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LOWER COLORADO RIVER BASIN PROJECT

HEARINGS

BEFORE THE

SUBCOMMITTEE ON IRRIGATION AND RECLAMATION

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS HOUSE OF REPRESENTATIVES

4 - JUN - 3
Copy ____ 1966
CARD DIVISION

EIGHTY-NINTH CONGRESS

SECOND SESSION

ON

H.R. 4671 and similar bills

TO AUTHORIZE THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOWER COLORADO RIVER BASIN PROJECT, AND FOR OTHER PURPOSES

MAY 9, 10, 11, 12, 13, AND 18, 1966

Serial No. 89-17—Part II

Printed for the use of the Committee on Interior and Insular Affairs

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LOWER COLORADO RIVER BASIN PROJECT

MONDAY, MAY 9, 1966

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

The subcommittee met, pursuant to notice, at 9:55 a.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs will come to order for consideration of pending business.

Today the subcommittee is resuming its consideration of H.R. 4671 and companion bills.

The committee held 8 days of hearings on this legislation last August and September. Following those hearings there were a series of meetings of representatives of the seven Colorado River Basin States to resolve differences on the legislation which were indicated during the hearings. The language set out in Committee Print No. 19 which is before the subcommittee today is the language that came out of those meetings. It is the hope of the subcommittee that the testimony this week will be directed to the changes between the original bill and the language in Committee Print No. 19. Certainly we should receive no testimony which is repetitious to that already received and before the committee. Also, in the interest of time, it is the hope of the chairman that all witnesses will cooperate by making their oral presentation as brief as possible in accordance with the committee rules. Without objection, the revised language of Committee Print No. 19 will be inserted at this place in the record.

A BILL To authorize the construction, operation, and maintenance of the Colorado River Basin project, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—COLORADO RIVER BASIN PROJECT: OBJECTIVES

SEC. 101. That this Act may be cited as the "Colorado River Basin Project Act".

SEC. 102. It is the object of this Act to provide a program for the further comprehensive development of the water resources of the Colorado River Basin and for the provision of additional and adequate water supplies for use in the Upper as well as in the Lower Colorado River Basin. This program is declared to be for the purposes, among others, of regulating the flow of the Colorado River; controlling floods; improving navigation; providing for the storage and delivery of the waters of the Colorado River for reclamation of lands, including

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supplemental water supplies, for municipal, industrial, and other beneficial purposes; improving water quality; providing for basic public outdoor recreation facilities; improving conditions for fish and wildlife, and the generation and sale of hydroelectrical power as an incident of the foregoing purposes. It is the policy of the Congress, that the Secretary of the Interior (hereinafter in this Act referred to as the "Secretary") shall continue to develop, after consultation with affected States and appropriate Federal agencies, a regional water plan, consistent with the provisions of this Act and with future authorizations, to serve as the framework under which projects, whether heretofore constructed in the Colorado River Basin or herein or hereafter authorized, may be coordinated and constructed with proper timing to the end that an adequate supply of water may be made available for projects heretofore, herein, or hereafter authorized in the Colorado River Basin, including the filling and refilling of reservoirs to optimum operating levels.

TITLE II—INVESTIGATIONS AND PLANNING

SEC. 201. (a) The Secretary is authorized and directed to—

(1) prepare estimates of the long-range water supply available for consumptive use in the Upper and Lower Basins of the Colorado River, respectively, of current water requirements in said basins, and of the rate of growth of water requirements therein to at least the year 2030;

(2) investigate sources and means of supplying water to meet the current and anticipated water requirements of the Upper and Lower Colorado River Basins, including reductions in losses, importations from sources outside the natural drainage basin of the Colorado River system, desalination, weather modifications, and other means;

(3) investigate projects within the Lower Basin, including projects on tributaries of the Colorado River, where undeveloped water supplies are available or can be made available by replacement or exchange;

(4) undertake investigations, in cooperation with other concerned agencies, of the feasibility of proposed development plans in maintaining an adequate water quality throughout the Colorado River system;

(5) investigate means of providing for prudent water conservation practices to permit maximum beneficial utilization of available water supplies; and

(6) investigate current and anticipated water requirements of areas outside the natural drainage area of the Colorado River system which feasibly can be served from importation facilities en route to the Colorado River system.

(b) The Secretary is authorized and directed to prepare planning and feasibility reports of a staged plan for projects adequate, in his judgment, to meet the requirements reported under paragraph (a) of this section, in conformity with section 202.

(c) The plan for the first stage of works to import water into the Colorado River system from outside the natural drainage area of that system shall include facilities to provide two million five hundred thousand acre-feet annually for use from the main stream of the Colorado River below Lee Ferry, including satisfaction of the obligations of the Mexican Water Treaty and losses of water associated with the performance of that treaty. The plan for the first stage may also include facilities to provide water in the following additional quantities:

(1) Up to two million acre-feet annually in the Colorado River for use in the Lower Colorado River Basin;

(2) Up to two million acre-feet annually in the Colorado River system for use in the Upper Colorado River Basin, directly or by exchange;

(3) Such additional quantities, not to exceed two million acre-feet annually, as the Secretary finds may be required and marketable in areas which can be served by said importation facilities en route to the Colorado River system.

(d) The Congress declares that the satisfaction of the requirements of the Mexican Water Treaty constitutes a national obligation. Accordingly, the States of the upper division (Colorado, New Mexico, Utah, and Wyoming) and States of the lower division (Arizona, California, and Nevada) shall be relieved from all obligations which may have been imposed upon them by article III(c) of the Colorado River compact when the President issues the proclamation specified in section 304(b) of this Act.

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(e) The Secretary shall submit annually to the President and the Congress reports covering progress on the investigations and reports authorized by this section.

SEC. 202. (a) In planning works to import water into the Colorado River system from sources outside the natural drainage area of that system, the Secretary shall make provision for adequate and equitable protection of the interests of the States and areas of origin, including assistance from the development fund established by title IV of this Act, to the end that water supplies may be available for use therein adequate to satisfy their ultimate requirements at prices to users not adversely affected by the exportation of water to the Colorado River system.

(b) All requirements, present or future, for water within any State lying wholly or in part within the drainage area of any river basin from which water is exported by works planned pursuant to this Act shall have a priority of right in perpetuity to the use of the waters of that river basin, for all purposes, as against the uses of the water delivered by means of such exportation works, unless otherwise provided by interstate agreement.

SEC. 203. (a) The Secretary shall prepare an importation plan, including proposed allocations of costs specified in section 401, and giving effect to the provisions of sections 201 and 202.

(b) On or before December 31, 1970, the Secretary shall submit a proposed report and findings on said plan to the affected States and to Federal agencies as required by law.

(c) Not later than one year after receipt of the comments of State and Federal agencies on such report and findings, the Secretary shall transmit his report and findings to the President and to the Congress. All comments received by the Secretary under the procedure specified in subparagraph (b) shall be included therein. The letter of transmittal and its attachments shall be printed as a House or Senate document.

TITLE III—AUTHORIZED UNITS: PROTECTION OF EXISTING USES

SEC. 301. The Secretary shall construct, operate, and maintain the lower basin units of the Colorado River Basin project (herein referred to as the "project"), described in sections 302, 303, 304, and 305.

SEC. 302. The main stream reservoir division shall consist of the Bridge Canyon and Marble Canyon units, including dams, reservoirs, powerplants, transmission facilities, and appurtenant works, and the Coconino and Paria River silt-detention reservoirs: Provided, That (1) Bridge Canyon Dam shall be constructed so as to impound water at a normal surface elevation of one thousand eight hundred and sixty-six feet above mean sea level, (2) fluctuations in the reservoir level shall be restricted, so far as practicable, to a regimen of ten feet, (3) Marble Canyon Dam shall be constructed so as to impound water at a normal surface elevation of three thousand one hundred and forty feet above mean sea level, and (4) this Act shall not be construed to authorize any diversion of water from either Bridge Canyon or Marble Canyon Reservoir except for incidental uses in the immediate vicinity. The Congress hereby declares that the construction of the Bridge Canyon Dam herein authorized is consistent with the Act of February 26, 1919 (40 Stat. 1175).

SEC. 303. (a) The central Arizona until shall consist of the following principal works, of such sufficiency as to provide for not to exceed an average annual diversion of one million two hundred thousand acre-feet of Colorado River system water from the main stream of the Colorado River below Lee Ferry: (1) a system of main conduits and canals, including a main canal and pumping plants (Granit Reef aqueduct and pumping plants) for diverting and carrying water from Lake Havasu to Orme Dam or suitable alternative; (2) Orme Dam and Reservoir and power pumping plant or suitable alternative; (3) Buttes Dam and Reservoir; (4) Hooker Dam and Reservoir; (5) Charleston Dam and Reservoir; (6) Tucson aqueducts and pumping plants; (7) Salt-Gila aqueducts; (8) canals, regulating facilities, powerplants, and electrical transmission facilities; (93 related water distribution and drainage works; and (10) appurtenant works.

(b) Unless and until otherwise provided by Congress, water from the natural drainage area of the Colorado River system diverted from the main stream below Lee Farry for the central Arizona unit shall not be made available directly or indirectly for the irrigation of lands not having a recent irrigation

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history as determined by the Secretary, except in the case of Indian lands, national wildlife refuges, and, with the approval of the Secretary, State-administered wildlife management areas. It shall be a condition of each contract under which such water is provided under the central Arizona unit that (1) there be in effect measures, adequate in the judgment of the Secretary, to control exponsion of irrigation from aquifers affected by irrigation in the countract service area, and (2) the canals and distribution systems through which water is conveyed after its delivery by the United States to the contractors shall be provided and maintained with linings, adequate in his judgment to prevent excessive conveyance losses.

(c) The Secretary may require as a condition in any contract under which water is provided from the central Arizona unit that the contractor agree to accept main stream water in exchange for or in replacement of existing supplies from sources other than the main stream.

In times of shortage or reduction of main stream water for the central Arizona unit (if such shortages or reductions should occur), contractors which have yielded water from other sources in exchange for main stream water supply by that unit shall have a first priority to recieve main stream water, as against other contractors supplied by that unit which have not so yielded water from other sources, but only in quantities adequate to replace the water so yielded.

SEC. 304. (a) Article II(B)(3) of the decree of the Supreme Court of the United States in Arizona against California (376 U.S. 340) shall be so administered that in any year in which, as determined by the Secretary, there is insufficient main stream Colorado River water available for release to satisfy annual consumptive use of seven million five hundred thousand acre-feet in Arizona, California, and Nevada, diversions from the main stream for the central Arizona unit shall be so limited as to assure the availability of water in quantities sufficient to provide for the aggregate annual consumptive use by holders of present perfected rights, by other users in the State of California served under existing contracts with the United States by diversion works heretofore constructed and by other existing Federal reservations in that State, of four million four hundred thousand acre-feet of main stream water, and by users of the same character in Arizona and Nevada. Water users in the State of Nevada shall not be required to bear shortages in any proportion greater than would have been imposed in the absence of this section 304(a). This paragraph shall not affect the relative priorities, among themselves, of water users in Arizona and California which are senior to diversions for the central Arizona unit, or amend any provisions of said decree.

(b) The limitation stated in paragraph (a) shall cease whenever the President shall proclaim that works have been completed and are in operation, capable in his judgment of delivering annually not less than two million five hunderd thousand acre-feet of water into the main stream of the Colorado River below Lee Ferry from sources outside the natural drainage area of the Colorado River system; and that such sources are adequate, in the President's judgment, to supply such quantities without adverse effect upon the satisfaction of the foreseeable water requirements of any State from which such water is imported into the Colorado River system. Such imported water shall be made available for use in accordance with paragraph (c) of this section.

(c) To the extent that the flow of the main stream of the Colorado River is augmented by such importations in order to make sufficient water available for release, as determined by the Secretary pursuant to article II(B)(1) of the decree of the Supreme Court of the United States in Arizona against California (376 U.S. 340), to satisfy annual consumptive use of two million eight hundred thousand acre-feet in Arizona, four million four hundred thousand acre-feet in California, and three hundred thousand acre-feet in Nevada, respectively, the Secretary shall make such additional water available to users of main stream water in those States at the same costs and on the same terms as would be applicable if main stream water were available for release in the quantities required to supply such consumptive use, taking into account, among other things, (1) the nonreimbursable allocation to the replenishment of the deficiencies occasioned by satisfaction of the Mexican treaty burden provided for in section 401, and (2) such assistance as may be available from the development fund established by title IV of this Act.

(d) Imported water made available for use in the lower basin to supply aggregate annual consumptive uses from the main stream in excess of seven

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million five hundred thousand acre-feet shall be offered by the Secretary for use in the States of Arizona, California, and Nevada in the proportions provided in article II(B)(2) of said decree. The Secretary shall establish prices therefor which take into account such assistance as may be available from the development fund established by title IV of this Act in excess of the demands upon that fund occasioned by the requirements stated in paragraph (c) of this section. Within each State, opportunity to take such water shall first be offered to persons or entities who are water users as of the effective date of this Act, and in quantities equal to the deficiencies which would result if the total quantity available for consumptive use from the main stream in such State were only the quantity apportioned to that State by article II(B)(1) of said decree.

(e) Imported water made available for use in the upper basin of the Colorado River, directly or by exchange, shall be offered by the Secretary for contract by water users in the States of Colorado, New Mexico, Utah, and Wyoming in the proportions, as among those States, stated in the Upper Colorado River Basin compact, and at prices which take into account such assistance as may be available from the Upper Colorado River Basin fund in excess of the demands upon that fund occasioned by the requirements of the Colorado River Storage Project Act.

(f) Imported water not delivered into the Colorado River system but diverted from the works constructed to import water into that system shall be made available to water users in accordance with the Federal reclamation laws.

SEC. 305. The main stream salvage unit shall include programs for water salvage along and adjacent to the main stream of the Colorado River and for ground water recovery. Such programs shall be consistent with maintenance of a reasonable degree of undisturbed habitat for fish and wildlife in the area, as determined by the Secretary.

SEC. 306. The Secretary shall construct, operate, and maintain such additional works as shall from time to time be authorized by the Congress as units of the project.

SEC. 307. (a) The Secretary shall, in a manner consistent with the other purposes of this Act, (1) investigate, plan, construct, operate and maintain or otherwise provide for basic public outdoor recreation facilities adjacent to reservoirs, canals, and other similar features of the units, and facilities and measures for the conservation and development of fish and wildlife as the Secretary finds to be appropriate; (2) acquire or otherwise include lands and interests in lands necessary for the aforesaid facilities and necessary for present and future public recreation use of areas adjacent to reservoirs, canals, and similar features included in the authorized units; (3) conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands; (4) allocate water and reservoir capacity to recreation and fish and wildlife purposes; and (5) provide for the public use and enjoyment of lands, facilities, and water areas included in the authorized units.

(b) The Secretary may enter into agreements with Federal agencies or State or local public bodies for the operation, maintenance, and additional development of lands or facilities included in units herein and hereafter authorized, or to dispose of such lands or facilities to Federal agencies or State or local public bodies by lease, transfer, conveyance, or exchange, upon such terms and conditions as will best promote the development and operation of such lands or facilities in the public interest for purposes of this subsection. No lands under the jurisdiction of any other Federal agency may be included for or devoted to recreation purposes under the authority of this Act without the consent of the head of such agency; and the head of any such agency is authorized to transfer any such lands to the jurisdiction of the Secretary for purposes of this subsection.

(c) The Secretary may transfer jurisdiction over lands included in the authorized units within or adjacent to the exterior boundaries of national forests and facilities thereon to the Secretary of Agriculture for recreation and other national forest system purposes; and such transfer shall be made in each case in which the lands adjacent to a reservoir are located wholly within the exterior boundaries of a national forest unless the Secretaries of Agriculture and Interior jointly determine otherwise. Where any lands are transferred hereunder to the jurisdiction of the Secretary of Agriculture, the lands involved shall become national forest lands: *Provided*, That the lands are waters within the flow lines of any reservoir or otherwise needed or used for the operation of the authorized units for other purposes shall continue to be administered by the Secretary to the extent he determines to be necessary for such operation.

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(d) Nothing in this section shall limit the authority of the Secretary under existing provisions of law relating to recreation and fish and wildlife conservation and development at water resource projects or to disposition of public lands for recreation purposes.

SEC. 308. The Secretary shall integrate the Dixie project and southern Nevada water supply project heretofore authorized into the project herein authorized as units thereof under repayment arrangements and participation in the development fund established by title IV of this Act consistent with the provisions of this Act.

