses pursuant to the Federal Water Power Act, as amended, relating to lands given a national monument status.

And that Solicitor's opinion has been in effect in 1939, has been used ever since that time, and I think takes Senator Watkins' argument as

to the withdrawals right out of the picture. And the Federal Power Commission has no authority whatsoever, and the President's proclamation, by the very words of the Solicitor's opinion, which were in effect after he wrote it, specifically saying that there is no authority to build even in Browns Park.

As for one, I might say that I am opposed to invading or building at Browns Park or anywhere else within a national monument.

I want to ask this group of Bradleys who are here before us: Am I correct that all the Bradleys here have gone down the river? All three have gone down the river?

Figuratively, that is. They are still here and very much alive and alert.

I might ask you this. Have you seen this propaganda that has been put out by the Aqualantes as to—what do they call it?—the Playground of Tomorrow?

Mr. DAVID BRADLEY. Tomorrow's Playground for Millions of Americans.

Mr. SAYLOR. Now, Dr. David Bradley, you heard Mr. Dawson ask the question as to a few isolated places that it would be possible for people to visit if they go down the river. And he mentioned certain places, such as Mantel's Ranch and Pat's Hole. Now, if they build that dam to that height, will it place the water above the level of the canyon?

Mr. DAVID BRADLEY. No.

Mr. SAYLOR. Then I am going to ask you the next question.

Where are we going to take care of these 20 million? Where are we going to find the park places to put those 20 million?

Mr. DAVID BRADLEY. You let them down the canyon like off the side of a battleship.

Mr. SAYLOR. And the very nature of the advertisements which these people have put out, have been prepared by those who have probably never visited the site, because there is no place other than the places that are going to be flooded wherein you can have any playground or anything else. Isn't that correct?

Mr. DAVID BRADLEY. I think that is correct.

Mr. SAYLOR. Now, I have been trying to find someone who would come in and tell us where they were, but I have not heard a word, I might say for your benefit, of testimony by any of the proponents, where these 20 million are going to find a place to go. The only thing that they can do is that they are going to be able to go fishing.

I would like to ask this next question. Is Mr. Kim Bradley any relative of yours? I want to ask that of Dr. Harold Bradley. Do you have a Mr. Kim Bradley in your family?

Mr. HAROLD BRADLEY. I haven't a Mr. Kim Bradley, but if you change that to "Miss" I think you would hit the mark. I have a granddaughter.

Mr. SAYLOR. The reason for that is that I have been told that the Department of Interior, the Secretary's Office, has written to Mr. Kim Bradley, and the Aqualantes have on their mailing list a Mr. Kim Bradley, and I am interested in finding out if you know of any such person.

Mr. HAROLD BRADLEY. Since the address was the same as her father's, Mr. Saylor, I think probably it was a mistake.

Mr. SAYLOR. Oh, is Miss Kim Bradley in the audience?

Miss Bradley, are you here? Come on up. I want the men of this committee to meet you. You can come on up. We will not make you stay down in front.

Now, Miss Bradley, how old are you?

Miss BRADLEY. (Miss Kim Bradley, Hanover, N. H.). Eleven.

Mr. SAYLOR. Do you live at 34 Ocken Ridge, Hanover, N. H.

Miss BRADLEY. Yes.

Mr. SAYLOR. And did you get a letter from the United States Department of Interior, the Office of the Secretary, addressed to Mr. Kim Bradley?

Miss BRADLEY. Yes.

Mr. SAYLOR. Do you know of anybody down there at that address called Mr. Kim Bradley?

Miss BRADLEY. No.

Mr. SAYLOR. Do you have some brothers and sisters?

Miss BRADLEY. Yes.

Mr. SAYLOR. But you do not have any named Mr. Kim Bradley?

Miss BRADLEY. No.

Mr. SAYLOR. Did you go down this terribly dangerous river where only the hardy are able to survive?

Miss BRADLEY. Yes.

Mr. SAYLOR. How old were you?

Miss BRADLEY. Nine.

Mr. SAYLOR. And where did you go on the river?

Miss BRADLEY. Well, what do you mean?

Mr. SAYLOR. Where did you start in?

Miss BRADLEY. I don't know the name of the place.

Mr. SAYLOR. You do not know the name of the place. How many days were you on the river?

Miss BRADLEY. Six.

Mr. SAYLOR. Six days. Did you get dumped out into the water at any place along the line?

Miss BRADLEY. No.

Mr. SAYLOR. And you completed the trip? Would you like to go back?

Miss BRADLEY. Yes.

Mr. SAYLOR. All right. I just think that the members of this committee should meet this charming young lady, because she came to my office and she told me that she had been down the river. I think that these people who come from that great area out there of the upper basin states and who want to talk about the horrors of the river and that it is only right for foolhardy individuals, should see this shining example of this young lady who went down and would like to go back again.

All right. Thank you, Miss Bradley.

Mr. Chairman, at this point I would like to introduce into the record a copy of a letter from John G. Marr, Director of the Technical Review Staff, Office of the Secretary of Interior, dated June 9, 1945, addressed to Mr. Kim Bradley.

Mr. ASPINALL. Does the gentleman from Pennsylvania consider that this has any particular merit as far as the consideration of the legislation is concerned?

Mr. SAYLOR. Without a doubt. I think it proves up just how far afield the Department of the Interior has gone in its effort to give some justification to its position to invade Dinosaur National Monument with the building of Echo Park and Split Mountain Dams. Because the important thing is that it is a form letter, and the form is the important thing. It points up some of the reasons that the Department of the Interior has given for supporting this legislation.

Mr. ASPINALL. Kim, may I ask you a question?

Did you, as you went down the river, sign the book when you were at Pat's Hole?

Miss BRADLEY. No.

Mr. ASPINALL. Did you put your name on it any place?

Miss BRADLEY. No.

Mr. ASPINALL. Did you leave your name at any place along the trip that you took?

Miss BRADLEY. No.

Mr. ASPINALL. Did you register when you were at Dinosaur National Monument?

Miss BRADLEY. No.