TITLE IV—LOWER COLORADO RIVER BASIN DEVELOPMENT FUND: ALLOCATION AND REPAYMENT OF COSTS: CONTRACTS

SEC. 401. Upon completion of each unit of the project herein or hereafter authorized, or separate feature thereof, the Secretary shall allocate the total costs of constructing said unit or features to (1) commercial power, (2) irrigation, (3) municipal and industrial water supply, (4) flood control, (5) navigation, (6) water quality control, (7) recreation, (8) fish and wildlife, (9) the replenishment of the depletion of Colorado River flows available for use in the United States occasioned by the performance of the Water Treaty of 1944 with the United Mexican States (Treaty Series 994), or (10) any other purposes authorized under the Federal reclamation laws. Costs of means and measures to prevent loss of and damage to fish and wildlife resources resulting from the construction of the project shall be considered as project costs and allocated as may be appropriate among the project functions. Costs of construction, operation, and maintenance allocated to the replenishment of the depletion of Colorado River flows available for use in the United States occasioned by compliance with the Mexican Water Treaty (including losses in transit, evaporation from regulatory reservoirs, and regulatory losses at the Mexican boundary, incurred in the transportation, storage, and delivery of water in discharge of the obligations of that treaty) shall be nonreimbursable. Costs allocated to recreation and fish and wildlife enhancement shall be nonreimbursable within appropriate limits determined by the Secretary to be consistent with the provisions of law and policy applicable to other similar Federal projects and programs: *Provided*, That all of the separable and joint costs allocated to recreation and fish and wildlife enhancement at the Dixie project and the main stream reservoir division shall be nonreimbursable. Costs allocated to nonreimbursable purposes shall be nonreturnable under the provisions of this Act.

SEC. 402. The Secretary shall determine the repayment capability of Indian lands within, under, or served by any unit of the project. Construction costs allocated to irrigation of Indian lands (including provision of water for incidental domestic and stock water uses) and within the repayment capability of such lands shall be subject to the Act of July 1, 1932 (47 Stat. 464), and such costs as are beyond repayment capability of such lands shall be nonreimbursable.

SEC. 403. (a) There is hereby established a separate fund in the Treasury of the United States, to be known as the Lower Colorado River Basin development fund (hereinafter called the "development fund"), which shall remain available until expended as hereafter provided for carrying out the provisions of title III (except section 307).

(b) All appropriations made for the purpose of carrying out the aforesaid provisions of title III of this Act shall be credited to the development fund as advances from the general fund of the Treasury.

(c) There shall also be credited to the development fund—

(1) All revenues collected in connection with the operation of facilities herein and hereafter authorized in furtherance of the purposes of this Act (except entrance, admission, and other recreation fees or charges and proceeds received from recreation concessionaires); and

(2) all Federal revenues from the Boulder Canyon and Parker-Davis projects which, after completion of repayment requirements of the said Boulder Canyon and Parker-Davis projects, are surplus, as determined by the Secretary, to the operation, maintenance, and replacements requirements of those projects.

(d) All revenues collected and credited to the development from pursuant to this Act shall be available, without further appropriation, for—

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(1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the project, within such separate limitations as many be included in annual appropriation Acts;

(2) payments, if any, as required by section 502 of this Act; and

(3) payments as required by subsection (e) of this section.

Revenues credited to the development fund shall not be available for appropriation for construction of the works comprised within any unit of the project herein or hereafter authorized.

(e) Revenues in the development fund in excess of the amount necessary to meet the requirements of clauses (1) and (2) of subsection (d) of this section shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each unit of the project or separable feature, thereof, herein authorized, which are allocated to irrigation, commercial power, or municipal and industrial water supply, pursuant to this Act, within a period not exceeding fifty years from the date of completion of each such unit or separable feature, exclusive of any development period authorized by law; and

(2) interest (including interest during construction) on the unamortized balance of the investment in the commercial power and municipal and industrial water supply features of the project at a rate determined by the Secretary of the Treasury in accordance with the provisions of subsection (f) of this section, and interest due shall be a first charge; and

(3) to the extent that revenues are available in the development fund after making the payments required by clauses (1) and (2) of subsection (d) and subparagraphs (1) and (2) of this subsection, costs incurred in connection with units herein or hereafter authorized in providing (i) for the importation of water into the main stream of the Colorado River for use below Lee Ferry as provided in section 201(c) to the extent that such costs are in excess of the costs allocated to the replenishment of the depletion of Colorado River flows available for use in the United States occasioned by performance of the Mexican Water Treaty as provided in section 401, and (ii) protection of States and areas of origin of such imported water as provided in section 202(a).

(f) The interest rate applicable to those portions of the reimbursable costs of each unit of the project which are properly allocated to commercial power development and municipal and industrial water supply shall be determined by the Secretary of the Treasury, as of the beginning of the fiscal year in which the first advance is made for initiating construction of such unit, on the basis of the computed average interest rate payable by the Treasury upon its outstanding marketable public obligations which are neither due nor callable for redemption for fifteen years from the date of issue.

(g) Business-type budgets shall be submitted to the Congress annually for all operations financed by the development fund.

SEC. 404. (a) Irrigation repayment contracts shall provide for repayment of the obligation assumed under any irrigation repayment contract with respect to any project contract unit or irrigation block over a basic period of not more than fifty years exclusive of any development periods authorized by law; contracts authorized by section 9(e) of the Reclamation Project Act of 1939 (53 Stat. 1196; 43 U.S.C. 485h(e)) may provide for delivery of water for a period of fifty years and for the delivery of such water at an identical price per acre-foot for water of the same class at the several points of delivery from the main canals and conduits and from such other points of delivery as the Secretary may designate, and long-term contracts relating to irrigation water supply shall provide that water made available thereunder may be made available by the Secretary for municipal or industrial purposes if and to the extent that such water is not required by the contractor for irrigation purposes.

(b) Contracts relating to municipal and industrial water supply from the project may be made without regard to the limitations of the last sentence of section 9(c) of the Reclamation Project Act of 1939 (53 Stat. 1194); may provide for the delivery of such water at an identical price per acre-foot for water of the same class at the several points of delivery from the main canals and conduits; and may provide for repayment over a period of fifty years if made pursuant to clause (1) of said section and for the delivery of water over a period of fifty years if made pursuant to clause (2) thereof.

SEC. 405. On January 1 of each year the Secretary shall report to the Congress, beginning with the fiscal year ending June 30, 1967, upon the status of the

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revenues from and the cost of construction, operating, and maintaining the project and each unit thereof for the preceding fiscal year. The report of the Secretary 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.

TITLE V—UPPER COLORADO RIVER BASIN AUTHORIZATIONS AND REIMBURSEMENTS

SEC. 501. (a) In order to provide for the construction, operation, and maintenance of the Animas-La Plata Federal reclamation project, Colorado-New Mexico; the Dolores, Dallas Creek, West Divide, and San Miguel Federal reclamation projects, Colorado, as participating projects under the Colorado River Storage Project Act (70 Stat. 105; 43 U.S.C. 620), and to provide for the completion of planning reports on other participating projects, subsection (2) of section 1 of said Act is hereby further amended by deleting the words "Pine River extension", and inserting in lieu thereof the words "Animas-La Plata, Dolores, Dallas Creek, West Divide, San Miguel". Section 2 of said Act is hereby further amended by deleting the words "Parshall, Troublesome, Rabbit Ear, San Miguel, West Divide, Tomichi Creek, East River, Ohio Creek, Dallas Creek, Dolores, Fruit Growers extension, Animas-La Plata", and inserting after the words "Yellow Jacket" the words "Basalt, Middle Park (including the Troublesome, Rabbit Ear, and Azure units), Upper Gunnison (including the East River, Ohio Creek, and Tomichi Creek units), Lower Yampa (including the Juniper and Great Northern units), Upper Yampa (including the Hayden Mesa, Wessels, and Toponas units)", and by inserting after the word "Sublette" the words "(including the Kendall Reservoir on Green River and a diversion of water from the Green River to the North Platt River Basin in Wyoming), Uintah unit and Ute Indian unit of the central Utah, San Juan County (Utah), Price River, Grand County (Utah), Ute Indian unit extension of the central Utah, Gray Canyon, and Juniper (Utah)". The amount which section 12 of said Act authorizes to be appropriated is hereby further increased by the sum of $360,000,000 plus or minus such amounts, if any, as may be required, by reason of changes in construction costs as indicated by engineering cost indexes applicable to the type of construction involved. This additional sum shall be available solely for the construction of the projects herein authorized.

(b) The Animas-La Plata Federal reclamation project shall be constructed and operated in substantial accordance with the engineering plans set out in the report of the Secretary transmitted to the Congress on May 3, 1966, and printed as House Document 436, Eighty-ninth Congress: *Provided,* (1) That the project construction shall not be undertaken until each of the Governors of the States of Colorado and New Mexico has certified in a manner acceptable to the Secretary that their respective States have agreed upon mutually satisfactory project operating principles and conditions; and (2) that the project shall always be operated by the Secretary.

(c) The Secretary shall, for the Animas-La Plata, Dolores, Dallas Creek, San Miguel, West Divide, and Seedskadee participating projects of the Colorado River storage project, establish the nonexcess irrigable acreage for which any single ownership may receive project water at one hundred and sixty acres of class 1 land or the equivalent thereof as determined by the Secretary, in other land classes.

(d) In the diversion and storage of water for any project or any parts thereof constructed under the authority of this Act or the Colorado River Storage Project Act within and for the benefit of the State of Colorado only, the Secretary is directed to comply with the constitution and statutes of the State of Colorado relating to priority of appropriation; with State and Federal court decrees entered pursuant thereto; and with operating principles, if any, adopted by the Secretary and approved by the State of Colorado.

(e) The words "any western slope appropriations" contained in paragraph (i) of that section of Senate Document Numbered 80, Seventy-fifth Congress, first session, entitled "Manner of Operation of Project Facilities and Auxiliary Features" shall mean and refer to the appropriation heretofore made for the storage of water in Green Mountain Reservoir, a unit of the Colorado-Big Thompson Federal reclamation project, Colorado; and the Secretary is directed

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to act in accordance with such meaning and reference. It is the sense of Congress that this directive defines and observes the purpose of said paragraph (i), and does not in any way affect or alter any rights or obligations arising under said Senate Document Numbered 80 or under the laws of the State of Colorado.

SEC. 502. The Upper Colorado River Basin fund established under section 5 of the Act of April 11, 1956 (70 Stat. 107), shall be reimbursed from the Colorado River development fund established by section 2 of the Boulder Canyon Project Adjustment Act (54 Stat. 755), for all expenditures heretofore or hereafter made from the Upper Colorado River Basin fund to meet deficiencies in generation at Hoover Dam during the filling period of reservoirs of storage units of the Colorado River storage project. For this purpose $500,000 for each year of operation of Hoover Dam and powerplant, commencing with the enactment of this Act, shall be transferred from the Colorado River development fund to the Upper Colorado River Basin fund, in lieu of application of said amounts to the purposes stated in section 2(d) of the Boulder Canyon Project Adjustment Act, until such reimbursement is accomplished. To the extent that any deficiency in such reimbursement remains as of June 1, 1987, the amount of the remaining deficiency shall then be transferred to the Upper Colorado River Basin fund from the Lower Colorado River Basin development fund, as provided in paragraph (d) of section 403.

TITLE VI—GENERAL PROVISIONS: DEFINITIONS: CONDITIONS

SEC. 601. (a) The Secretary shall promulgate equitable criteria for the coordinated long-range operation of the reservoirs constructed under the authority of this Act, the Colorado River Storage Project Act and the Boulder Canyon Project Act, consistent with the provisions of those statutes, the Boulder Canyon Project Adjustment Act, the Colorado River compact, the Upper Colorado River Basin compact and the Mexican Water Treaty. Such criteria shall be prepared and reviewed annually after an exchange of views in writing with the official representatives of each of the seven Colorado River Basin States and the parties to contracts with the United States affected by such criteria.

(b) Such criteria shall have as their objective the assurance, so far as practicable, to each basin, of the availability of water in sufficient quantities to supply the consumptive uses apportioned to the Upper Basin and the Lower Basin respectively, by the Colorado River compact. To this end, in the preparation and subsequent execution of the criteria, the following listed order of priorities shall govern the storage of water in storage units of the Colorado River storage project and releases of water from Lake Powell:

Releases to supply one-half the deficiency described in article III(c) of the Colorado River compact, if any such deficiency exists and is chargeable to the States of the upper division, but in any event such releases, if any, shall terminate when the President issues the proclamation specified in section 304(b) of this Act.

(2) Releases to comply with article III(d) of the Colorado River compact, less such quantities of water delivered into the Colorado River below Lee Ferry to the credit of the States of the upper division from sources outside the natural drainage area of the Colorado River system.

(3) Storage of water not required for the releases specified in subparagraphs (1) and (2) to the extent that the Secretary, after consultation with the Upper Colorado River Commission and representatives of the three lower division States and taking into consideration all relevant factors (including, but not limited to, historic stream flows, the most critical period of record and probabilities of water supply), shall find to be reasonably necessary to assure deliveries under subparagraphs (1) and (2) without impairment of consumptive uses in the upper basin pursuant to the Colorado River compact: *Provided*, That water not so required to be stored shall be released from Lake Powell: (i) to the extent it can be reasonably applied in the States of the lower division to the uses specified in article III(e) of the Colorado River compact, but no such releases shall be made when the active storage in Lake Powell is less than the active store in Lake Mead, (ii) to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell, and (iii) to avoid anticipated spills from Lake Powell.

(c) Section 7 of the Colorado River Storage Project Act shall be administered in accordance with the foregoing criteria.

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SEC. 602. Rights of the upper basin to the consumptive use of water apportioned to that basin from the Colorado River system by the Colorado River compact shall not be reduced or prejudiced by any use thereof in the lower basin.

SEC. 603. Except as otherwise provided in this Act, in constructing, operating, and maintaining the units of the project herein and hereafter authorized, 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) to which laws this Act shall be deemed a supplement.

SEC. 604. (a) Nothing in this Act shall be construed to alter, amend, repeal, modify, or be in conflict with the provisions of the Colorado River compact, the Upper Colorado River Basin compact, the Water Treaty of 1944 with the United Mexican States (Treaty Series 994), the decree entered by the Supreme Court of the United States in Arizona against California, and others (376 U.S. 340), or, except as otherwise provided herein, the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774) or the Colorado River Storage Project Act (70 Stat. 105).

(b) The Secretary is authorized and directed to—

(1) make reports as to the annual consumptive uses and losses of water for the Colorado River system after each successive five-year period, beginning with the five-year period starting on October 1, 1965. Such reports shall be prepared in consultation with the States of the Lower Basin individually and with the Upper Colorado River Commission, and shall be transmitted to the President, the Congress, and to the Governors of each State signatory to the Colorado River compact.

(2) condition all contracts for the delivery of water originating in the drainage basin of the Colorado River system upon the availability of water under the Colorado River compact, and

(3) comply with the applicable provisions of this Act, and of the laws, treaty, compacts, and decree referred to in paragraph (a) of this section, in the storage and release of water from all reservoirs and in the operation and maintenance of all facilities in the Colorado River system under the jurisdiction and supervision of the Secretary. In the event of failure of the Secretary to so comply, any affected State of the Colorado River Basin may maintain an action to enforce the provisions of this section in the Supreme Court of the United States and consent is given to the joinder of the United States as a party in such suit or suits, as a defendant or otherwise.

(c) Nothing in this Act shall be construed so as to impair, conflict with or otherwise change the duties and powers of the Upper Colorado River Commission.

SEC. 605. (a) All terms used in this Act which are defined in the Colorado River compact shall have the meanings there defined.

(b) "Mainstream" means the mainstream of the Colorado River downstream from Lee Ferry within the United States, including the reservoirs thereon.

(c) "User" or "water user" in relation to mainstream water in the Lower Basin means the United States, or any person or legal entity, entitled under the decree of the Supreme Court of the United States in Arizona against California, and others (376 U.S. 340), to use mainstream water when available thereunder.

(d) "Active storage" means that amount of water in reservoir storage, exclusive of bank storage, which can be released through the existing reservoir outlet works.