Mr. ASPINALL. Did you write a letter to the Department of the Interior at any time, signed by you?

Miss BRADLEY. What?

Mr. ASPINALL. Did you write a letter to any member of the Department of Interior at any time?

Miss BRADLEY. One letter? I don't know what he is talking about.

Mr. ASPINALL. I am just trying to find out for the committee just how they might have found your name. That is all. Did you write a letter to the President of the United States about this project?

Miss BRADLEY. Yes.

Mr. ASPINALL. You did? I think it is very easy to understand how the name perhaps got mixed up as it did, as far as that is concerned.

The Chair finds no reason why the letter should be made a part of the record, but it will be made a part of the file, and it is so ordered.

Without objection, a statement by our colleague, Mr. Dawson, will be placed in the record at this point.

STATEMENT OF REPRESENTATIVE WILLIAM A. DAWSON

Mr. Chaiman, Now that the testimony has all been presented and both sides have had their day in court, it is well for us to deliberate on the basic issues raised by the opponets of the upper Colorado River storage project. Without cluttering up the record with surplus matter, let me briefly outline these objections and the answers to them.

MISTAKE NO. 1

There is no need for further reclamation programs because agriculture surpluses dictate the curtailment rather than an expansion of our ability to produce food and fiber.

Fact

The Department of Agriculture's representatives tell us that by 1975 this country will be faced with a food shortage rather than a surplus. It should be kept firmly in mind that this project will not be in full production until several years after 1975. It should also be emphasized that irrigated land does not generally produce the crops that are now in surplus. Instead, irrigation is responsible for the increase in fresh fruits and vegetables that now have become such a necessary part of the diet of our Nation. For example, the 17 irrigation States produce 72 percent of the carrots, 89 percent of the lettuce, 100 percent

of the olives, 100 percent of the apricots, 83 percent of the cantaloups, 95 percent of the sweet grapes, 51 percent of the tomatoes. These and similar production figues dramatically bear out the important part reclamation has played and must continue to contribute toward the American diet.

MISTAKE NO. 2

This project will cost the American taxpayers as much as $15 billion.

Fact

The project, as recommended by the Department of Interior, would cost slightly less than $1 billion and even if if the Senate amendments are approved by the House, the authorization will not exceed $1.658 billion. What the opposition does not say is that all but $8 million of this amount will be repaid to the Treasury by the project's sponsors. Actually, when it is considered that the repayment contracts for this water will be divided among 4 States and spread out over a 50-year period, the cost is not high. The repayment contract will provide for interest repayment on the power and municipal water features of the project and after the repayment is completed, the Federal Treasury will benefit from a net power income from the project of from 15 to 20 million dollars per year.

MISTAKE NO. 3

Irrigation costs per acre of land will be $5,000.

Fact

This is an outrageously inflated figure. The average cost per acre is $537—or slightly more than $10 per year per repayment period to change a nonproductive, worthless acre of land into a productive one. Past reclamation history indicated that reclamation projects return 4½ times the original investment to the Federal Government in taxes alone, to say nothing of additional benefits to the general economy of the Nation.

MISTAKE NO. 4

The construction of a dam at Echo Park would invade a national monument and destroy beautiful scenery.

Fact

If any invasion has been made in this area, it has been by the conservationists who would lock up this area notwithstanding the fact that the proclamation setting aside this area as a monument reserved all existing rights, including power withdrawals for the purpose of construction of dams in this whole area. It should be further remembered that Mr. David H. Madsen, the agent representing the Park Service at the time the reservation was made, specifically assured the people that the enlargement of this monument would not interfere with the building of dams in the future. The record clearly shows that it was never intended to limit the construction of dams within the monument, or to prevent the use of the area for grazing. The fact of the matter is that the construction of the dam at Echo Park would make the area accessible and provide a playground for millions.

MISTAKE NO. 5

The dam site at mile 15 for Glen Canyon is unsuitable for the construction of a dam.

Fact

Not a single witness appeared to support this contention. On the other hand, expert witnesses from the Department of the Interior who made a detailed study of the area are firm in their views that Glen Canyon was a most desirable site for the construction of this dam.

MISTAKE NO. 6

The project is not needed because plenty of power and water is already available in this area.

Fact

The upper-basin States have reached the end insofar as water is concerned unless this project is approved. Our growth in the intermountain area is limited by the amount of water available. At the present time, an average of over 4 milion acre-feet of water a year has been flowing into the Pacific Ocean from the Colorado River. This water could be applied to beneficial uses in the upper-basin States and assist in the development of that great area.

MISTAKE NO. 7

California is entitled to more water, and there is no provision in the Colorado River compact which would permit the upper-basin States to store water which was not immediately put to beneficial consumptive use.

Fact

This is a very strained interpretation by our friends from southern California and is entirely inconsistent with the provisions of the compact. Even if the largest package of all the bills pending were adopted, the upper-basin States would still not use in excess of 4.8 million acre-feet of water, still leaving a balance of 2.7 milion acre-feet unused. The total amount of water in dispute in the suit between California and Arizona which may involve the upper-basin States is less than 2 million acre-feet, according to Mr. Ely, counsel for southern California interests. There would, therefore, be no reason for withholding construction of this project because the bills all make the consumptive use of water subject to the terms of the compact, which amply protects the lower-basin States.

CONCLUSION

President Eisenhower has strongly endorsed this project, as have the Bureau of the Budget and all Federal agencies concerned with it. We plead with our colleagues to give us an opportunity to develop our area with the passage of this measure.

COMMITTEE NOTE.—In accordance with instructions appearing on p. 251, pt. 1, the following statements and letters received after March 28, 1955, are included at this point:

NORTHWESTERN UNIVERSITY,
Evanston, Ill., March 31, 1955.

Hon. WAYNE ASPINALL,
Subcommittee on Power and Irrigation.