TITLE VII—THE COLORADO-PACIFIC REGIONAL WATER COMMISSION

SEC. 701. (a) There is hereby created the Colorado-Pacific Regional Water Commission (hereinafter referred to as the "Commission") composed of members to be appointed as follows:

(1) A chairman appointed by the President: Provided, That in the event the Chairman is the head of a Federal department or agency, such Chairman may appoint a deputy to act as Chairman in his stead during his absence: And provided further, That no State, Federal department, or agency which is represented by the Chairman shall be otherwise represented; and

(2) One member representing each of the State of Arizona, California, Nevada, New Mexico, Colorado, Utah, and Wyoming, appointed by the Governors of the States, and one member representing each other State which

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the President may find to be affected, such member to be appointed by the Governor of such State: Provided, That if, pursuant to section 201, the Secretary undertaken an investigation involving export of water from the Columbia River Basin, one member shall be appointed by the Governor of each State in that basin; and

(3) One member appointed by and representing each of the Secretaries of the Interior, Agriculture, the Army, Health, Education, and Welfare, and State and one member representing each of such other departments and agencies as the President may designate.

(b) The compensation of each member shall be paid by the entity appointing him.

(c) The functions of the Commission shall be advisory only, and in its advisory capacity the Commission shall—

(1) assist in the coordination of present and future Federal, State, interstate, and local plans for the conservation, augmentation, and beneficial utilization of the water and related power and land resources of the region, Colorado River Basin, and affected areas;

(2) advise and consult with the Secretary of the Interior with respect to his responsibilities under title II of this Act;

(3) recommend long-range schedules of priorities for the collection and analysis of basic data and for investigation, planning, and construction of projects; and

(4) recommend to the appropriate Federal and State agencies studies of water resources and related power and land resources in the region as the Commission believes are necessary in the preparation of the plans described in clause (1) of this subsection.

(d) In carrying out the provisions of this Act, the Commission may—

(1) employ and compensate such personnel as it deems advisable;

(2) use the United States mails in the same manner and upon the same conditions as departments and agencies of the United States;

(3) acquire, furnish, and equip such office space as is necessary;

(4) accept for any of its purposes and functions appropriations, donations, and grants of money, equipment, supplies, materials, facilities, and services, and receive, utilize, and dispose of the same; and

(5) incur such necessary expenses and exercise such other powers as are consistent with and reasonably required to perform its functions under this section.

(e) The Commission shall determine the proportionate shares of its expenses which shall be borne by the Federal Government and each of the States. The Commission shall prepare a budget annually and transmit it to the Federal departments and the States. Estimates of proposed appropriations from the Federal Government shall be included in the budget estimates submitted by the Secretary of the Interior under the Budgeting and Accounting Act of 1921, as amended, and may include an amount for advance to the Commission against State appropriations for which delay is anticipated by reason of later legislative sessions.

TITLE VIII—APPROPRIATIONS

SEC. 801. There are hereby authorized to be appropriated such sums as are required to carry out the purposes of this Act.

(Inserted at this point pursuant to permission granted on p. 1016.)

MAJOR CHANGES IN H.R. 4671 WHICH ARE INCORPORATED IN COMMITTEE PRINT No. 19

TITLE II—INVESTIGATIONS

Title II of H.R. 4671 which covers investigations and planning in connection with the future water needs of the Colorado River Basin has been amended to provide more specific directions and guidance in carrying out the studies.

The language of the original bill would require the Secretary to submit to the President and to the Congress within three years a plan to import not less than 2.5 million acre feet per year into the Colorado River. It places a floor on the amount involved in the study but provides no guidance to the Secretary so far

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as a ceiling on the amount is concerned. The amended language in the Committee Print sets out more specific provisions for studying existing supplies and needs in both the Upper and Lower Colorado River Basins as well as areas along any route of importation facilities. It indicates an upper limit on the amount that should be considered in the study although a definite ceiling is not established

Briefly, the Secretary is required to submit to the affected States and Federal agencies by the end of 1970, and to the President and the Congress within one year after receiving comments thereon, a first-stage importation plan for not less than 2.5 million acre-feet per year. This plan may be expanded to include an additional two million acre-feet each for the Lower and Upper Basins and 2 million acre-feet more for use along the route of the importation aqueduct or canal. Language is included to provide protection of the interests of the States and areas of origin. The Mexican Treaty obligation is declared to be a national obligation and Basin states are relieved of this burden at such time as not less than 2.5 million acre-feet is imported into the Colorado River.

TITLE III—AUTHORIZED UNITS IN LOWER BASIN

The first substantial change in Title III is the addition of language to permit the aqueduct serving the Central Arizona Project to be constructed of sufficient size to permit average annual diversion of 1.2 million acre-feet per year. This is understood to mean an increase from 1800 to 2500 cubic-feet per second for project financing with the cost of any increase above 2500 cubic-feet per second to be borne by the State of Arizona.

Another change in Title III involves the Southern Nevada Water Supply Project in Nevada which is included in the original bill for authorization and the Dixie Project in Utah. Both of these projects have now been authorized by the Congress as separate projects. The language of the Committee Print integrates these two previously authorized projects into the Basin project as units thereof. In the case of the Dixie project, this would mean financial assistance from the Lower Colorado River Basin Fund.

New language in Title III also sets out the procedure for making imported water available to the Upper Basin States.

TITLE IV—LOWER COLORADO RIVER BASIN DEVELOPMENT FUND

Although the language of Title IV in the original bill has been rewritten, there is no substantial change in the provisions relating to the Development Fund.

TITLE V—UPPER COLORADO RIVER BASIN AUTHORIZATIONS

The language under this Title is completely new. It amends the Colorado River Storage Project Act to authorize construction of five Upper Basin projects and provides for planning of additional projects. It also provides that the Upper Basin Fund be reimbursed for payments for deficiencies in power generation at Hoover Dam during the filling of Lake Powell.

TITLE VI—GENERAL PROVISIONS (TITLE V OF THE ORIGINAL BILL)

The language of the original bill has been expanded and revised to require the Secretary to promulgate criteria for operating all the reservoirs on the River. The objective of the criteria is to provide equitable treatment at both basins and to assure each Basin, so far as possible, water in sufficient quantities to satisfy uses apportioned by the Colorado River Compact. Priorities are established which the Secretary must follow. The Upper Basin is protected against more rapid development in the Lower Basin.

TITLE VII—COLORADO-PACIFIC REGIONAL WATER COMMISSION (TITLE VI IN ORIGINAL BILL)

The only change in the language of the original bill establishing this Commission is the addition of Members from Colorado and Wyoming, thus providing a Commission with representatives from all Colorado River Basin States and appropriate Federal departments.

Mr. ROGERS of Texas. In view of the fact that these hearings are on language developed by representatives of the lower Colorado States, it

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seems appropriate to hear the state representatives first and then receive the Department's comments and recommendations on this legislation.

The Chair will state that he has received numerous communications from various groups, individuals, and organizations, and all of these will be found in the files of the subcommittee for reference purposes.

Our first witnesses this morning will be the Representatives of the State of Arizona. It is the Chair's understanding that Hon. Morris K. Udall will be the spokesman of the Arizona delegation which includes, in addition to Mr. Udall, our colleagues, Mr. John J. Rhodes and Mr. George F. Senner, Jr.

It is good to see these Members back before the committee. Mr. Udall.

JOINT STATEMENT OF HON. MORRIS K. UDALL, HON. JOHN J. RHODES, AND HON. GEORGE F. SENNER, JR., REPRESENTATIVES IN CONGRESS FROM SECOND, FIRST, AND THIRD CONGRESSIONAL DISTRICTS OF THE STATE OF ARIZONA, RESPECTIVELY

Mr. UDALL. This is a joint statement and, in the interest of time, I would ask unanimous consent that the entire statement, consisting of 22 pages, be printed in the record as though read, and I will summarize it. I think we can save considerable time if this is done.

Mr. ROGERS of Texas. Without objection, the statement will be included in the record in full.

Mr. UDALL. For some 8 days, beginning August 23, 1965, extensive hearings were held before this subcommittee on H.R. 4671 and similar bills, and explored all of the aspects of the legislation as then drafted.

We also note that in November of 1964 this subcommittee held field hearings in Phoenix, Ariz. The record of those hearings will be before the subcommittee and the full committee for their consideration in making its decisions.

Subsequent to the hearings last fall we held additional meetings among representatives of the seven Colorado Basin States, to try to perfect and complete the rather general four-point consensus on principles with respect to the rights, obligations, and requirements of each basin as against the other.

And, finally, in February of this year, a draft of a revised H.R. 4671 was agreed to by the Upper Colorado River Commission, by the States of Utah, Wyoming, Colorado, and by California, Nevada, and Arizona. For the first time in years, we had almost complete basinwide solidarity. The only exception was the State of New Mexico, which was willing to support this project only if Arizona made certain concessions, and I here interpolate in my statement the observation that yesterday afternoon we had a most fruitful meeting between the representatives of Arizona and some of the key people from New Mexico, and while I cannot announce any detailed agreement, because there are some further things which must be done, I can express the hope and the feeling that within the next few days we will have a settlement of these differences as between Arizona and New Mexico, giving us a complete seven-State solidarity on this project.

The Arizona Interstate Stream Commission has endorsed the Revised Committee Print No. 19 draft of H.R. 4671. We have a resolu-

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tion to leave with the subcommittee with regard to that which can be placed either in the file or in the record, as the Chair may see fit.

Mr. ROGERS of Texas. Without objection, it will be received and included in the record of these proceedings.

(The resolution follows:)

RESOLUTION APPROVING THE PROPOSED "COLORADO RIVER BASIN PROJECT ACT"

Whereas there is now pending in the Congress of the United States proposed legislation to authorize the construction, operation and maintenance of the Colorado River Basin Project, such proposal being designated as H.R. 4671; and

Whereas the several basin states through their representatives have been meeting together for the purpose of working out modification of the language of said H.R. 4671 which would bring about a general agreement among the basin states; and

Whereas a draft of H.R. 4671 more particularly described as a recommended revision of H.R. 4671, draft of February 22, 1966, has now been effected which represents a consensus of thought of the Colorado River basin states; and

Whereas that recommended revision provides for the development of all of the existing resources of the Colorado River and a study of means for the augmentation of the supply of water in that river to better meet the needs of all of the Colorado River basin states; and

Whereas an integral part of the recommended revision is the construction of a central Arizona unit necessary to the State of Arizona if the present economy of this state is to survive; and

Whereas the Arizona Interstate Stream Commission is the official agency of the State of Arizona charged with the responsibility of formulating plans and development programs for the control and use of the waters of interstate streams and to make recommendations thereon to the Governor and the Legislature; and

Whereas in the discharge of its responsibility, the said Arizona Interstate Stream Commission has spent years of study attempting to obtain authorization of a Central Arizona Project; and

Whereas the present revised draft of H.R. 4671 provides for immediate authorization and construction of the Central Arizona Project, the Arizona Interstate Stream Commission believes it would be in the best interest of the State of Arizona to approve enactment of such a bill: Now, therefore, be it

Resolved, That the Arizona Interstate Stream Commission approves the said recommended revision of H.R. 4671 dated February 22, 1966, and commends it to the people of this state and to the Governor of the State of Arizona.

CERTIFICATE

I, Rich Johnson, do hereby certify that I am the Executive Director of the Arizona Interstate Stream Commission; that, as such, I have custody of the records of the proceedings of said Commission; and, that the foregoing is a true copy of a resolution unanimously adopted by the said Commission at its regular meeting held at Phoenix, Arizona, on March 22, 1966.

RICH JOHNSON,
Executive Director.

Dated: March 22, 1966.

Mr. UDALL. I want to say on behalf of the three Arizona Members of the House that we wholeheartedly and enthusiastically endorse this revised draft of the bill. We recommend favorable action upon it at the earliest possible time.

What are the differences between the bill that we were considering here last August and the bill that is before us, the revised draft which the committee is considering here today?

While there are a number of changes, in broad terms the main differences are two.

First, certain safeguards which the Upper Basin believed were necessary for its protection with regard to the use of water during the

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interim period until the Upper Basin was using its full entitlement in the river. These safeguards have been incorporated and, at the same time, they provide, we think, sufficient flexibility for a proper and reasonable operation of the river.

Secondly, the second major change is that certain small and important projects in Colorado are authorized in a separate title in this bill.

I would like to make a few additional comments on the latest version of the bill.

You will notice that in section 101 the citation is given as the "Colorado River Basin Project Act" rather than the "Lower Colorado River Basin Project Act." This is significant because the more we worked with the legislation the more we realized that we could not isolate a particular part of the Colorado River, nor even one basin of the river, and solve its water problems without at least setting the stage for a solution to all of the river's problems. This led to a change in title II, "Investigations and Planning." Title II had required the Secretary in the submission of his report and recommendations for means of supplying water to meet current and anticipated water requirements of the Upper and Lower Colorado River Basins to submit a plan capable of delivering annually not less than 2,500,000 acre-feet of water into the main stream of the Colorado River below Lee's Ferry from sources outside the natural drainage area of the Colorado River system. This imported water was to be devoted to satisfaction of the obligations of the United States under the Mexican Treaty and as needed to assure availability of the full 7,500,000 acre-feet allotted for use by the lower basin States. This original plan embodied a floor but no guidelines as to a ceiling.

In order to give Congress some idea of the scope of possible imports, the several States of the Colorado River Basin agreed that the Secretary should be authorized and directed to prepare planning and feasibility reports of a staged plan for projects adequate, in this opinion, to meet the water requirements of the Colorado River Basin. The current language includes, in addition to the basic 2,500,000 acre-feet, that the Secretary may plan, as part of the first stage, facilities to provide water in the following additional quantities:

(1) Up to two million acre-feet annually in the Colorado River for use in the Lower Colorado River Basin;

(2) Up to two million acre-feet annually in the Colorado River System for use in the Upper Colorado River Basin, directly or by exchange;

(3) Such additional quantities, not to exceed two million acre-feet annually, as the Secretary finds may be required and marketable in areas which can be served by said importation facilities en route to the Colorado River System.

The States agreed that in addition to the area of origin protection which we had in the legislation last fall, that certain additional safeguards should be written in to satisfy and meet the objections and fears raised by States in some of the possible areas of export, and on page 5 of this statement we quote the proposed addition to the original legislation:

(b) All requirements, present or future, for water within any state lying wholly or in part within the drainage area of any river basin from which water is exported by works planned pursuant to this Act shall have a priority of right in perpetuity to the use of the waters of that river basin, for all purposes, as against the uses of the water delivered by means of such exportation works, unless otherwise provided by interstate agreement.

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In other words, the States which have the potentiality of exporting water, if we come to this, would have a double assurance. They would have a prior right in perpetuity to water developed in its area in addition to the area of origin protection which was included in the original bill.

With respect to the costs of importation of water to the basin, section 201(d) of Committee Print No. 19 proposes that the cost of importing water to satisfy the Mexican Treaty is a national obligation and should be nonreimbursable.

I also call your attention to the provisions in section 304(c). That section provides that present contract users of water from the main stream of the Colorado River shall not be required to pay any of the costs of importation of water where such present uses are within the 7,500,000 acre-feet allotted to the lower basin States in the quantities set forth in that section.

The importation of water to the Colorado River Basin from a source outside that basin is frequently challenged on the ground that if the existing water supply were priced to users at "full cost" or "market price," there would be no shortage of water. Such pricing would encourage efficient use and change the end use from agriculture to municipal and industrial which require much less water and produce more income per unit of water.

This suggests that the agriculture of the Colorado River Basin be discriminated against, as a class. Water for agriculture is seldom priced at "full cost" or "market price" in the reclamation States. Nor has water pricing ever been used as a means of allocating water away from one end use to another end use. If such a policy were universally applied, Western States farm crop production would virtually cease.

But we do want to assure our friends from the Northwest that we recognize that they have certain prior rights to the rivers in their areas which we respect. We do believe, however, that broad-gage objective studies should be made by the most competent means which will lead, within 5 years, to plans for redistribution of water resources from areas where surplus water may be determined to exist to water-deficient areas. That is all we seek in this legislation. If surplus water does not exist in a given area obviously this basic resource cannot be exported from that area.

During our negotiations this past year some of the States became concerned about the size of the principal works to be constructed as part of the central Arizona project unit. In Committee Print No. 19 we had agreed to specify that principal works shall be "of * * * such sufficiency as to provide for not to exceed an average annual diversion of 1,200,000 acre-feet of Colorado River System water from the mainstream of the Colorado River below Lee Ferry: * * *."