DEAR SIR: "We swatted that fly once!" is the feeling of national parks' defenders about the Echo Park Dam threat. Now it's before you again, with a big slush fund back of it. May I reiterate for you the points against Echo Park Dam:

1. It is financially fantastically unsound. Its power would have to be sold at an unprofitably high rate.
2. Cheaper and unlimited power is in the coal reserves of Colorado.
3. The power is not yet needed.
4. The interests pressing for it are obviously just pork-barrel interests.
5. Opponents of the dam include all the major conservation bodies in the country. (They are not opposed to a rational, unselfish water and power program.)
6. Water can be controlled and supplied with equal or greater effectiveness through alternate plans, without irrevocably destroying the beauty and dedicated use of this unique national resource.
7. The canyon can be made easily accessible to increasing thousands, in its unspoiled state.
8. To permit this dam would break the bulwarks of our whole national park system. They are ready with many another devastating violation.

The new element in this year's crises is more dishonest propaganda: The Utah Wildlife Federation (for instance) utterly misrepresents the situation with misleading pictures. (The front and back of its handsome brochure, as

only one example, show magnificent pictures of scenes which would be drowned under 400 feet of water if the dam were built.) It has also issued a statement of effects on wild species which omits the destructive effects of a dam at Echo Park.

This should be a nonpartisan issue: It is unfortunate that the President has been misled or pressured into approving this outrageous proposal.

I again beg you to read thorough and conscientious reports on it by the National Parks Association, the Conservation Council, the Hoover Commission, the former Governor of Wyoming, the Sierra Club, the National Wild Life Federation, etc.

Opposed are also the Izaak Walton League, the garden clubs, the mountain clubs, etc.

I beg you to save Dinosaur Park for posterity.

THOMAS DAWES ELIOT.

AMERICAN PUBLIC POWER ASSOCIATION,
Washington 6, D. C., March 28, 1955.

Hon. WAYNE ASPINALL,
Chairman, Irrigation and Reclamation Subcommittee,
House Interior Committee, House Office Building,
Washington, D. C.

DEAR CONGRESSMAN ASPINALL: The executive committee of the American Public Power Association, at a meeting in Washington, D. C., on March 19, 1955, unanimously adopted a motion directing me to express to your committee our associations objections to the following two policies which are contained in certain bills, presently before your committee, relating to the Colorado River storage project:

1. That power from this project should be sold at the "highest practicable price." Under H. R. 4488 by Congressman Rogers of Colorado, the Secretary of the Interior would be required to follow this practice in marketing power from this project.

2. That the Collbran formula or a modified version thereof should be utilized in subsidizing the payment of a substantial portion of the irrigation allocation.

One of the cardinal principles which the American Public Power Association has long advocated is that power from publicly owned electric utilities should be sold at the lowest possible rates, consistent with sound business practices. This policy is stated as follows in paragraph 4 of section IV, entitled "Power Rates," in the statement of Federal Power Policy adopted by our board of directors on September 26, 1949:

Power from Federal projects should be sold at the lowest possible rates consistent with sound business principles. Rates for power produced at multiple-purpose projects should be sufficient to meet all costs properly chargeable to power, but should not be burdened with any costs, properly chargeable to any other purpose; provided, however, that when irrigation is one of the joint purposes, then power revenues may properly be used to pay that portion, if any of the capital costs properly chargeable to irrigation which is beyond the ability of the irrigators to pay; provided the total capital costs paid from power revenues (those chargeable to power plus those chargeable to irrigation but paid from power revenues) shall never exceed the amount for which a comparable supply of power could have been developed had irrigation not been one of the purposes of the project.

The policy of selling power at the lowest possible rates is a fundamental principle which the Congress itself has enunciated on many occasions, and which the Federal Government has followed consistently in the marketing of power by such agencies such as the Bureau of Reclamation, Tennessee Valley Authority and Bonneville Power Administration.

To advocate now, as is being done in the case of the Colorado River storage project, that power should be sold at the "highest practicable price," is to institute a complete reversal of policies long established by Congress and practiced by the Federal Government. Such a new policy would deprive electric consumers of the benefits of low rates which are possible from the development of economically sound hydroelectric power projects. We cannot believe that the Congress at this time wishes to countenance such an important change in established policies.

With regard to the Collbran formula, our position on this matter was stated in Resolution No. 8 adopted May 6, 1954, at our annual convention at Chicago, Ill. For your information, I am attaching a copy of both this resolution and a related resolution, No. 8 (a), on the subject of "Excessive Subsidies to Reclamation."

Although our executive committee has instructed me to advise your committee of our opposition to the above-described features of the legislation currently before your committee, our executive committee did not pass upon the merits of the project as a whole, and this letter should not be construed either as approval or disapproval of the project itself.

Sincerely,

ALEX RADIN, *General Manager.*

AMERICAN PUBLIC POWER ASSOCIATION RESOLUTIONS ADOPTED MAY 6, 1954, AT ANNUAL CONVENTION, CHICAGO, ILL.

RESOLUTION NO. 8. INTEREST COMPONENT—COLLBRAN FORMULA

Whereas the American Public Power Association, composed of the principal locally owned public power systems of the United States, has a direct concern in the standard of financial operations established for Federal power projects, as any public discredit resulting from uneconomic Federal power policies reflects in a degree upon the locally owned public power systems; and

Whereas the American Public Power Association disapproves the Federal power practice of diverting from the Federal Treasury the interest component of revenues derived from the power investment portion of Bureau of Reclamation projects, and using the interest so collected for retirement of capital amounts invested in irrigation projects instead of for paying interest on the resulting national debt; and

Whereas the Collbran formula proposed by the Bureau of Reclamation indirectly effects the same result, by postponing the commencement of repayment of the irrigation investment until the power investment is first retired, and is equally unsound; and

Whereas in the aggregate the sums involved in diversion of the interest component and Collbran formula would require the replacement through added taxes of many billions of dollars for the numerous reclamation projects now proposed; and

Whereas this association has been on record since 1946 as not opposing a reasonable subsidy to irrigation from power revenues, but insists as a matter of principle and sound economics, that any irrigation subsidy believed to be in the public interest should be clearly set forth and be specifically recognized and approved as such in authorization of the project by the Congress; and

Whereas, as stated in this association's statement of power policy, total capital costs paid from power revenues shall not exceed the amount for which a comparable supply of power could have been developed had irrigation not been one of the purposes of the project: Now, therefore be it

Resolved, That the American Public Power Association condemns these practices and recommends that they not be employed in future Reclamation Bureau projects. This recommendation is made in the best interests of the American taxpayer, of the public power industry, and of the public it serves. Adoption of such a reform would avoid a concealed subsidy, the benefits of which go to only a limited number of persons at the expense of the Federal Treasury.

RESOLUTION NO. 8 (A). EXCESSIVE SUBSIDIES TO RECLAMATION

Be it resolved, The American Public Power Association is opposed to the increasing burden which is being placed upon the power users in order to subsidize irrigation projects. In some projects recently proposed by the Bureau of Reclamation the irrigators are required to pay less than 15 percent of the costs allocated to irrigation, and the power users are required to pay more than 85 percent thereof plus all the costs allocated to power. In other cases the subsidy to be exacted from the power users would amount to the equivalent of nearly $100,000 for each 160-acre farm. This practice is not in the public interest.

This association's declaration of Federal power policy states that when irrigation is one of the joint purposes of a project, power revenues may be used to pay that portion of the capital costs properly chargeable to irrigation which is beyond the ability of the irrigators to pay, but that the total capital costs to be paid from power revenues shall never exceed the amount for which a comparable supply of power could have been developed had irrigation not been one of the purposes of the project. This formula concedes fair and adequate subsidies to irrigation from the power users. If a reclamation project is sufficiently meritorious to justify greater subsidies, they should be fully disclosed, and paid from the General Treasury.

PASADENA 5, CALIF., *March 12, 1955.*

Representative CLAIR ENGLE,
House of Representatives,
Washington, D. C.

DEAR SIR: Would you please see that the enclosed official statement of the Utah and National Committees for a Glen Canyon National Park be made part of the written record and, if possible, presented orally at the subcommittee hearings on the upper Colorado River project.

Having recently had the pleasure of exploring this magnificent canyon on foot and by foldboat, I feel very strongly that it should be preserved for posterity.

Yours truly,

W. S. CHAMBERLIN,
Member National Committee.

JOINT OFFICIAL STATEMENT OF THE UTAH AND NATIONAL COMMITTEES FOR A GLEN CANYON NATIONAL PARK IN OPPOSITION TO THE PROPOSED GLEN CANYON DAM

Durig the hearings of the Subcommittee on Irrigation and Reclamation of the Senate Committee on Interior and Insular Affairs of the 83d Congress, the Utah Committee for a Glen Canyon National Park presnted a detailed, documented statement in opposition to the proposed Glen Canyon Dam. This was made a part of the record of these hearings, and for the sake of brevity, this information will not be re-presented at this time as it is so readily available. Instead, this statement will deal with recent developments, some of which have rendered parts of the former statement obsolete.

During the hearings of the 83d Congress, the following facts were conclusively demonstrated by the Utah committee:

1. Glen Canyon is worthy of national park status.
2. There is strong local support for the establishment of a Glen Canyon National Park among those who have seen Glen Canyon.
3. The damage to this area by the proposed Glen Canyon Dam would be irreparable.
4. Rainbow Bridge National Monument would be subject to severe damage by the proposed Glen Canyon Dam.
5. The philosophy requiring a Glen Canyon Dam is based upon a dubious interpretation of the 1922 Colorado River compact, which is not a Federal document. This interpretation sets one clause as precedent to another, which is not justified by the text of the compact which document guarantees use of an equal amount of water to both upper and lower basin.
6. There has not been sufficient water in the Colorado River in modern decades to fulfill the stated plans for the dam nor the 1922 compact in its entirety.
7. The cost of this proposed dam is fantastic. No realistic estimates of its eventual total cost are available, but the cost will exceed $1 billion and perhaps 2 billion or even more if interest is included.
8. None of the water to be stored in this proposed dam is for use in the upper basin.
9. The economic use of power from this dam is subject to question.
10. No recreational benefits will accrue from this dam.
11. A Glen Canyon Dam is not essential to the upper Colorado project.

The desirability of this dam was rendered even more dubious by a recent statement of Secretary of the Interior Douglas McKay, who stated, in part, by letter on November 30, 1954:

"On the basis of data available at the time of writing the 1950 report on the Colorado River storage project and participating projects, a 700-foot dam (580 feet above stream level) at Glen Canyon was the maximum height which met the criteria of economy, safety of the structure, and adequate protection of the Rainbow Natural Bridge. Subject to writing the 1950 report on the Colorado River storage project, the Bureau (of Reclamation) conducted grouting tests in the drift tunnels driven 50 or more feet into each canyon wall of Glen Canyon Dam site. Also, special bearing tests of 6-inch cores and large fragments of the foundation materials were made in the Bureau's Denver laboratory. The poorly cemented and relatively weak condition of the materials in comparison with the foundations common to most high dams has given the engineers who prepared the preliminary designs of the dam some concern as to the competency of the foundation to support any structure higher than 700 feet. Experiments to im-

prove the strength of the foundation through a chemical grouting process were unsuccessful. This amazing admission was made in answer to an inquiry whether the height of the proposed 700-foot dam could be raised 35 feet—a mere 5 percent. It reveals an alarming lack of a margin of safety which would be a personal concern to each of the hundreds of thousands of Arizonans, Californians, and Mexicans who live along the Colorado River and in the Imperial Valley. The devastation which would be wrought in these areas by the result of a tiny engineering error—or an atomic bomb—under these circumstances would be beyond belief.

A realization of the futility of this dam was recently emphasized by Governor Johnson of Colorado who pointed out, in a widely published speech, that under the terms of the 1922 compact, it was more improbable that any water would ever be allowed to accumulate in this reservoir. As he pointed out, under the terms of the compact, any surplus water in the upper basin may be demanded by the lower basin, and since water in Glen Canyon would lie below the lowest point of diversion in the upper basin, it would indisputably fall within this category.