As I will subsequently mention, the States of the Basin have agreed that a more practicable limitation would be obtained by setting out the size of the aqueduct system between Parker Dam and Granite Reef. Accordingly, we propose to delete the limitation tied to annual diversion as set forth in Committe Print No. 19. We believe considerable misunderstanding might have ensued as to the period over which the "average" was to be taken in determining the size of a main aque-

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duct system based on an average diversion. At some point in the future, it might be argued that Arizona should cut back her diversions even though water was available to her in order not to exceed the 1,200,000 acre-feet average diversion. This was not intended, and, as I said before, a more practicable parameter has been established by setting up guidelines for capacity of the main aqueduct system.

You will recall that during the August 1965 hearings I questioned Commissioner Dominy at some length concerning appropriate size of the Granite Reef aqueduct—one of the principal works of the central Arizona project. Mr. Dominy testified, at page 142 of this subcommittee's printed hearings: "The capacity would be that to deliver 1,200,000 acre-feet annually, and this would require a main aqueduct of roughly 1,800 cubic feet per second in size." He admitted, however, that such an aqueduct would not provide sufficient capacity for Arizona to share in any surplus water to which it might be entitled from lower basin supplies and that 3,800 cubic feet per second would result in a greater benefit-to-cost ratio because the larger sized canal would improve "the certainty of water supply over the payout period with a larger canal taking advantage of the peak in the river's runoff." At that time I suggested to the committee and to representatives of the 7 States that we should carefully consider the advantages of constructing a large sized canal.

Certainly, we can all agree that the studies conducted since the presentation of the Secretary's 1964 Southwest water plan, proposing construction of an 1,800-second-foot aqueduct, all lead to the conclusion that a larger aqueduct will be required if Arizona is to receive an average of 1,200,000 acre-feet. To meet this need, we have agreed with the States of California and Nevada, who are involved in the lower Colorado River development fund, that an aqueduct of 2,500 second-feet shall be built and repaid from funds accruing to the developing fund as set out in the proposed legislation. Additionally, the lower basin States have agreed that, if the definite plan report of the Bureau of Reclamation shows that additional capacity (i) will provide an improved cost-to-benefit ratio, and (ii) will enhance the ability of the central Arizona unit to divert water from the main stream to which Arizona is entitled, the aqueduct may be constructed for a capacity larger than 2,500 second-feet. However, the enlargement of the aqueduct beyond the 2,500-second-feet size is contingent upon a finding by the Secretary of the Interior that the additional costs resulting from an increase in capacity may be financed by funds from sources other than the funds credited to the development fund pursuant to section 403(c) of this act and will not be chargeable directly or indirectly to water users or power customers in the States of California and Nevada. I plan to introduce an amendment which embodies these principles. And it says, in effect, that Arizona will pay the incidental costs of a larger aqueduct if it is determined to be feasible.

With respect to the enlargement of the size of the aqueduct, I wish to point out that we have not specified possible sources of revenues to fund such enlargement beyond the 2,500-second-feet capacity—nor have we attempted to limit the Secretary to any particular source of revenue.

The original H.R. 4671 included the authorization of the southern Nevada water supply unit. Since that unit has been authorized as a

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separate project, its authorization herein has been deleted. However, in section 308, the southern Nevada water supply project has been included as an authorized unit under repayment arrangements and for participation in the development fund established by title IV.

In title V there has been added certain Upper Colorado River Basin authorizations for projects to be constructed in that area. One, I understand, is in New Mexico. Suffice it to say here that my colleagues from Arizona join me in full support of the inclusion of this title V into the Colorado River Basin bill. As I said before, we found that we could not cure the river's deficiencies without taking cognizance of the problems of the total river. The inclusion of these projects is a step in that direction. Note, however, that the repayment of the projects set out in title V is to be made from the already established Upper Colorado River Basin fund.

Title VI has been added to provide safeguards for the operation of the river which the upper basin States believed to be necessary in order that equitable benefits would flow to each basin consistent with appropriate statutes and compacts. We place reliance in the studies and conclusions of the Bureau of Reclamation that the provisions of title VI do not adversely affect the lower basin, nor are they unreasonably restrictive on the Secretary of the Interior in the discharge of his functions of operating the river to achieve optimum benefits from the river and from the natural resources in the area.

There is another witness who will testify for the upper basin people. I will not go into these arrangements except to say that they were the product of long negotiations. We think that they provide a fair balance between the rights of the upper basin, and each of the upper basin States, and the rights and the needs of the lower basin States, all without unduly restricting the Secretary in the discharge of his duties.

In recognition of the broader scope of the functions of the proposed Colorado-Pacific Regional Water Commission as set out in title VI, a provision has been made for representation from any State in the West which is affected by the provisions of title II—the section under which studies are to be made to determine feasible sources of water to augment supplies available from the Colorado River.

You will recall that, during the August hearings, representatives of the Hualapai Indian Tribe appeared before this committee to urge Congress to restore jurisdiction to the Federal Power Commission with respect to the Bridge Canyon damsite to permit the Commission to take action on the license applications previously filed by the Arizona Power Authority and the Department of Water and Power, City of Los Angeles, as an alternative to Federal authorization and construction of this hydroelectric project. Since Bridge Canyon Dam and Reservoir will encroach upon the Hualapai Reservation in certain areas, the Hualapais have requested that, in the event Congress should authorize the construction of Bridge Canyon Dam, certain conditions be met to protect the vested interests of the tribe. In recognition of these rights and in an effort to arrive at conditions which would be equitable to the Hualapais and further their social and economic development, we have conferred and negotiated with their representatives and have reached accord on certain provisions which have been incor-

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porated in a proposed amendment to H.R. 4671 which we will offer and endorse and which has the full support of the Hualapai Indian Tribe. And their chief is in the room, and he will appear later to testify.

Briefly, the proposed amendment for the protection of the Hualapai Tribe contains the following provisions as agreed to by the sponsors of the bill:

1. The Hualapai Tribe is to have the exclusive rights to the recreational area and concessions to be constructed within the reservation with the approval of the Secretary. The revenues of such concessions will inure to the benefit of the tribe.

2. A public access road from Peach Springs, Ariz., through and along Peach Springs Canyon to the recreational area at Diamond Point will be constructed as part of the project.

3. The name of the dam will be changed from Bridge Canyon Dam to Hualapai Dam.

4. The Hualapai Indians shall have the right to purchase up to 25,000 kilowatts and up to 100 million kilowatt-hours annually of firm power on a preference basis at the lowest rate established by the Secretary for the sale of firm power from the Hualapai Dam. The tribe shall have the right to resell such power to users within the Hualapai Reservation.

5. A tax-free cash payment of $16,398,000 would be covered into the Treasury for the credit of the Hualapai Tribe as compensation for their interest in the damsite, rights-of-way, and other facilities to be used or constructed as part of this project.

We feel it is important to make the recreation features of this area available, and we propose to change the name of the dam from Bridge Canyon to Hualapai, to recognize the importance of the Indian tribe in the area in which the damsite is located.

With regard to the Hualapai Indians, I want to share with the committee a thought expressed by Prof. Henry F. Dobyns, lecturer in anthropology at Cornell University, in his recent letter to the New York Times. Incidentally, Professor Dobyns plans to appear before this committee later on this week.

When people first began going to look at what came to be called the Grand Canyon, they actually stopped at the Peach Springs station of the Atlantic and Pacific Railway. Carriages then carried them down Peach Springs Canyon to the Diamond Creek Canyon junction and the main canyon. Later, the present developments within Grand Canyon National Park were built, and tourist traffic diverted from Peach Springs. Constructing Bridge Canyon dam would bring people back to the original entry-way into canyon wonderland * * *. The Hualapai Indian Reservation occupies the South Rim of the canyon above and below the Bridge Canyon dam site. The access roads to the construction site, to artificial lake recreation sites, and to scenic viewing points will all lie within this Indian territory. The Hualapai Tribe would benefit tremendously both socially and economically from construction of Bridge Canyon dam. May I urge that it be accorded this opportunity, and not treated as part of the picturesque canyon scenery?

I would ask unanimous consent that this letter be made part of the hearing record.

Mr. ROGERS of Texas. Without objection, that will be done.

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Hearing none, it is so ordered. It will be received in its entire text.
(The letter referred to follows:)

CORNELL UNIVERSITY,
DEPARTMENT OF ANTHROPOLOGY,
Ithaca, N.Y., April 25, 1966.

Mr. WILLIAM V. SHANNON,
The New York Times,
New York, N.Y.

DEAR MR. SHANNON: Thank you for attempting to present differing points of view concerning Bridge Canyon and Marble Gorge dam construction in your comment in this morning's issue.

If scenic beauty really is the decisive consideration, then it seems to me that both dams should be built, not opposed, by those interested in scenic beauty.

You mention that Bridge Canyon has 3,000 foot deep sheer walls. How tall would Bridge Canyon dam rise? Would it not be some 300 feet? Even at the dam site, a tenth of the canyon, its deepest and narrowest portion, would be flooded. Upstream, the impounded artificial lake would become progressively shallower. Since the lake would occupy a small proportion of the canyon bottom, how much of the scenery visible from the rim would it actually affect? Given the steepness of the canyon walls, there are few observation points on the rim from which the river can now be seen. The great bulk of the visitors to Grand Canyon National Park now look at the canyon from the rim. Only a relatively small number takes the trip into the canyon proper. There is no reason to expect the pattern to be different in the Bridge Canyon area.

Your pointing out that boat travel has opened up canyons not accessible prior to dam construction is a key point in this discussion of scenery. Bridge Canyon dam would have precisely this effect. The last time I explored into the South Rim country that would be affected by Bridge Canyon dam, there was not much in-canyon scenery accessible to very many people. To those wealthy enough to afford four-wheel drive vehicles, it was possible to drive through the sand in Peach Springs Canyon to the river at the mouth of Diamond Creek, and to make some progress towards Bridge Canyon. Any real enjoyment of the canyon bottom views required riding horseback, or hiking.

While there are people determined enough to enjoy canyon scenery to ride or hike in, the same scenery would be enjoyed by many more U.S. taxpayers were there a paved road down Peach Springs Canyon to a lake behind Bridge Canyon dam, where boats would then provide access to all the wonders of canyon-bottom scenery, plus fishing and water sports. Lake Havasu and Lake Mead both provide considerably easier access to canyon scenery than existed prior to dam construction lower down the Colorado River, and both provide recreation for city dwellers not only in Arizona, but also in California and Nevada. Bridge Canyon dam would add to the *available* scenery, rather than damaging inaccessible scenery.

It is true that there are thousands of lakes in this country, but it is also true that the artificial lake behind Bridge Canyon dam would be nearly unique in its deep-canyon setting, to be matched only by the lake behind Marble Gorge dam.

May I remind you that Bridge Canyon dam would be built downstream from Grand Canyon National Park? It would not affect the flow of the Colorado River through the Park, so would not affect the erosional power of the stream in the Park? That argument may apply to dams upstream from the Park, but not to those downstream.

When people first began going to look at what came to be called the Grand Canyon, they actually stopped at the Peach Springs station of the Atlantic and Pacific Railway. Carriages then carried them down Peach Springs canyon to the Diamond Creek Canyon junction and the main canyon. Later, the present developments within Grand Canyon National Park were built, and tourist traffic diverted from Peach Springs. Constructing Bridge Canyon dam would bring people back to the original entry-way into the canyon wonderland. Today, the developments would not be in the hands of outside railway companies. The Hualapai Indian Reservation occupies the South Rim of the canyon above and below the Bridge Canyon dam site. The access roads to the construction site, to artificial lake recreation sites, and to scenery viewing points will all lie within this Indian territory. The Hualapai Tribe would benefit tremendously

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both socially and economically from construction of Bridge Canyon dam. May I urge that it be accorded this opportunity, and not treated as part of the picturesque canyon scenery?

Sincerely yours,

HENRY F. DOBYNS,
Lecturer in Anthropology.

Mr. UDALL. Professor Dobyns has also made the following observations concerning the construction of Bridge Canyon Dam which, I believe, are food for thought in our deliberations here:

(1) If a dam kills a river, then the several dams already on the Colorado have left it already quite dead.

(2) Saving the geological and archeological features is much better done with a systematic search of the kind made when Glen Canyon was closed as against boaters picking up unrelated pieces for souvenirs.

(3) Those who are concerned over archeological remains of Indians ought to be equally concerned about living Indians whose future is tied to the construction of the dam.

Parenthetically, Professor Dobyns questions aloud the advisability of preserving these archeological sites as "* * * a wilderness playground in which the Hualapais and the Havasupai Tribes would be living museum exhibits."

These, then, are the major changes that have been made in the legislation as originally proposed. We believe these changes and additions are mutually beneficial to the States involved. As I said above, they represent a tremendous amount of work, negotiation, compromise, and realization of the other fellow's problem. We wholeheartedly recommend the adoption of the legislation embodied in this committee print.

Before relinquishing the witness chair, I wish to make a few additional observations on behalf of the Arizona sponsors of the bill.

The country continues to be flooded with misstatements and distortions regarding the various aspects of Bridge and Marble Canyon Dams and powerplants which are to be authorized by this legislation. As you will recall, this committee heard extensive testimony both as to the need for these structures and resulting power revenues, and as to the effect that these structures will have on the natural beauty and scenic resources of the Grand Canyon area. Those who oppose these projects in favor of leaving the undeveloped portions of the river in a natural state were given a fair hearing, and their assertions and contentions were duly recorded as part of the record in the earlier hearings. On the basis of that record, I believe that we can fairly state that the proponents of this legislation are keenly aware of and sensitive to the conservation values at stake in the development of the Colorado River. And I believe that it is also fair to conclude that, through passage of the proposed legislation, including authorization of both Bridge and Marble Canyon Dams and Reservoirs, Congress may achieve the delicate balance between conservation of scenic and historic values and the full development of the water and power potential of the river to meet pressing human needs.

Still, the brushfire of opposition to these dams continues to be fed and fanned by individuals and organizations who are willing to overlook long-range needs for lofty but shortsighted and unrealistic principles. I have related to several members of this committee my recent

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experience at Grand Canyon when I attended a conference sponsored by opponents of Bridge and Marble Canyon Dams. There, the distortions and myths about the so-called desecration of Grand Canyon were reiterated. And at my insistence, some of the proponents of these dams were permitted the opportunity to comment. I pointed out, as I have to this committee, that Bridge and Marble Canyon Dams will not destroy the beauty of Grand Canyon—that the lakes to be created by these dams could not be seen from the rim of the Canyon—that they would open up a largely inaccessible portion of this great natural wonder to thousands just as Glen Canyon Dam has done in the Upper Basin.

I was supported in my defense of the integrity of this project by former Senator Barry Goldwater who, I believe, stated our position eloquently when he commented:

I know this river better than most people, and I love it as much as anyone here. This canyon is the greatest natural beauty we have in Arizona, and I defend it from harm with all of the strength I have. But I believe a dam at Bridge Canyon would enhance the canyon.

* * * * * * *

I'd like to see this country without dams any place. But when I have to weigh the lives of millions of people against a remote part of the canyon I love, then I have to take the people.

* * * * * * *

When you look down that river, I wish you would weigh carefully the value of that water, measuring the human needs against its value for beauty alone.

Consistent with this philosophy, the Arizona Senate recently adopted a memorial urging the Department of the Interior and its Bureau of Reclamation to take affirmative action toward building hydroelectric dams at Bridge and Marble Canyons and assuring the Department and the Bureau of the full support of the people of Arizona and the Southwest. A copy of this memorial is attached to my statement, and I ask unanimous consent that it be made a part of this record.

We submit the memorial, which indicates that the people of Arizona do not feel that there will be any damage to scenic archeological values by the construction of these dams.

Mr. ROGERS of Texas. Without objection, it will be included in the record at this point.

Hearing no objection, it is so ordered.

(The memorial referred to follows:)

STATE OF ARIZONA

OFFICE OF THE SECRETARY

UNITED STATES OF AMERICA,
State of Arizona, ss:

I, Wesley Bolin, Secretary of State, do hereby certify that the attached document is a true, correct and complete copy of Senate Memorial No. 4, Arizona State Senate, Twenty-Seventh Legislature, Second Regular Session, adopted April 5, 1966, and that I am the official of the State of Arizona having custody and control of the original of said copy and the legal keeper thereof.

In witness whereof I have hereunto set my hand and affixed the Great Seal of the State of Arizona. Done at Phoenix, the capital, this 3rd day of May A.D. 1966.