If it were not for the seriousness of the situation, it might seem ridiculous for one major objection to the dam to stem from its menace when the reservoir is completely filled, and another from the belief that it can probably never contain any water at all. This, however, is typical of the obscurity and confusion which surround all aspects of this project. These, in turn, stem from the incompleteness of the investigations and inadequacy of the engineering data at the present time.

Eight years after the authorization of the Missouri River Basin project, Acting Reclamation Commissioner Lineweaver admitted that the near 1,000 percent increase in cost estimates of that project had arisen as "the result of the incompleteness of the investigations and the inadequacy of the engineering data * * * at the time the project was authorized." The same situation exists today at Glen Canyon. Even despite this, it has been proposed by Secretary McKay that the additional studies follow authorization of this dam. In view of the national tragedy which would result from construction of a Glen Canyon Dam, it is essential to the people of America that no major Glen Canyon Dam be authorized unless the facts are completely available.

The problem of Rainbow Bridge National Monument today differs somewhat from that at the time of hearings on the measures introduced during the 83d Congress. At that time, the Utah committee pointed out that the proposed dam would severely damage the monument, and that many precedents existed for mistrust of mere assurances of protection for the monument. Subsequently, it has been said that the Bureau of Reclamation and the national park system have agreed that this protection must be written into the law if any Glen Canyon Dam is authorized. It is expected that the legislation proposed before this committee will contain this safeguard against flooding, silting, and quicksand accumulations.

While the Utah and National Committees for a Glen Canyon National Park are totally opposed to any major Glen Canyon Dam, it is believed that the accumulated experience of their members and associates in this area is such that they are qualified to outline the safeguards which must be fulfilled to prevent this proposed protection from becoming a mockery. They are:

1. The monument must not be flooded.
2. There must be no interference with the natural drainage through and from the monument, which could produce quicksand and silting.
3. There must be no disfiguring artificial structures visible from Rainbow Bridge. (This is about ½ mile downstream.)
4. The cost of the protection must be such that, when combined with the total eventual cost of the upper Colorado storage project, it is acceptable to the Congress and the people of the United States.
5. This protection must be completed before construction of any Glen Canyon Dam with a height which would back water into any part of the Aztec-Bridge Canyon system.

Prior to these hearings, no engineering or other data have been made public on any project which would satisfy these minimum criteria. Analysis of the proposals to be made at this hearing will be prepared on this basis before the time of the hearings of the full Senate Committee on Interior and Insular Affairs.

Further data on any phase of the Glen Canyon problem will be furnished upon request, with extreme pleasure.

STATEMENT ON H. R. 270, ECHO PARK DAM AND THE NATIONAL PARK SYSTEM, BY SIGURD F. OLSON, PRESIDENT, NATIONAL PARKS ASSOCIATION

I represent the National Park Association, pledged to defend from exploitation or change all the areas comprised in the national park system. We believe that if any integral part of this system is destroyed or injured, all other parts are threatened. We are convinced that Congress when it established the National Park Service to administer the areas concerned meant what it said, "that these areas should be passed on unimpaired."

We also believe that these areas are for the education and spiritual rejuvenation of all the people, and that the task of protecting them is for these purposes. We feel that the protection of any places of unspoiled nature has a greater spiritual significance than any other, and that any change in these areas which depreciates the spiritual values is wrong.

I realize the importance of evaporation statistics, kilowatt hours, irrigation, concrete and steel, not to mention the many millions and possibly billions of dollars involved. These are questions to consider; but the basic reason for our concern about Echo Park Dam has to do with the intangible or spiritual values and what their loss will mean to the American people. We believe that if Dinosaur National Monument is desecrated certain values will be lost forever, values far more important than those of power or storage.

We have come a long way in the past 400 years, have crisscrossed our broad land with highways, railroads, powerlines; spotted it with cities and towns; placed under management and cultivation most of our arable land. We have done our job of subduing the wilderness so well that there is little left—less than one percent of our land set aside in our national-park system so that future generations can see what the primeval continent was like. We have become so imbued with the pioneer concept of utilizing every acre of soil that we try even now to subdue and change what little is left.

During this process of pioneer expansion our culture began a slow development from the outlook of a physical conquering race to that of a people with a growing concern of appreciation for the arts and the better things of life evident in the setting aside of preserves which one may well call sanctuaries of the spirit, places where men could find release from the tensions and pressures of an industrial age.

The historian Trevelyn said, "Any nation not concerned with preservation of the natural scene is doomed to brutishness." He recognized the signs in England, as he would have recognized them here, deplored attempts to destroy areas that were once set aside, thereby undoing the cultural advances of former years.

I sometimes wonder where our much-vaunted industrial civilization is leading us; if our country is going to become a sprawling industrial network that will engulf our quiet little villages; if all the land is going to be used up; if the population is going to go beyond the 200 million predicted for 1975; and eventually reach a point where there is standing room only and no longer any places of quiet and peace. I wonder what is going to happen to what we feel is the good life and what has been the good life for several centuries, a life in a country where there was room and breathing space, where a man and his family could enjoy the earth, its smells and sounds and the feel of it. I wonder in our mad rush to dam every river, chop down every tree, utilize all resources to the ultimate limit, if we are not destroying the very things that have made life in America worth cherishing and defending?

Dinosaur National Monument and the threat confronting it is a symptom of an era and a way of looking at the earth and its resources which has come down to us from the frontier days. It is indicative of a way of life that is dominated by speed, confusion, noise, where material values have actually become more important than the spiritual. Much has been said about the hypothetical recreational values that will be developed should Echo Park Dam be built, a hundred miles or so of placid lake, over which could cruise speedboats and cabin cruisers. Little has been said about the effects of the drawdown, the desolate stinking flats and ruined shorelines that accompany fluctuating levels, and the change in atmosphere should the magnificent canyons be flooded and their precipitous walls echoing to the roar of high-powered watercraft.

A whole philosophy is engangered by this one act, an emerging cultural concept of regard for the beauties of a primitive scene, a realization that there are certain benefits that are beyond price or practical consideration. The American people have come to believe this issue is far more important than just an argu-

ment over power potential or water storage, that actually the Echo Park Dam proposal is a challenge, which, if not met, may eventually destroy the very basis of the good life in America.

The founders of the national-park system would be shocked to realize what is proposed in 1955, the most serious and threatening attack yet launched against these great reservations. Should Echo Park Dam be built, it will serve as a precedent that may well make it possible to construct other dams in the Grand Canyon, in Kings Canyon, Yosemite, Glacier, and Mammoth Cave National Parks, and others. Let no one think this danger is not real, for many of the projects have progressed beyond the blueprint stage and need only a precedent to set the new pattern for them. If Echo Park Dam is built, the sanctity of the entire national-park system will be endangered. That is the real significance of the proposal.

The National Parks Association, with all other conservation groups, is in favor of a sound water development program for the upper Colorado which will conserve the water of this great basin and make an equitable distribution to the States concerned; and they know that such a program need not violate any national park or monument; that alternative sites and methods of securing the desired results make the proposed violation absolutely unnecessary.

STATEMENT IN SUPPORT OF DINOSAUR NATIONAL MONUMENT BY CHARLES EGGERT, BARRYTOWN, N. Y.

My name is Charles Eggert. I live in Barrytown, N. Y. I have, for the past several years, leased a small ranch in Shell, Wyo. which has caused me to be somewhat more acutely aware of the water problems of the West than I might be had I been merely a tourist passing through that great area of our country. Also, having interests in the East and the West, I am aware of the importance of the wonderful scenic resources the West contributes to the rest of the country. Millions of us each year journey to the great western national parks. If you have traveled extensively in the East, you will understand this almost "mass" exodus to the West. We easterners no longer have vast areas of untouched wilderness, or unexploited canyons where we can discover for ourselves what our magnificent country was like when—and before—it was trail blazed by the pioneers. We are acutely aware that once a wilderness is gone it cannot be restored. We know what is lost when outstanding scenic areas are exploited—and that is why we shall always look very carefully at the reasons before we will agree to the destruction of any of the units of our national-park system.

For the past several years various reasons have been put before this committee as justifications for the destruction of Dinosaur National Monument. Looking back, the first reason I can discover is that power was needed for a nuclear project. Because of it, I understand that the former Secretary of the Interior, Oscar Chapman, approved the Echo Park project. When the nuclear project was relocated in another State, the Secretary withdrew his approval. Later, water evaporation losses was called the fundamental reason. When gross errors in evaporation loss figures were pointed out, that reason fell apart.

Now the reason seems to be power to give economic justification to the whole upper Colorado project. But that reason vanishes into thin air when competent engineers claim Echo Park won't pay out its own costs, let alone bail out other, less economical units of the project. We have discovered from previous testimony at this hearing that the upper basin doesn't need the water storage from Echo Park Reservoir. As a matter of fact, we have heard that the upper basin doesn't need to store any water at all for the next 32 years to get the irrigation benefits it needs. As for power needs, it sounds like sensible economics to me to use coal resources rather than hydro if we wish to make a serious attempt at saving money. On top of all this, serious doubts as to the possibility of building the key unit of the entire project—Glen Canyon Dam—has been raised. I believe I am justified as a taxpayer, and as part owner of our national park system, to ask just what is going on here anyway. With such serious doubts as have been raised here and elsewhere, I believe this entire project needs far more careful investigation and planning before it is approved. We cannot risk the limited water resources of the West on anything less than the best plan we can devise—a plan which will stand up under the close scrutiny of its engineering feasibility, agricultural and industrial benefits, and economic justification.

But I have not come before this committee to discuss the pros or cons of the upper Colorado storage project. Others have done that far more competently than I can. I want to talk about Dinosaur National Monument. I listened to many sessions of this committee's hearings last year. I was continually reminded of that old retort Baron Munchaussen would make after one of his lengthy stories was challenged: "Vas you dere, Charlie?" I have been there, and I may have seen more of Dinosaur National Monument than anyone else in this room today. I have traveled most of its roads, many trails, and I have gone through the entire length of Yampa, Whirlpool, and Split Mountain Canyons by boat—some of it twice. I have been through a third of Lodore Canyon by boat. I have flown over the monument area twice in a private plane, the purpose of these flights being to orient the seasonal park rangers for fire duty. After those flights, gentlemen, we were thoroughly oriented.

I was rather shocked last year at these hearings to listen to one distinguished old gentleman, who spoke with considerable authority, say to the committee that there was no easy access to the rivers. This simply is not true. There are many places where one can reach the river's edge by car: At the Gates of the Lodore, at Castle Park, Echo Park, Lily Park, at Island and Rainbow Parks, and at Split Mountain Gorge. I drove my Ford ranch wagon to the very edge of the river at Echo Park, and in a two-wheel-drive pickup truck. I have driven with ease to Castle Park, Lily Park, Island Park, and the Gates of Lodore. Even the local people drive down to Echo Park or Split Mountain Gorge for a Sunday picnic. Mrs. Charlie Mantle, who, with her family live almost on the Yampa River's edge in Castle Park, drives back and forth to shop in nearby towns in her dynaflow Buick—at least, she had a Buick in 1952. For canyon country, it is nothing short of amazing to discover how complimentary the land is for road construction. There is just one steep grade that I know of, and that is down Iron Spring Draw, but from my observation, and from what park officials have told me, even this grade could be avoided by relocating the road. If it is hard to get around by car in Dinosaur, it is because of the surface of the roads. They are narrow and they are dirt. Even a slight rain makes them slick, and a soaking rain makes them impassable. Because of improper grading, sections are liable to washouts in very heavy rains. With proper surfacing, widening, and grading, these roads today could handle unlimited numbers of visitors. The National Park Service has done what it can with its limited budget to improve the roads within the monument boundaries. And they have done a good job. But the monument is "landlocked," as it were, by the Moffat and Uintah County roads which lead from the main highway to the monument border. These latter roads are often in disgraceful shape, and I can't understand why they haven't made an attempt at improving—and therefore, promoting—this wonderful scenic asset in their area.