[SEAL]

WESLEY BOLIN,
Secretary of State.

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SENATE MEMORIAL NO. 4: A MEMORIAL URGING THE DEPARTMENT OF INTERIOR AND ITS BUREAU OF RECLAMATION TO TAKE AFFIRMATIVE ACTION TOWARDS BUILDING HYDROELECTRIC DAMS AT BRIDGE AND MARBLE CANYONS, AND ASSURING THE DEPARTMENT AND THE BUREAU OF THE FULL SUPPORT OF THE PEOPLE OF ARIZONA AND THE SOUTHWEST.

To the Secretary of the Department of Interior and the Commissioner of the Bureau of Reclamation:

Your memorialist respectfully represents:

Whereas an article published in a national magazine has made unjust and unwarranted allegations that construction of hydroelectric dams at Bridge and Marble Canyons would bring ruin and dissipation to our natural resources at the Grand Canyon National Monument; and

Whereas the Grand Canyon National Monument is a great natural beauty not only of Arizona but of the World and the dam at Bridge Canyon would enhance the beauty of the Canyon and create a lake behind the dam which could be one of the greatest attractions in Western United States; and

Whereas the construction of dams at Bridge and Marble Canyons would in no way destroy the geological formations and wild life habitat in the bottom of the Gorge; and

Whereas the construction of the dams would be of inestimable economic value to the whole of the Southwest and would aid in the development of the Nation; and

Whereas Arizona and the Southwest are in need of developing water sources and the very lives of the future population of the Southwest area depend on obtaining water which must be done soon because of declining water tables and it is estimated that underground reservoirs are being exhausted twice as fast as they are being replenished.

Wherefore your memorialist, the Senate of the State of Arizona, prays:

1. That the United States Department of the Interior and its Bureau of Reclamation continue to give full support towards the construction of hydroelectric dams at Bridge and Marble Canyons so that the beauty of the Grand Canyon National Monument will be enhanced and so that the economic development of the great Southwest will be continued by assuring power and water where it is needed most.

2. That the United States Department of the Interior and its Bureau of Reclamation be assured of the full support of the governments and people of the Southwest.

3. That the Secretary of State of Arizona is directed to transmit a copy of this Memorial to the Honorable Stewart L. Udall, Secretary of the Interior, the Honorable Floyd E. Dominy, Commissioner of Reclamation, and to each member of the Arizona Congressional Delegation.

Passed the Senate April 5, 1966 by the following vote: 23 Ayes, 0 Nays, 5 Not Voting.

Approved by the Governor, April 6, 1966.

Filed in the Office of the Secretary of State, April 6, 1966.

Mr. UDALL. As part of the movement in opposition to these dams, the opponents of the legislation have attempted to convince this committee and the public at large that these hydrodams are not necessary because electricity generated by coal and/or atomic energy is cheaper than hydropower and should, therefore, be substituted for the hydropower to be produced by Bridge and Marble Canyon Dams. I want to comment on this contention and point out the fallacy of this approach in adequately meeting the power needs of the Southwest.

(Chart I on p. 998.)

Mr. UDALL. Copies of these charts are also attached to the copy of my statement. The first chart shows that the baseload is typically about 55 percent, but that the loads vary up to 100 percent, so that at any one point in the week you may be using almost twice as much power as you are using at some other point in the week.

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The black part at the bottom is referred to as the baseload. This can be served by large thermal generators. The hatched areas at the top show the peak load in the system.

The extremely low costs from thermal plants are only made possible by using extra-large generators and operating them near 90 percent of the available time. Yet, in any electrical system, consumer needs are variable from minute to minute, hour by hour, day by day, and month by month, creating peak demands that must be served by operating some generating units only during the periods of peak demand. This is demonstrated on the attached chart I that shows high and low demands for each day of a week. The large constant block of power at the bottom is referred to as baseload. Large, high-efficiency thermal generators operating at high plant factor levels serve this load adequately. The hatched areas at the top show the peakloads on the system. Hydroplants are best suited to serve such peakloads and also to meet emergencies on a system because they can be started quickly and can stand large changes in loads over short periods without damage to the unit. Thermal generators are unsuitable and inefficient when used in this manner.

The hatched areas indicate two classes of peaking load determined by the relative time duration of each. The uppermost area, roughly 35 percent of the total peak, is made up of the short duration peakload demands on the system each day and are ideally served by rapid response hydrogenerating units. This may be for an hour or 2 hours or such during a day. The middle peaking area is also most economically served by hydro. In operating practice, this load is best served by hydro if it is available. As an alternative, older, less efficient steam-fired generation must normally be utilized at a greatly increased cost.

Bridge and Marble operating as peaking hydroplants will provide cheaper power than coal- or atomic-fired plants in meeting system peaks. The attached chart II compares estimated delivered costs per kilowatt-hour for hydro, coal, and nuclear generation at varying plant factor operating levels. Costs for coal and nuclear are those a typical utility would experience. Hydro costs are Bureau of Reclamation's sales price. These estimates include relatively larger transmission costs for coal-fired plants.

(Chart II on p. 999.)

Mr. UDALL. The bottom scale is the plant factor, indicating the percentage of the time you are operating the plant.

Over on the far right, you are operating the plant 90 percent of the time.

On the left, over here, you would be operating at 10, or 15, or 20 percent of the time. The scale on the left in this case is the cost in mills per kilowatt-hour, so that you can readily see the difference in costs between operating a plant 90 percent of the time or 35 percent of the time.

Costs are all comparable in the 70- to 80-percent plant factor area, but water is not available for hydrogeneration at this level of operation. Low costs from both coal and nuclear generation can only be realized at the very high plant factors to the right of the chart. In the range of peaking operations, which is also the range of water availability, hydroenergy is considerably less expensive—almost $10 mil-

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lion a year cheaper than using coal or atomic energy. You will recall the first chart which reflects that sometimes we are using twice as much power as at other times which happens to be the range of water availability. In a 100-year period, this price difference in favor of hydrogeneration at Bridge and Marble, 1.7 mills per kilowatt-hour at 35-percent plant factor, would be almost $1 billion. We are talking in terms of $1 billion of additional money for developing, even assuming that we would have large thermal plants to take up this difference in peak.

On pages 17 and 18, we compare the advantages and disadvantages of hydroplants as against thermal electric plants.

Item 5 of the foregoing table warrants special emphasis as a particularly valuable advantage of hydrogeneration. The ability of hydroplants to pick up added loads quickly is an added measure of protection and reliability for any electric system. When seconds count, the ability to pick up a large load quickly can be of vital importance in keeping power flowing and protecting against a widespread blackout. In this regard, I call your attention to an advertisement in the Wall Street Journal, eastern edition, under date of March 21, 1966, which was entitled: "Why Does Con Edison Want To Go Ahead With the Cornwall Hydroelectric Plant When Some People Are Opposed To It?" Let me quote from that advertisement Con Edison's reasons—reasons which our engineers tell me are fully applicable to the power situation in the southwestern part of our country:

> Reliability of electric service is the single most important reason why we want to build a hydroelectric plant at Cornwall.
>
> In our continuing efforts to increase the reliability of electric service, our engineers have thoroughly examined, and continue to examine, every possible alternative. We know of no practical way that can provide the added protection to New York and Westchester's power supply as reliably and as effectively as the Cornwall hydroelectric project.
>
> IT WILL HELP PREVENT BLACKOUTS
>
> A hydroelectric plant has the ability to pick up added loads quickly. This is very important in emergencies. With the Cornwall project in operation, we could jump electricity production by three-quarters of a million kilowatts or more in less than a minute. All of Con Edison's present generating facilities are steampowered, and steam plants take longer to pick up this kind of sudden load. And when seconds count, being able to pick up a large load quickly can be of vital importance in keeping power flowing. The result will be greatly added protection against a widespread blackout.

I also want to point out that the substitution of Federal steamplants of identical capacity for hydroplants will have a serious detrimental effect on the Lower Colorado River development fund. A basin fund predicated on steam powerplants with normal power rates would develop only one-half of the amount of revenues that would be accumulated in the development fund if hydroelectric projects are constructed. The attached chart III indicates the magnitude of this difference in projected development fund accumulation. There are two main reasons for the deficiency resulting from the use of a steamplant alternative. First, steamplants have a much shorter life than hydroelectric plants; therefore, over a long period, they are more expensive to operate, maintain, and replace. Second, roughly half of the total cost of producing electrical power and energy in a steamplant is repre-

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sented by the cost of fuel. In a hydroelectric plant, once built, there is no cost for the energy to turn the generator, because water, a renewable source, provides the motive power.

All other presently accepted methods of producing electricity use nonrenewable resources for motive power.

(Chart III on p. 1000.)

Mr. UDALL. Down at the bottom we have years of operation, the blue line starting just above it going all the way up, and, it shows the total accumulation in the development fund with Bridge and Marble. It turns out to be $3.5 billion with the two, Bridge and Marble, hydroelectric plants. The red line shows the accumulations with comparable coal plants. We are assuming that the Federal Government—and this is a violent assumption—will authorize the construction of coal plants of similar capacity, and the showing here is what would happen to the development funds. Notice that the revenues do not even begin to accumulate until about the 42d and 43d year, whereas under hydro you begin to accumulate revenues in about the 33d year. One of the reasons for this is that in the hydro, the big advantage is that once you get it in you never have to replace it, but a typical steamplant wears out in about 35 years. This is the average useful life the engineers tell us. So, just at the time when thermal would begin to put some money into the development fund, at about the year 35, you find that you have to replace the whole unit. The point that this chart makes is that the total accumulations, assuming that we could get comparable thermal plants authorized by the Federal Government, would be a billion, six; whereas, the $3.5 billion would be the accumulation of the hydro. And this is a difference of nearly $2 billion—$1,800 million in the development fund.

From time to time, questions have been raised as to the marketability of as much as 2 million kilowatts of peaking power from the Bridge and Marble Canyon powerplants. By the time these plants could be constructed pursuant to a Colorado River Basin Project Act, the utilities which would be served either directly or indirectly from these plants will have an annual load growth of 2 million kilowatts per year. Mr. Hennen Forman, vice president of the Arizona Public Service Co., testified before this committee in August 1965:

*** * * My estimates indicate that the available market can easily absorb these quantities by the time the dams are constructed.**

Mr. Forman then justified his statement, paying particular attention to the fact that the 2 million kilowatts of these plants would be peaking power.

The opponents of Bridge and Marble Dams make much ado about the evaporation from the reservoirs thus created. It should be recognized that thermal plants consumptively use substantial quantities of water. By way of illustration, thermal plants of a size comparable to the proposed hydroplants would have a nonrecoverable use of nearly half the evaporation from the reservoirs. By way of contrast, the evaporation from the reservoirs makes possible multiple uses, including recreation, streamflow regulation, fish and wildlife propagation, et cetera; whereas water, consumed by a thermal plant, serves only one purpose.

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Perhaps the most significant problem posed by the suggestion to substitute steampower for hydropower is one of political philosophy. The basic reclamation law would have to be fundamentally changed to permit the Bureau of Reclamation to build thermal steamplants. This would bring private and public power interests into direct conflict and the result would undoubtedly embroil this legislation in a major congressional controversy which we regard as wholly unnecessary, which I have alluded to here earlier.

Discussion of the proposal to delete the Bridge Canyon and Marble Canyon units of the Colorado River Basin project and substitute coal-fired or atomic-fired thermal plants is largely academic in any event. If these two dams and powerplants are not built as part of the Colorado River Basin project, they will undoubtedly be constructed pursuant to the license applications, now pending before the Federal Power Commission, by the Arizona Power Authority of the State of Arizona and the department of water and power of the city of Los Angeles. In granting licenses for the construction of such facilities, the Federal Power Commission is not constrained to consider the esthetic values of the area, for the Commission is primarily concerned with the optimum utilization of the power potential of the river under the statute by which it operates.

This, then, is the posture of H.R. 4671 and proposed amendments thereto as we commence final deliberations and markup of the bill. Time is of the essence here. This has become almost as crucial as the precious water we seek to utilize under this legislation. We cannot afford the luxury of lengthy discussion and deliberation over minor issues. The proposed legislation is, as I have said before, the product of the best talent available, and each point has been assiduously considered and negotiated by representatives of the basin States. Arizona's need for this water was thoroughly established in the hearings last August, and even our most vociferous opponents were willing to concede this need. They voiced objections only as to the means to be utilized in meeting this need. This determination is now up to the judgment of the Members of Congress and to the members of this committee in particular. I trust that the statesmanlike attitude and cooperation of all those interested in this project will lead to early passage of this legislation even as it led to consensus and accord among representatives of the seven basin States on the major provisions set forth in the final bill. We of Arizona appreciate this attitude as much as the results it has produced this past year.

Thank you, Mr. Chairman.

(The prepared joint statement reads in full as follows:)

JOINT STATEMENT OF REPRESENTATIVES MORRIS K. UDALL, JOHN J. RHODES, AND GEORGE F. SENNER, JR., MAY 6, 1966

I make this statement on behalf of myself, and of my distinguished colleagues the Honorable John J. Rhodes, representing the First Congressional District of Arizona, and Honorable George F. Senner, Jr., representing the Third Congressional District of Arizona.

For some 8 days, beginning August 23, 1965, extensive hearings were held before this Subcommittee on HR 4671 and similar bills to authorize the construc-

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tion, operation, and maintenance of the Lower Colorado River Basin project and other purposes. These hearings were thorough and we believe that all pertinent aspects of the proposed legislation were adequately covered by the many witnesses who appeared and by the extensive questioning on the part of committee members.

The record of this hearings is bolstered by the field hearings which were held by this subcommittee in Phoenix, Arizona, in November 1964. The record of both of these hearings is available to the Committee for its use in making the decisions before it and in the time available to us now, we shall not review in detail the matters presented there. During the August hearings I presented a joint statement on behalf of myself and my colleagues from Arizona in the House of Representatives. We attempted to raise and to answer the many questions which naturally arise in a project of this magnitude.

Also, on behalf of my colleagues and myself, I advised the Committee that "we are extremely gratified with the willingness of all seven states to work toward a general understanding on this vital water supply problem." By the time the August 1965 hearings were held, representatives from all of the Colorado River Basin states had reached a four point consensus on principles with respect to the rights, obligations, and requirements of each basin as against the other. Yet, it was apparent that these guidelines needed to be refined and extended if the interests of all of the states in the basin were to be accommodated.

To that end, representatives of the various states in the Colorado River Basin have, since the August hearings, engaged in numerous meetings and discussions in an attempt to reach a final agreement which could be brought before this Committee and recommended to it by all of the states. By February 22, 1966, a draft of a revised H.R. 4671 had been agreed to by the Upper Colorado River Commission, by the states of Utah, Wyoming, and Colorado, and by the states of California, Nevada, and Arizona. Thus, for the first time in years we have almost complete basin-wide solidarity. The one exception is the state of New Mexico which is willing to support the Colorado River Basin Project if Arizona agrees to give up to the state of New Mexico certain water which is allocated to the state of Arizona. These two states have not reached agreement on this point. New Mexico, however, does not oppose the policy position adopted by other states on key features of the bill.

The official agency of the state of Arizona, the Arizona Interstate Stream Commission, approved the February 22nd draft, now Committee Print No. 19, which you have before you. A copy of its approving resolution is attached hereto.

I want to say on behalf of Congressmen Rhodes and Senner that we each actively and wholeheartedly support and recommend favorable action on the legislation embodied in this committee print.

In broad terms, the main difference between the committee print and H.R. 4671, upon which hearings were held last August, is the incorporation of certain safeguards required by the Upper Basin states in the matter of their use of water from the Colorado River while maintaining at the same time sufficient flexibility for proper and reasonable operation of the vast natural resources of the Colorado River. Also certain small projects were included in the authorization.

May I now comment upon this latest version of the bill and to point out where it differs from the original version of H.R. 4671.

First, you will notice that in Section 101 the citation is given as the "Colorado River Basin Project Act" rather than the "Lower Colorado River Basin Project Act." This is significant because the more we worked with the legislation the more we realized that we could not isolate a particular part of the Colorado River, not even one basin of the river, and solve its water problems without at least setting the stage for a solution to all of the river's problems. This led to a change in Title II, "Investigations and Planning." Title II had required the Secretary in the submission of his report and recommendations for means of supply water to meet current and anticipated water requirements of the Upper and Lower Colorado River Basins to submit a plan capable of delivering annually not less than 2,500,000 acre-feet of water into the mainstream of the Colorado River below Lee's Ferry from sources outside the natural drainage area of the Colorado River system. This imported water was to be devoted to satisfaction of the obligations of the United States under the Mexican Treaty and as needed to assure availability of the full 7,500,000 acre-feet allotted for use by the Lower

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Basin States. This original plan embodied a floor but no guidelines as to a ceiling.