Much has been said about the inaccessibility of Dinosaur. It is not inaccessible in that it is located in Antarctica or near the top of Mount Everest. It is 25 miles to Echo Park from a major highway—U. S. 40. It is closer by many miles to a major highway than is Grand Canyon or Yellowstone. Dinosaur is inaccessible only in that the roads are not for the average driver. Ironically, perhaps, the one spot which might be called inaccessible—and really so—is the proposed Echo Park Dam site. It would take some very fancy road construction and engineering to reach it. Given decent roads, the tourist will find more than enough of Dinosaur's beauty to make a visit worth while. It is not necessary to make a river trip to see it, although certainly this is by far the most spectacular way to see it, and, I think, is the major feature of the monument. No other Park Service area offers this opportunity with the convenience and safety to be found here.

Now, what about the safety of these river trips? You may have heard some people say that anyone heading down the Green or Yampa is headed for sure disaster. Or, you may have heard that anyone can float down the river in an inner tube. Neither is true. Hells Half Mile in Lodore Canyon is as dangerous as any rapid in the Colorado River system. There are rapids in Split Mountain which command the respect of the best boatmen. These places are found at either end of the monument. They are not for the inexperienced, and I certainly wouldn't advise anyone without a thorough knowledge of white water to attempt them any more than I would advise someone to drive around the city of Washington who doesn't know how to operate a car. But with experience, and with reasonable caution, which experience teaches, these places can be run in utmost safety. There are competent men running these rapids

today who have taken hundreds of people through without mishap * * * Bus Hatch, his son Don, and Roy Despaine, to mention a few. It seems a little strange, but I suppose it is human nature, that these many successful river runs get very little, if any, publicity. Yet, let one mishap occur and it receives headlines. Seldom, if ever, are the facts which might have caused the accident—it may have been incompetence, lack of proper caution, overconfidence, or many other reasons—printed or explained. Because of these isolated accidents—and occasionally, tragedies—the rivers have been called treacherous.

On the other hand, there are miles of quiet water—especially on the Yampa—which afford the sightseer hours of boating of the safest kind. And most important, it is these portions of the river which contain the best of the canyon scenery. Here on the Yampa, the canyon rises to its greatest height, and it is here where practically all the spectacular bends and amphitheaters and hanging cliffs are located. Particularly mild is the river from Castle Park to Echo Park—a half day's run on the river. There are one or two riffles in this section, but I assure you, nothing of consequence whatsoever. This section is the "pièce de resistance" of Dinosaur. Should major accommodations be built in Echo Park, as tentative plans show, the visitor will leave shortly after breakfast by bus to Castle Park where he will embark in a regularly scheduled boat, float down the Yampa to Echo Park and be in his hotel in time for lunch. Without the slightest bit of exaggeration, anyone of any age and in any physical condition will be able to have this fantastic experience in absolute safety, and it will probably cost no more than $5 or $10. For the more adventuresome, longer, and more existing trips could be arranged. This is not mere dream or conjecture. It is being done now, but with more elaborate development, it can be done on a very elaborate scale. One more thing—in spite of the many people making these trips, the flavor of wilderness will not be lost as it is in many of our other parks when they are filled with people. The Yampa bends and curves so many times in its course, with proper timing, no two boats need ever see each other during the whole trip. No other park area offers such experience as this, and if any of you have made a boat trip through Dinosaur, you will agree with me that it is one of the most extraordinary and beautiful experiences one could possibly have.

There are other attractions in Dinosaur—not just the canyons and their amazing geological exhibits, or the boat trips. There are the traces of Indian culture to be found there. Referring to an article in the Denver Post for February 7, 1954, in which it was stated that of the nearly $21 million proposed to be spent for recreation in the proposed Echo Park Reservoir area, including $3,380,000 which would be spent on 9 museums and for the planning and study of the monument's archeology, paleontology, geology, and wildlife and for excavation and artifacts recovery, Dr. Hugo Rodeck, president of the Colorado-Wyoming Academy of Science, and director of the Colorado University Museum wrote, "The Colorado portion of the Dinosaur National Monument contains widespread evidences of aboriginal cultures. Some of these occur at the higher elevations but they are particularly conspicuous in the canyons, where the ancient people took advantage of caves and rock shelters for living quarters and more commonly for the storage and concealment of their property. The Utes left their marks there, and long before them the Fremont Basket Makers lived there and planted corn on the cultivable fragments of ground along the rivers. Excavations have indicated that even these early peoples were preceded by centuries by even more ancient hunters and campers.

"It is difficult," Dr. Rodeck continues, "even to estimate the quantity of material or the number of sites still undiscovered in the monument area. Past archeological work has been carried out on a shoestring by nongovernmental agencies, so that even the more easily reached portions of the area have scarcely been scratched. It would be ironical if convincing archeological reasons for the preservation of Dinosaur National Monument should be demonstrated in the very process of its destruction. It is already a wry commentary on our values that funds for the adequate exploration of this cultural resource can only be expected in the form of expletory crumbs from the economic exploitation table."

Wry commentary indeed. And wry commentary that $21 million should be planned to construct second-rate recreational facilities when first-rate ones already exist and need but to be developed. It is a mere pipedream to imagine Dinosaur as a popular, attractive reservoir-recreation area. You have already heard about silt deposits and water drawdown. You need only to go around the corner, to the Mead Reservoir to see it. But let us imagine that we had a stable reservoir with no drawdown. Let us imagine that there would be no silt deposit at all. What would we have? First, still another reservoir among

hundreds—not the largest in the world held back by the biggest dam in the world by any means. Second, we'd have beaches up there above the canyons where there is nothing but scrub growth and cactus and sagebrush. Anyone who has been there cannot deny that there will be no shade trees or attractive campsites up there, gentlemen—nothing but a hot, arid desert. You could fish in the reservoir, or run around on it in a powerboat, but with still water boxed in by canyon walls, it is going to be so hot in the summer—and the weather can get mighty hot there the first week in June—and the place so noisy with motorboat noises, it will be almost unlivable. And third, are you going to travel a couple of thousand miles—or even a couple of hundred—to see a reservoir? Spending $21 million to recreate this would be pretty foolish indeed, and were Echo Park Dam to be built, I would be the first to protest to such fabulous and foolish spending—even were the reservoir conditions to be ideal, which they certainly will not be. Spend that $21 million—or much less—on park development now, and I am sure places like Vernal, Craig, Maybell, and Elk Springs are going to have an ever increasing tourist-dollar income.