In order to give Congress some idea of the scope of possible imports, the several states of the Colorado River Basin agreed that the Secretary should be authorized and directed to prepare planning and feasibility reports of a staged plan for projects adequate, in his opinion, to meet the water requirements of the Colorado River Basin. The current language includes, in addition to the basic 2,500,000 acre-feet, that the Secretary may plan, as part of the first stage, facilities to provide water in the following additional quantities:

"(1) Up to two million acre-feet annually in the Colorado River for use in the Lower Colorado River Basin;

"(2) Up to two million acre-feet annually in the Colorado River System for use in the Upper Colorado River Basin, directly or by exchange;

"(3) Such additional quantities, not to exceed two million acre-feet annually, as the Secretary finds may be required and marketable in areas which can be served by said importation facilities en route to the Colorado River System."

The states agreed that in addition to the area of origin protection provided in the original legislation that there should be added:

"(b) All requirements, present or future, for water within any state lying wholly or in part within the drainage area of any river basin from which water is exported by works planned pursuant to this Act shall have a priority of right in perpetuity to the use of the waters of that river basin, for all purposes, as against the uses of the water delivered by means of such exportation works, unless otherwise provided by interstate agreement."

Thus the exporting basin has double assurance by reason of the provision for protection of areas of origin as in the original draft plus a perpetual priority as in the present draft.

With respect to the costs of importation of water to the basin, Section 201(d) of Committee Print No. 19 proposes that the cost of importing water to satisfy the Mexican Treaty is a national obligation and should be non-reimbursable. I also call your attention to the provisions in Section 304(c). That section provides that present contract users of water from the mainstream of the Colorado River shall not be required to pay any of the costs of importation of water where such present uses are within the 7,500,000 acre-feet allotted to the Lower Basin states in the quantities set forth in that section.

The importation of water to the Colorado River Basin from a source outside that basin is frequently challenged on the ground that if the existing water supply were priced to users at "full cost" or "market price," there would be no shortage of water. Such pricing would encourage efficient use and change the end use from agriculture to municipal and industrial which require much less water and produce more income per unit of water.

This suggests that the agriculture of the Colorado River Basin be discriminated against, as a class. Water for agriculture is seldom priced at "full cost" or "market price" in the reclamation States. Nor has water pricing ever been used as a means of allocating water away from from one end use to another end use. If such a policy were universally applied, western states farm crop production would virtually cease.

But we do want to assure our friends from the Northwest that we recognize that they have certain prior rights to the rivers in their areas which we respect. We do believe, however, that broad-gauge objective studies should be made by the most competent means which will lead, within five years, to plans for the redistribution of water resources from areas where surplus water may be determined to exist to water-deficient areas. That is all we seek in this legislation. If surplus water does not exist in a given area obviously this basic resource cannot be exported from that area.

During our negotiations this past year some of the states became concerned about the size of the principal works to be constructed as part of the Central Arizona Project unit. In Committee Print No. 19 we had agreed to specify that principal works shall be "of . . . such sufficiency as to provide for not to exceed an average annual diversion of 1,200,000 acre-feet of Colorado River System water from the mainstream of the Colorado River below Lee Perry:. . . ."

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As I will subsequently mention, the states of the Basin have agreed that a more practicable limitation would be obtained by setting out the size of the aqueduct system between Parker Dam and Granite Reef. Accordingly, we propose to delete the limitation tied to annual diversion as set forth in Committee Print No. 19. We believe considerable misunderstanding might have ensued as to the period over which the "average" was to be taken in determining the size of a main aqueduct system based on average diversion. At some point in the future, it might be argued that Arizona should cut back her diversions even though water was available to her in order not to exceed the 1,200,000 acre-feet average diversion. This was not intended, and, as I said before, a more practicable parameter has been established by setting up guidelines for capacity of the main aqueduct system.

You will recall that during the August 1965 hearings I questioned Commissioner Dominy at some length concerning appropriate size of the Granite Reef Aqueduct—one of the principal works of the Central Arizona Project. Mr. Dominy testified:[1] "The capacity would be that to deliver 1,200,000 acre-feet annually, and this would require a main aqueduct of roughly 1,800 cubic feet per second in size." He admitted, however, that such an aqueduct would not provide sufficient capacity for Arizona to share in any surplus water to which it might be entitled from Lower Basin supplies and that 3,800 cubic feet per second would result in a greater benefit to cost ratio because the larger sized canal would improve "the certainty of water supply over the payout period with a larger canal taking advantage of the peaks in the river's runoff." At that time I suggested to the Committee and to representatives of the seven states that we should carefully consider the advantages of constructing a larger sized canal.[2]

Certainly, we can all agree that the studies conducted since the presentation of the Secretary's 1964 Southwest Water Plan, proposing construction of an 1800 second foot aqueduct, all lead to the conclusion that a larger aqueduct will be required in Arizona is to receive an average of 1,200,000 acre-feet. To meet this need, we have agreed with the states of California and Nevada, who are involved in the Lower Colorado River Development Fund, that an aqueduct of 2500 second feet shall be built and repaid from funds accruing to the Development Fund as set out in the proposed legislation. Additionally, the Lower Basin states have agreed that, if the Definite Plan Report of the Bureau of Reclamation shows that additional capacity (i) will provide an improved cost to benefit ratio, and (ii) will enhance the ability of the Central Arizona Unit to divert water from the mainstream to which Arizona is entitled, the aqueduct may be constructed for a capacity larger than 2500 second feet. *However*, the enlargement of the aqueduct beyond the 2500 second feet size is contingent upon a finding by the Secretary of the Interior that the additional costs resulting from an increase in capacity may be financed by funds from sources other than the funds credited to the Development Fund pursuant to Section 403(c) of this Act and will not be chargeable directly or indirectly to water users or power customers in the states of California and Nevada. I plan to introduce an amendment which embodies these principles.

With respect to the enlargement of the size of the aqueduct, I wish to point out that we have not specified possible sources of revenues to fund such enlargement beyond the 2500 second feet capacity—nor have we attempted to limit the Secretary to any particular source of revenue.

The original H.R. 4671 included the authorization of the Southern Nevada Water Supply Unit. Since that unit has been authorized as a separate project, its authorization herein has been deleted. However, in Section 308, the Southern Nevada Water Supply Project has been included as an authorized unit under repayment arrangements and for participation in the Development Fund established by Title IV.

In Title V there has been added certain Upper Colorado River Basin authorizations for projects to be constructed in that area. Suffice it to say here that my colleagues from Arizona join me in full support of the inclusion of this Title V into the Colorado River Basin bill. As I said before, we found that we

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[1] Lower Colorado River Basin Project, hearing before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, 89th Congress, 1st Session, page 142.

[2] Ibid., page 145.

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could not cure the river's deficiencies without taking cognizance of the problems of the total river. The inclusion of these projects is a step in that direction. Note, however, that the repayment of the projects set out in Title V is to be made from the already established Upper Colorado River Basin Fund.

Title VI has been added to provide safeguards for the operation of the river which the Upper Basin states believed to be necessary in order that equitable benefits would flow to each basin consistent with appropriate statutes and compacts. We place reliance in the studies and conclusions of the Bureau of Reclamation that the provisions of Title VI do not adversely affect the Lower Basin, nor are they unreasonably restrictive on the Secretary of the Interior in the discharge of his functions of operating the river to achieve optimum benefits from the river and from the natural resources in the area.

In recognition of the broader scope of the functions of the proposed Colorado-Pacific Regional Water Commission as set out in Title VI, provision has been made for representation from any state in the west which is affected by the provisions of Title II—the section under which studies are to be made to determine feasible sources of water to augment supplies available from the Colorado River.

You will recall that, during the August hearings, representatives of the Hualapai Indian Tribe appeared before this Committee to urge Congress to restore jurisdiction to the Federal Power Commission with respect to the Bridge Canyon dam-site to permit the Commission to take action on the license applications previously filed by the Arizona Power Authority and the Department of Water and Power, City of Los Angeles, as an alternative to Federal authorization and construction of this hydroelectric project. Since Bridge Canyon Dam and Reservoir will encroach upon the Hualapai Reservation in certain areas, the Hualapais have requested that, in the event Congress should authorize the construction of Bridge Canyon Dam, certain conditions be met to protect the vested interests of the Tribe. In recognition of these rights and in an effort to arrive at conditions which would be equitable to the Hualapais and further their social and economic development, we have conferred and negotiated with their representatives and have reached accord on certain provisions which have been incorporated in a proposed amendment to HR 4671 which we will offer and endorse and which has the full support of the Hualapai Indian Tribe.

Briefly, the proposed amendment for the protection of the Hualapai Tribe contains the following provisions as agreed to by the sponsors of the bill:

1. The Hualapai Tribe is to have the exclusive rights to the recreational area and concessions to be constructed within the reservation with the approval of the Secretary. The revenues of such concessions will inure to the benefit of the Tribe.

2. A public access road from Peach Springs, Arizona, through and along Peach Springs Canyon to the recreational area at Diamond Point will be constructed as part of the Project.

3. The name of the dam will be changed from Bridge Canyon Dam to Hualapai Dam.

4. The Hualapai Indians shall have the right to purchase up to 25,000 kilowatts and up to 100,000,000 kilowatt-hours annually of firm power on a preference basis at the lowest rate established by the Secretary for the sale of firm power from the Hualapai Dam. The Tribe shall have the right to resell such power to users within the Hualapai Reservation.

5. A tax-free cash payment of $16,398,000 would be covered into the Treasury for the credit of the Hualapai Tribe as compensation for their interest in the dam site, rights-of-way, and other facilities to be used or constructed as part of this project.

With regard to the Hualapai Indians, I want to share with the Committee a thought expressed by Professor Henry F. Dobyns, Lecturer in Anthropology at Cornell University, in his recent letter to the New York Times. Incidentally, Professor Dobyns plans to appear before this Committee later on this week.

"When people first began going to look at what came to be called the Grand Canyon, they actually stopped at the Peach Springs station of the Atlantic and Pacific Railway. Carriages then carried them down Peach Springs Canyon to

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the Diamond Creek Canyon junction and the main canyon. Later, the present developments within Grand Canyon National Park were built, and tourist traffic diverted from Peach Springs. Constructing Bridge Canyon dam would bring people back to the original entry-way into the canyon wonderland . . . . The Hualapai Indian Reservation occupies the South Rim of the canyon above and below the Bridge Canyon dam site. The access roads to the construction site, to artificial lake recreation sites, and to scenery viewing points will all lie within this Indian territory. The Hualapai Tribe would benefit tremendously both socially and economically from construction of Bridge Canyon dam. May I urge that it be accorded this opportunity, and not treated as part of the picturesque canyon scenery?

Profesor Dobyns has also made the following observations concerning the construction of Bridge Canyon Dam which, I believe, are food for thought in our deliberations here:

1. "If a dam kills a river, then the several dams already on the Colorado have left it already quite dead.

2. "Saving the geological and archeological features is much better done with a systematic search of the kind made when Glen Canyon was closed as against boaters picking up unrelated pieces for souvernirs.

3. "Those who are concerned over archeological remains of Indians ought to be equally concerned about living Indians whose future is tied to the construction of the dam."

Parenthetically, Professor Dobyns questions aloud the advisability of preserving these archeological sites as '. . . a wilderness playground in which the Hualapais and the Havasupai Tribes would be living museum exhibits."

These, then, are the major changes that have been made in the legislation as originally proposed. We believe these changes and additions are mutually beneficial to the states involved. As I said above, they represent a tremendous amount of work, negotiation, compromise, and realization of the other fellow's problem. We wholeheartedly recommend the adoption of the legislation embodied in this committee print.

Before relinquishing the witness chair, I wish to make a few additional observations on behalf of the Arizona sponsors of the bill.

The country continues to be flooded with misstatements and distortions regarding the various aspects of Bridge and Marble Canyon Dams and powerplants which are to be authorized by this legislation. As you will recall, this committee heard extensive testimony both as to the need for these structures and resulting power revenues, and as to the effect that these structures will have on the natural beauty and scenic resources of the Grand Canyon area. Those who oppose these projects in favor of leaving the undeveloped portions of the river in a natural state were given a fair hearing, and their assertions and contentions were duly recorded as part of the record in the earlier hearings. On the basis of that record, I believe that we can fairly state that the proponents of this legislation are keenly aware of and sensitive to the conservation values at stake in the development of the Colorado River. And I believe that it is also to conclude that, through passage of the proposed legislation, including authorization of both Bridge and Marble Canyon Dams and reservoirs, Congress may achieve the delicate balance between conservation of scenic and historic values and the full development of the water and power potential of the river to meet pressing human needs.

Still, the brushfire of opposition to these dams continues to be fed and fanned by individuals and organizations who are willing to overlook long-range needs for lofty but short-sighted and unrealistic principles. I have related to several members of this committee my recent experience at Grand Canyon when I attended a conference sponsored by opponents of Bridge and Marble Canyon Dams. There, the distortions and myths about the so-called "desecration" of Grand Canyon were reiterated. At my insistence, some of the proponents of these dams were permitted the opportunity to comment. I pointed out, as I have to this committee, that Bridge and Marble Canyon Dams will not destroy the beauty of Grand Canyon—that the lakes to be created by these dams could not be seen from the rim of the Canyon—that they would open up a largely inaccessible portion of this great natural wonder to thousands just as Glen Canyon Dam has done in the Upper Basin.

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I was supported in my defense of the integrity of this project by former Senator Barry Goldwater who, I believe, stated our position eloquently when he commented:

"I know this river better than most people, and I love it as much as anyone here. This canyon is the greatest natural beauty we have in Arizona, and I defend it from harm with all of the strength I have. But I believe a dam at Bridge Canyon would enhance the canyon."

* * * * * * *

"I'd like to see this country without dams any place. But when I have to weigh the lives of millions of people against a remote part of the canyon I love, then I have to take the people."

* * * * * * *

"When you look down that river, I wish you would weigh carefully the value of that water, measuring the human needs against its value for beauty alone."

Consistent with this philosophy, the Arizona Senate recently adopted a Memorial urging the Department of the Interior and its Bureau of Reclamation to take affirmative action towards building hydro-electric dams at Bridge and Marble Canyons and assuring the Department and the Bureau of the full support of the people of Arizona and the Southwest. A copy of this Memorial is attached to my statement, and I ask unanimous consent that it be made a part of the record in these proceedings.

As part of the movement in opposition to these dams, the opponents of the legislation have attempted to convince this committee and the public at large that these hydro dams are not necessary because electricity generated by coal and/or atomic energy is cheaper than hydro power and should, therefore, be substituted for the hydro power to be produced by Bridge and Marble Canyon Dams. I want to comment on this contention and point out the fallacy of this approach in adequately meeting the power needs of the Southwest.

The extremely low costs from thermal plants are only made possible by using extra large generators and operating them near 90% of the available time. Yet, in any electrical system, consumer needs are variable from minute to minute, hour by hour, day to day, and month by month, creating peak demands that must be served by operating some generating units only during the period of peak demand. This is demonstrated on the attached Chart I that shows high and low demands for each day of a week. The large constant block of power at the bottom is referred to as base load. Large, high efficiency thermal generators operating at high plant factor levels serve this load adequately. The hatched areas at the top show the peak loads on the system. Hydro plants are best suited to serve such peak loads and also to meet emergencies on a system because they can be started quickly and can stand large changes in loads over short periods without damage to the unit. Thermal generators are unsuitable and inefficient when used in this manner.

The hatched areas indicate two classes of peaking load determined by the relative time duration of each. The uppermost area, roughly 35% of the total peak, is made up of the short duration peak load demands on the system each day and are ideally served by rapid response hydro generating units. The middle peaking area is also most economically served by hydro. In operating practice, this load is best served by hydro, if it is available. As an alternative, older, less efficient steam fired generation must normally be ulitized at a greatly increased cost.

Bridge and Marble operating as peaking hydro plants will provide cheaper power than coal or atomic fired plants in meeting system peaks. The attached Chart II compares costs per kilowatt-hour for hydro, coal, and nuclear generation at varying plant factor operating levels. Costs are all comparable in the 70 to 80% plant factor area, but water is not available for hydro generation at this level of operation. Low costs from both coal and nuclear generation can only be realized at the very high plant factors to the right of the chart. In the range of peaking operations, which is also the range of water availability, hydro energy is considerably less expensive—almost $10 million a year cheaper than using coal or atomic energy. In a 100-year period, this price difference in favor of hydro generation at Bridge and Marble—1.7 mills per kilowatt-hour at a 35% plant factor, would be almost $1 billion.

The following table lists for your convenience the major differences between Bridge and Marble hydro plants and the alternative steam fired plants.

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HYDRO-ELECTRIC PLANTS	THERMAL ELECTRIC PLANTS
1. Can be started quickly and brought to capacity load in a very short period of time without damage or shortening of time without damage or shortening of life of unit.	Units must be heated and brought on the line slowly to avoid damage from thermal stress.
2. Although water would not be available in quantities to permit operating at high plant factor levels, hydro has a low average cost at low plant factors associated with serving peaking loads—*its best use.*	Low average cost at high plant factors associated with serving base loads—*its best use.*
3. Longer life than thermal units. Thus, lower operating, maintenance, and replacement costs.	Shorter life than hydro because of the complexity and operating conditions of machinery.
4. No cost for fuel—uses falling water for energy.	Cost for fuel—roughly ½ of total cost and continues for life of plant.
5. Particularly suitable as stand-by plant for meeting emergency generating requirements.	Particularly suitable for serving base load power demands on an around-the-clock annual basis.

Item 5 of the foregoing table warrants special emphasis as a particularly valuable advantage of hydro generation. The ability of hydro plants to pick up added loads quickly is an added measure of protection and reliability for any electric system. When seconds count, the ability to pick up a large load quickly can be of vital importance in keeping power flowing and protecting against a widespread blackout. In this regard, I call your attention to an advertisement in the Wall Street Journal, Eastern Edition, under date of March 21, 1966, which was entitled, "Why does Con Edison want to go ahead with the Cornwall hydroelectric plant when some people are opposed to it?" Let me quote from that advertisement Con Edison's reasons—reasons which our engineers tell me are fully applicable to the power situation in the Southwestern part of our country.

"Reliability of electric service is the single most important reason why we want to build a hydroelectric plant at Cornwall.

In our continunig efforts to increase the reliability of electric service, our engineers have thoroughly examined, and continue to examine, every possible alternative. We know of no practical way that can provide the added protection to New York and Westchester's power supply as reliably and as effectively as the Cornwall hydroelectric project.

IT WILL HELP TO PREVENT BLACKOUTS

A hydroelectric plant has the ability to pick up added loads quickly. This is very important in emergencies.

With the Cornwall project in operation, we could jump electricity production by three-quarters of a million kilowatts or more in less than a minute. All of Con Edison's present generating facilities are steam-powered, and steam plants take longer to pick up this kind of sudden load. And when seconds count, being able to pick up a large load quickly can be of vital importance in keeping power flowing. The result will be greatly added protection against a widespread blackout."

I also want to point out that the substitution of Federal steam plants of identical capacity for hydro plans will have a serious detrimental effect on the Lower Colorado River Development Fund. A basin fund predicated on steam power plants with normal power rates would develop only one-half of the amount of revenues that would be accumulated in the development fund if hydro electric projects are constructed. The attached Chart III indicates the magnitude of this difference in projected development fund accumulation. There are two main reasons for the deficiency resulting from the use of a steam plant alternative. First, steam plants have a much shorter life than hydro electric plants: therefore, over a long period, they are more expensive to operate, maintain, and replace. Second, roughly half of the total cost of producing electrical power and

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energy in a steam plant is represented by the cost of fuel. In a hydro electric plant, once built, there is no cost for the energy to turn the generator because water, a renewable resource provides the motive power.

All other presently accepted methods of producing electricity use non-renewable resources for motive power.

From time to time, questions have been raised as to the marketability of as much as 2 million kilowatts of peaking power from the Bridge and Marble Canyon power plants. By the time these plants could be constructed pursuant to a Colorado River Basin Project Act, the utilities which would be served either directly or indirectly from these plants will have an annual load growth of 2 million kilowatts per year. Mr. Hennen Forman, Vice President of the Arizona Public Service Company, testified before this committee in August 1965: "* * * My estimates indicate that the available market can easily absorb these quantities by the time the dams are constructed." Mr. Forman then justified his statement, paying particular attention to the fact that the 2 million kilowatts these plants would be "peaking power.'

The opponents of Bridge and Marble Dams make much ado about the evaporation from the reservoirs thus created. It should be recognized that thermal plants consumptively use substantial quantities of water. By way of illustration thermal plants of a size comparable to the proposed hydro plants would have a non-recoverable use of nearly half the evaporation from the reservoirs. By way of contrast, the evaporation from the reservoirs makes possible multiple uses including recreation, steam flow regulation, fish and wildlife propagation, etc., whereas water, consumed by a thermal plant serves only one purpose.

Perhaps the most significant problem posed by the suggestion to substitute steam power for hydro power is one of political philosophy. The basic reclamation law would have to be fundamentally changed to permit the Bureau of Reclamation to build thermal steam plants. This would bring private and public power interests into direct conflict and the result would undoubtedly embroil this legislation in a major congressional controversy which we regard as wholly unnecessary.

Discussion of the proposal to delete the Bridge Canyon and Marble Canyon units of the Colorado River Basin Project and substitute coal fired or atomic fired thermal plants is largely academic in any event. If these two dams and power plants are not built as part of the Colorado River Basin Project, they will undoubtedly be constructed pursuant to the license applications now pending before the Federal Power Commission, by the Arizona Power Authority of the State of Arizona, and the Department of Water and Power of the City of Los Angeles. In granting licenses for the construction of such facilities, the Federal Power Commission is not constrained to consider the esthetic values of the area, for the Commission is primarily concerned with the optimum utilization of the power potential of the River.

CONCLUSION

This, then, is the posture of H. 4671 and proposed amendments thereto as we commence final deliberations and mark-up of the bill. Time is of the essence here. Time has become almost as crucial as the precious water we seek to utilize under this legislation. We cannot afford the luxury of lengthy discussion and deliberation over minor issues. The proposed legislation is, as I have said before, the product of the best talent available, and each point has been assiduously considered and negotiated by representatives of the Basin States. Arizona's need for this water was thoroughly established in the hearings last August, and even our most vociferous opponents were willing to concede this need. They voiced objections only as to the means to be utilized in meeting this need. This determination is now up to the judgment of the members of Congress and to the members of this committee in particular. I trust that the statesmanlike attitude and cooperation of all those interested in this project will lead to early passage of this legislation even as it led to consensus and accord among representatives of the seven Basin States on the major provisions set forth in the final bill. We of Arizona appreciate this attitude as much as the results it has produced this past year.

Thank you, Mr. Chairman.

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CHART I

BASE AND PEAKING POWER LOADS DURING A WEEK

DEMONSTRATED BY

MAXIMUM AND MINIMUM DAILY PEAK DEMANDS

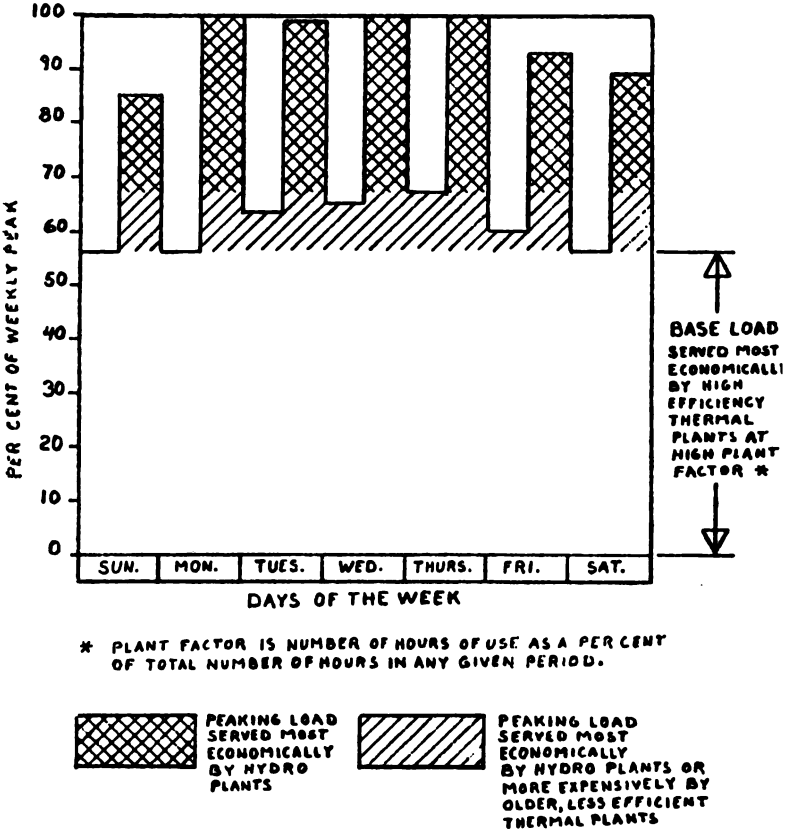

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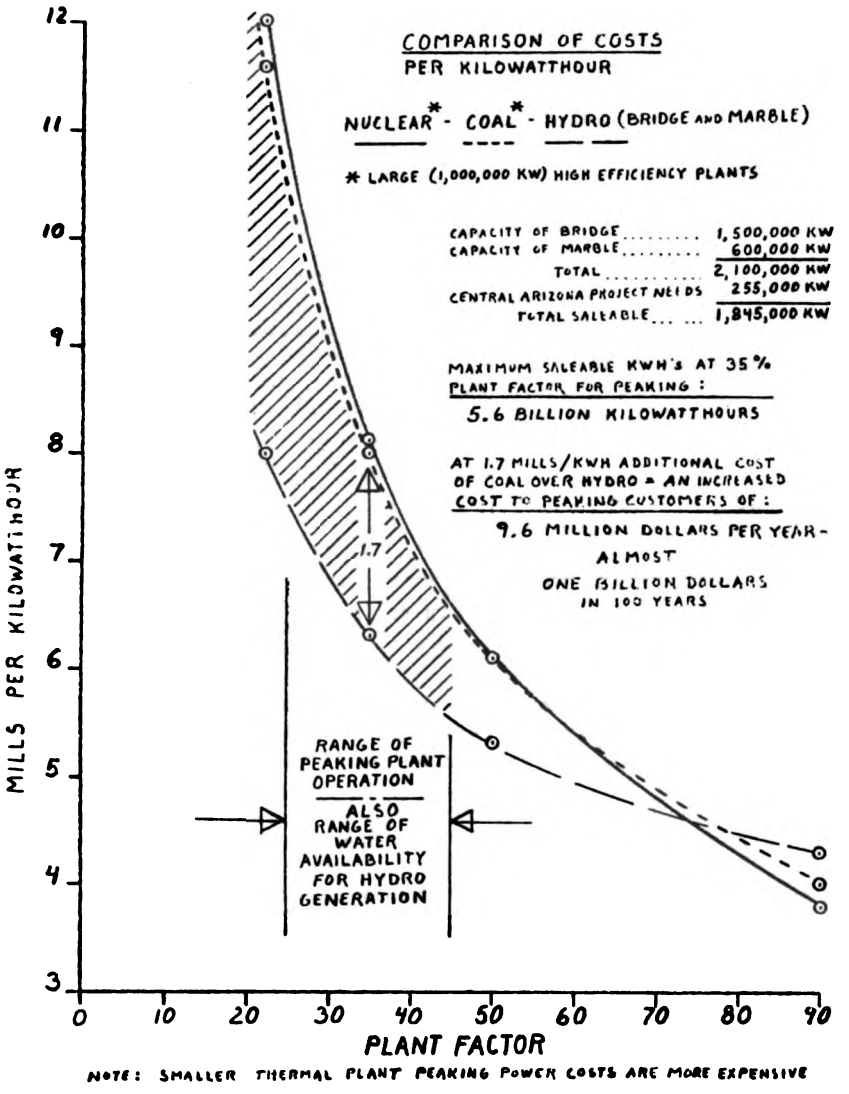
CHART II



NOTE: SMALLER THERMAL PLANT PEAKING POWER COSTS ARE MORE EXPENSIVE

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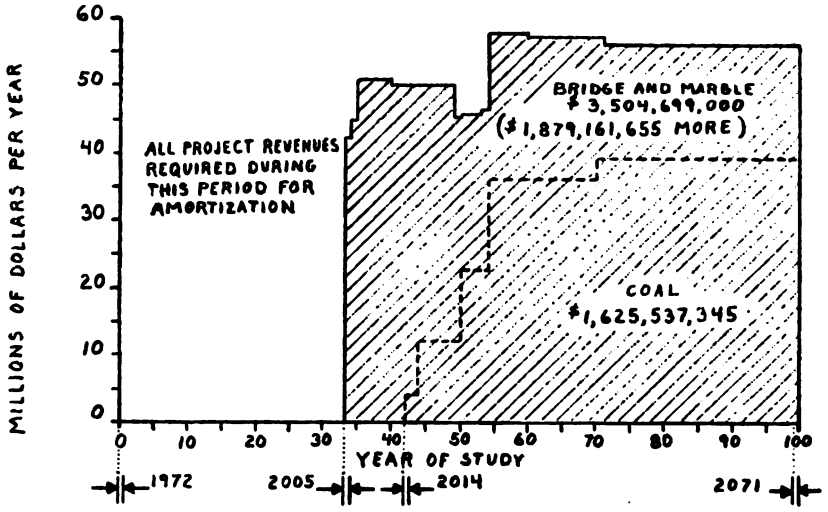
CHART III

COMPARISON OF ACCUMULATIONS
IN DEVELOPMENT FUND BY YEAR 2071
(100 YEAR STUDY PERIOD)

BRIDGE AND MARBLE VS COAL



REFERENCE: PAGES 737 AND 738 OF LOWER COLORADO RIVER BASIN PROJECT, U.S. HOUSE OF REPRESENTATIVES, AUGUST 23 - SEPTEMBER 1, 1965

Mr. ROGERS of Texas. Thank you, Mr. Udall.

Is there anything that you care to add, Mr. Rhodes?

Mr. RHODES. I just want to thank the chairman and the members of this very distinguished subcommittee for again allowing the State of Arizona to bring this matter before you, which is very important—in fact, vital to our State. It is always a pleasure for me to be back before this committee in this room and to see sitting around the table so many of my old colleagues on the committee. I always appear here with confidence in the fairness and the sufficiency with which this committee will arrive at a decision and, also, its ability to get the decision which it makes enacted into law by the Congress. The record of this committee for success in doing that is certainly one which should be the envy of any other committee, and I know full well that when the committee has completed its work on this very important piece of legislation it will be in a form which will pass the Congress in this session.

Thank you.

Mr. ROGERS of Texas. Thank you, Mr. Rhodes.

Let us go off the record.

(Discussion was had outside the record.)

Mr. ROGERS of Texas. The Chair recognizes the gentleman from Colorado, Mr. Aspinall, chairman of the full committee.

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Mr. UDALL. Pardon me, could I interrupt, and could I present several people that we have here who are assisting us as backups?

I think for the record that they should be identified.

Mr. ROGERS of Texas. Yes, you may proceed.

Mr. UDALL. Mr. William S. Gookin, the State water engineer of Arizona; Mr. L. M. Alexander, Salt River project engineer; Mr. J. A. Riggins, attorney, Salt River project; and Mr. O. M. Trask, Arizona Interstate Stream Commission attorney.

Mr. ROGERS of Texas. Thank you very much.

The gentlemen from Colorado, the chairman of the full committee.

Mr. ASPINALL. I wish to congratulate the Arizona delegation for this coordinated appearance before this committee this morning. Your joint statement shows a great deal of cooperation among the members of the delegation and I am very pleased.

Also, I wish to commend you for your statement. This, of course, is a backup statement and is additional material to the material which has been set forth in the other hearings we have had heretofore.

I only have a few questions.

The statement is so presented that its logic and rationalization is satisfactory to me.

On page 5 of your statement at the bottom of the page, in the third paragraph, there is this sentence:

That section provides that present contract users of water from the mainstream of the Colorado River shall not be required to pay any of the costs of importation of water where such present uses are within the 7,500,000 acre-feet allotted to the Lower Basin states in the quantities set forth in that section.

Mr. Udall, will you explain the rationale of that statement and what it means?