The little ranch we have been leasing up in Wyoming is near the town of Cody. Year after year I have watched that town grow. It has not grown appreciably due to better ranch economy. It has grown and is becoming wealthy because of the dollars spent by tourists going into Yellowstone. Here is positive proof of the economic benefits of a national park area. Our place is not too far from Shoshoni, Wyo. where the Boysen project is located. I have seen that town boom while the dam building was going on. Today it is a pathetic, rundown little community struggling for existence. Tourists speed by it heading for the nearest scenic attractions—the Tetons and Yellowstone. Boysen Reservoir is a very fantastic sight to see, with its strikingly blue water out there on a dry desert, with colorful buttes rising out from it. It reminds one of a surrealist painting. But it can be seen from the car window. I don't know of a single tourist who'd stop there to fish or swim. They're going to do that at Yellowstone or Jackson Lake.

Because of my personal experiences with ranch life, and because of my many trips to Utah and Colorado, I know the upper basin States need more water. One of the reasons for my interest in Dinosaur was because of this. I wanted to see for myself just how important this unit of our park system was, and whether it was worth saving. I discovered that it was; it far surpassed what I had expected to see and experience. I found it a little hard to sympathize with the water problem out there when every day, as I drove to the Dinosaur headquarters, I had to drive through mud and muck on the road caused by the overflow of irrigation laterals and ditches, and when I saw gallons of water flowing down the streets of Vernal, I began to question this cry for water. It disturbs me not a little too, to see lawn-sprinkler systems in towns running full force during a rain. To me, with this alleged water shortage, it is a disgrace to find so many green lawns—beautiful and neat as they might be—while on the horizon the air is brown with blowing topsoil. I realize that an amazing percentage of this water is recovered, but with the fine-spray sprinklers which are used to such a great extent, some of that water evaporates even before it hits the grass. If the water shortage is so critical, then even that bit ought to be saved.

If the water situation is so critical, and I believe it is in spite of the casual way it is wasted in many places, then I think it is all the more important to make very sure this water project is the very best that can be planned before it is approved. So many questions have been raised, I am convinced that further study is imperative before we go ahead with it. If the people of the upper basin States are worried about making use of their water before the terms of the river compact run out, then that compact should be extended or revised. Expediency can cause some very serious mistakes. We have learned that from the past. With so many serious doubts cast on this project, I am beginning to wonder just exactly what the reasons are for pushing it so hard. Why is there so much insistence on the inclusion of Echo Park Dam? I honestly don't know. I thought I did once when evaporation figures were cited. But this reason evaporated in Bureau of Reclamation errors. I thought it was power, but we've heard answers to that. Now, is Echo Park to substitute for Glen Canyon? If the project has been that poorly planned—that the key project, the big water storage and power work horse, Glen Canyon Dam, is not feasible—then I think to approve the upper Colorado project would be a great and tragic mistake.

Gentlemen, we all want to see the upper basin developed. But we can take the time to plan a project which will make economic sense and utilize the water needs of that area. We cannot afford to lose this valuable unit of the national park system. Our population is growing. Our appreciation for the intangible things of life is growing even faster. Eighteen million people visited our national parks—not our national monuments or recreational areas, but our 28 national parks—last year. This to me is proof enough that our people need and want these places. How many people are going to benefit from this project? Secretary McKay states 3 million—that's a pretty big figure, but even at that, six times as many benefit from our national parks. It seems to me very commentary that we are here arguing the expenditure of more than five times the amount of the entire National Park Service budget to benefit one-sixth the number of people—or maybe one-fifteenth, if you'd prefer using the number of people who benefit from all the park areas.

But let's throw those figures out and talk about park values in another way. In our household, Maj. John Wesley Powell has become a familiar word. For several years I have been planning to make a river trip very similar to his down the Colorado River system. My oldest boy, Kip, who is 9½, has shown a great interest in that man who figured so importantly in American history. Last spring my boy Kip and I took a boat and traveled down a bit of the Green River in Dinosaur just as Powell did in 1869. Kip got a firsthand account of what it was like, a real feeling of history. He learned also firsthand what a synclinal fault was, and these things are going to stick with him. In school, when he comes to studying the exploration of the great West, he is going to have a far better understanding of it. And when he gets around to studying geology, having seen that great syncline (which, incidentally, would be flooded by the Echo Park Reservoir), is going to mean a lot.

You may say there are a lot of other places where he can see that. Well, not so many. I can think of one on the Vernal-Manila Highway over the Uintah Mountains. But it isn't protected by national-park laws, and we can't save everything for posterity. But we can save what little we do have—and which we have saved specifically for this purpose. Are we going to stick to our original and admirable intentions, or are we going to chew off our park units bit by bit as expediency seems to make necessary? No matter what the costs, barring the defense of our country, we can afford to stick to the intentions. If we mean to save them, then we don't make an exception any place or any time. I believe the real crux of this whole controversy is whether the integrity of the national park system is going to continue or not. We are not so rich we can afford to squander our parks, nor are we so poor in natural resources—not yet—that we must sacrifice these places. Perhaps, as it has been said, Utah and Colorado have plenty of scenery. But if they grow according to their expectations, one day Utah and Colorado, like New York, is going to find its scenery—its natural wilderness scenery—disappear.

I believe it has been clearly enough demonstrated at these hearings that the upper basin States can have water and power, and that unique scenic wonder, Dinosaur National Monument. As a final word, I'd like to quote from the Book of Isaiah:

"Woe unto them that join house to house,
That lay field to field,
Till there be no place,
That they may be placed alone.
In the midst of the earth."

Mr. ASPINALL. I think that is all I have at this time.

Thank all of you very much.

The committee is adjourned.

(Whereupon, at 3:22 p. m., the committee adjourned to the call of the Chair.)

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