Mr. UDALL. Well, we have in Arizona, as we have in California, certain perfected rights and certain contract users who have been identified in previous hearings. These include people whose rights go back 40, 50, or 60 years. We have had problems within our State, as the other States have had, in trying to get total agreement on the legislation. This language is in here primarily to assure the areas in California and in Arizona that have old established rights and present contract uses, that we are not going to place the burden upon them of paying for the importation of the water to be used in other areas. This burden will fall on the development fund created by the provisions of this act.

Mr. ASPINALL. What you are saying is that the new project has to be carried by the new users?

Mr. UDALL. Yes, sir.

Mr. ASPINALL. Is that right?

Mr. UDALL. Yes, sir.

Mr. ASPINALL. Now, on page 10 of your statement, you have stated in the first paragraph relative to title VI:

We place reliance in the studies and conclusions of the Bureau of Reclamation that the provisions of Title VI do not adversely affect the Lower Basin, nor are they unreasonably restrictive on the Secretary of the Interior in the discharge of his functions of operating the river to achieve optimum benefits from the river and from the natural resources in the area.

This refers to the new criteria for operating Lake Mead and Lake Powell, as I understand it?

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Mr. UDALL. Yes, sir.

Mr. ASPINALL. Just how far do you go in thinking that this title VI will not adversely affect the lower basin, and if it is shown that there is a slight adverse effect, does this at all change the position of the lower basin States or primarily the State of Arizona?

Mr. UDALL. No; we participated at great length in the negotiations that led up to the drafting of the language referred to. There was considerable give and take by your very fine people in the upper basin. We felt that there had to be a little give on each side in order to resolve this question because it also refers back to some gaps in the compact, as the gentleman from Colorado knows. In 1922 they did not really spell out what we were going to do when both basins had big reservoirs and were in operation. We concede that some additional burden may well be placed upon the lower basin, because of this language. We cheerfully accept and will bear these burdens and will carry out the compromise in the spirit in which it was entered into.

Mr. ASPINALL. In other words, this agreement between the two basins of the Colorado River practically eliminates for the time being all of our current problems with the exception of those having to do with importing the water?

Mr. UDALL. That is exactly correct, and I think it is to the credit of the leaders in all of the States that we were able to do this.

Mr. ASPINALL. Thank you very much.

Mr. ROGERS of Texas. The gentleman from Pennsylvania, Mr. Saylor.

Mr. SAYLOR. I join the chairman of the full committee in commending the Arizona House delegation in their statement. Not that I agree with it, but, in the interest of time, I commend you for having presented a bipartisan approach to this committee and, as it is a matter of survival for all, because you are all in this together.

I have been fascinated by this bill, Mr. Udall, which you introduced a few days ago, and which I have not had time to examine as thoroughly as I will before we are through. This bill changes the entire concept that you had, and the other members of the Arizona delegation had, when you introduced your original legislation. Is that not correct?

Mr. UDALL. Not entirely. There are some major changes, some very major changes.

Mr. SAYLOR. Just a minute. You say it does not change it entirely. The title of the bill which you introduced in February of 1965 and on which hearings have been held was to authorize the construction, operation and maintenance of the Lower Colorado River Basin project and for other purposes; is that not correct?

Mr. UDALL. That is correct.

Mr. SAYLOR. Now, you immediately start out in your new bill by striking out everything after the enacting clause and title I calls this now "The Colorado River Basin project", and states, section 101, "that this Act may be cited as the 'Colorado River Basin Project Act' "; is that not correct?

Mr. UDALL. That is correct.

Mr. SAYLOR. Heretofore you were dealing with the problems of the lower basin and now you are dealing in this bill with the problems of the entire basin?

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Mr. UDALL. That is correct.

Mr. SAYLOR. That is correct?

Mr. UDALL. Yes.

Mr. SAYLOR. Now even the reports that were submitted by the Secretary of the Interior and the Bureau of Reclamation in support of the original bill stated that in order to comply with that bill there was a shortage of water in the Colorado River to meet those objectives; is that not correct?

Mr. UDALL. This is right.

Mr. SAYLOR. How much did the report say that you needed to import into the lower basin to take care of the needs of the original bill?

Mr. UDALL. Well, there are two or three separate problems.

The first need is to give the user in the lower basin the 7½ million acre-feet that we thought we would get when we entered into the compact of 1922.

The second question, of course, is what are the ultimate needs of this area, 10 or 15 or 20 years from now?

These are obviously considerably more than the 7½ million acre-feet allocated to the lower basin.

Mr. SAYLOR. Mr. Udall, that is not very responsive to the question. I asked you how much water did the report say that you would need to import into the lower basin, in order to take care of your original bill.

Mr. UDALL. About 2½ million acre-feet I think is the figure that the gentleman wants.

Mr. SAYLOR. Right.

Now, then, you have included in this bill all of the seven States in the basin. You said that you had the cooperation of six of them, but that so far New Mexico has not gone along with you. You tell us that you have had conversations with them in the past several days and hoped you may have a united front to present to this committee; is that correct?

Mr. UDALL. I made such a statement; yes, sir.

Mr. SAYLOR. All right. Now, in view of the fact that the Colorado has never produced the amount of water that the original Colorado compact intended it to have or contemplated there would be in the river, how much additional water will need to be imported from any other sources in order to maintain the Colorado River project as you have designed it in your bill?

Mr. UDALL. Mr. Saylor, again—and I do not want to quibble or evade any questions that you have, but we are talking about stages.

The first stage would be an attempt to make the river whole so that we will have the 7½ million acre-feet in the lower basin that we were allocated and so that our States can meet their share of the Mexican treaty. Beyond this, the bill contemplates a study only of three additional stages which would be another 2 million acre-feet for the lower basin, another 2 million acre-feet for the upper basin, and another 2 million to be used en route from the area of export to the Colorado River. These amounts even, will probably not satisfy the long-term needs of the lower basin. We will have to do things in terms of desalting water, and so forth. If you are talking 40 and 50 years from now.

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Mr. SAYLOR. So, to add all of the things you have included here in your bill, your original bill and this bill, you have 8½ million acre-feet, and by your own statement and a careful reading of this bill, you already anticipate that will not be enough to take care of the eventual needs of the Southwest; is that not correct?

Mr. UDALL. This is very likely to be the case in the very long term.

Mr. SAYLOR. All right.

Mr. HALEY. Will you yield right there?

Mr. SAYLOR. Yes.

Mr. HALEY. Where are you going to get this water? I think we ought to know that.

Mr. UDALL. Is the gentleman talking about the water beyond the 8 million acre-feet, or the original imports that we are discussing?

Mr. HALEY. I am talking about the water you have admitted here that your allocation is such that you do not have sufficient water for it. Where will you get the additional water?

I think that we need to know that.

Mr. UDALL. I will say to my friend from Florida, that the bill provides for a 5-year study of how this could be done and where the water would come from. There are certain obvious locations that the studies will refer to.

Mr. HALEY. Is one of them the Columbia River?

Mr. UDALL. One of them is; one is northern California. There may be other sources, such as large desalting plants that could be studied, but let us not fool anyone or try to play any games here—these are the two most likely sources that ought to be studied.

Mr. HALEY. Thank you.

Mr. SAYLOR. I will say to my colleague from Florida: "Watch yourself; they have got their eyes on Florida water, too."

Mr. HALEY. May I say to my colleague from Pennsylvania that recently we have had plenty of water.

Mr. SAYLOR. This is another little piece in the jigsaw puzzle that is being fitted into place. Some of us have tried to warn the other members of Congress what some of you people out there had in mind. Some of you in the upper Columbia, acted as though you had your head in the sands like the proverbial ostrich, and told us it would not happen; but I want you boys up there on notice that you are finding out the price you are going to pay for some of the things that you did.

On page 30 of the bill, beginning with line 24——

Mr. UDALL. What page is that?

Mr. SAYLOR. Page 30 of your bill, beginning with line 24 and going through to line 8 on page 31, in this you are changing a treaty, of the United States are you not?

Mr. UDALL. No, indeed. The Mexican treaty will stand as is. The United States is committed to deliver to its neighbor, Mexico, a certain amount of water. We cannot change that treaty. However, there is not enough water to satisfy that treaty, and, also, to satisfy the users in Arizona and New Mexico, or Arizona and Nevada and California that we are entitled to, and all we say in that section is that the United States in fulfilling an obligation to a neighboring country did this to the detriment of the water users in the United States. And, that part of the importation necessary to make the river

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whole, and that the Mexican treaty, so far as that is concerned, shall be a national obligation and not an obligation of the water users in that immediate area.

Mr. SAYLOR. So I add another 1½ acre-feet each year to your 8½ acre-feet?

Mr. UDALL. No, no, no, it is included.

Mr. SAYLOR. Because you have got 10 million already.

Mr. UDALL. That is included, the million and a half is included.

Mr. SAYLOR. No, no, it is not included, because you have already said you were short when you answered before as to this 2½ million acre-feet. You also included 2-million acre-feet in each of three other cases, and stated this would not be sufficient, and now you want to relieve the States of the upper basin and the States of the lower basin of their responsibility and say it is a national obligation. Boys, I want you in the Pacific Northwest to know there is already 10 million acre-feet in this.

Mr. UDALL. No, I must correct the gentleman, if you will permit me. The first stage of 2½ million acre-feet is necessary in order to make the Colorado River whole so that we can deliver the water to Mexico and have 7½ million consumptive use in the three lower basin States, so that the original 2½ million out of that 8½ million is made up of 1½ million for the Mexican treaty burden, plus another million acre-feet to make up for losses in transit and some of the other shortages that we have. In other words, the best hydraulic information is that you need 2½ million acre-feet in the first stage to make the river what we thought it was, so that we could keep our treaty with Mexico and also give the lower basin States their basic allocation of water.

Mr. ROGERS of Texas. Will you yield?

Mr. SAYLOR. I will yield.

Mr. ROGERS of Texas. To get your position clear now, Mr. Udall, is it your position that even though Mexico, under any application of the water law, would be entitled to certain water out of the Colorado River of what goes into Mexico, but because of this treaty which fixes 1½ million acre-feet available to Mexico, that if the river does not produce this amount of water that the entire allocation to Mexico is a national obligation, and unless the requirements of the lower basin and the upper basin of this country are fulfilled by the production of the river, then the Government would have to go in and make it available to Mexico, even if the water cost $1 a thousand gallons.

Mr. UDALL. The chairman of the subcommittee has gotten most of it. I would elaborate just a little bit.

Mr. ROGERS of Texas. Yes, please do.

Mr. UDALL. The States divided up the water in 1922; 7½ million below and 7½ above in both in the United States. Mexico was even then an old and established user. They had been using water for a long time, too. They had rights. It was not a gift.

During the war in 1944, and as a part of our national policy to get this problem with Mexico settled, and against the objections of a lot of people in the West who said that there was not enough water to give 1½ million acre-feet to them, the Senate approved the treaty and said to Mexico, we will deliver 1½ million acre-feet of water every year. Let us put this controversy to rest. We will see that this amount comes down the river, and the only way that they can do that with the present

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hydrology is to take away from Arizona and California and perhaps the upper basin that water, and we get them into an argument about the burden of the upper basin to service this Mexican Treaty. So, what we are saying is that in order to make the river whole, so that the lower basin States can have their allocated amounts of water, so that they can have their 7.5 million acre-feet, and we can do for Mexico what we said we would do, to deliver 1½ million acre-feet, that this 1½ million ought to be a national obligation. The U.S. Government got us into this mess, because they made this treaty with Mexico. In order to make the river whole, so that we do not have to hurt the lower basin users in order to fill the treaty, and, therefore, the U.S. Government will pick up this part of the tab.

Mr. ROGERS of Texas. My point is this, Mr. Udall: The river produces only 15 million acre-feet of water. Then, it is your position that the upper basin is entitled to 7½ million acre-feet, and the lower basin is entitled to 7½ million acre-feet, and the Government then is under obligation to get 1½ million acre-feet to Mexico from some other source, that would be only fair, and if there had been bad guessing which, obviously, there has been, that it is a national obligation and that it should only go to the ratio that is the difference between what the river actually produces and that which you thought you had when you made the guess?

Mr. UDALL. I see the chairman's point. There may be some validity to it. But the hydraulic studies of the Bureau of Reclamation and of the independent people of both basins tell us that the bad guess is about in that amount, that we need these 2½ million acre-feet in order to make the river whole. I guess I have not made my additional point clear, but the Mexican water would, probably, have to come ahead of Arizona and California if we had a very dry year—you would have to hurt the users in Arizona and California and Nevada in order to supply this water to Mexico.

Mr. ROGERS of Texas. Of course, if Mexico had priority, it is obvious under the present statute law, I think, that they would have that priority, but it makes no difference, because you would require the Government, as a national obligation then, to transfer that, to produce the additional water, to replace what was lost?

Mr. UDALL. Let me make one additional point so that it is clearly understood. You do not have a covered pipe that takes this water to Mexico. In order to be able to deliver 1½ million acre-feet to Mexico, you do not need just 1.5 million acre-feet at Lee's Ferry, but you need more, because you lose water en route by evaporation. You lose water by having dams so that you can store the water and be able to deliver this amount. It is not quite that simple.

Mr. HALEY. Will you yield at that point?

Mr. SAYLOR. Yes.

Mr. HALEY. You spoke about the prior claims that had been protected under this bill to the users who have a prior right. What does that amount to in acre-feet?

Mr. UDALL. Is the gentleman referring to the Mexican use?

Mr. HALEY. You are going to name a dam here for the Indians. They have water rights. And other people may have prior water rights. How much does that amount to?

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Mr. UDALL. I will let my friend John Rhodes comment on this, if I may.

Mr. RHODES. The present perfect rights have not been adjudicated. This is part of the unfinished business in the case of *Arizona* v. *California*. The estimates in Arizona are that perfected rights may run as high as 1.2 million acre-feet. I would rather that the gentleman would ask somebody from California what their estimate is.

Mr. UDALL. Mr. Ely testified on this last August. It is in the record. He gave an estimate for the Californians.

Mr. HALEY. That is in addition to the rights of the various other people? That does not come from the Arizona allotment?

Mr. RHODES. Yes; it does. These rights are included in the figures which we have already given as to the likely consumption from the river.

Mr. HALEY. The gentleman from Arizona, Mr. Udall, said that we had to take care of the Indian rights to the water; is that correct?

Mr. UDALL. No; the Hualapai Indians, which the gentleman knows because he has been there and through this area—he knows that the reservation runs into the Colorado River which is the lower part of the Grand Canyon area, and there is really no place that you could put agriculture water to use down in the bottom of these canyons. What we have agreed to, with the Hualapai Indians, is the taking of their land for the damsites, for town sites, for roads, for the transmission lines that will be necessary. The problem is giving them the complete recreation rights, so that they can develop the recreation potential of the lake—giving them a block of power to be used on the reservation, to be sold at a preferential rate so that they can bring industry in, and things of this kind, but there will be no irrigation uses planned on the Hualapai Reservation.

Mr. HALEY. And they are not providing them with any water at all?

Mr. UDALL. They cannot use it, Mr. Chairman. Of course, the domestic water supplies they will have. This will not create any problem. They are not asking for irrigation water.

Mr. HALEY. Thank you.

Mr. SAYLOR. Now, Mr. Udall, when the seven basin States met in 1922, and divided the water of the Colorado River, they placed a ceiling on the amount of water, because they anticipated the maximum average yield. If the bill that you have introduced is put into law, it changes entirely the concept of the Colorado River compact, and, instead of a ceiling, you have placed the 15 million acre-feet as the floor, and anything that is brought in from outside is added to that; is that not correct?

Mr. UDALL. Yes; the basic thrust is to make the river whole, so that we have the water we thought we had in 1922, and then to bring in some more.

Mr. ROGERS of Texas. Will you yield?

Mr. UDALL. It does not change the compact. You cannot change the compact through an act of Congress, except in exceptional circumstances. This is a legal question. We do not intend to go into that.

Mr. SAYLOR. In effect, you are saying you cannot change the compact, but, in effect, what this bill does is to change the Colorado River compact.

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Mr. UDALL. No, sir. The Colorado River compact also provides for the use of surplus water. It divides 7½ and 7½ and says that the surplus shall be divided so and so.

Mr. SAYLOR. That is right, but the compact has been in effect since 1922. It never has had any surplus water.

Mr. UDALL. Sure. We frequently have surplus water, because the Upper Basin were not using its full entitlement, and Arizona is not using its full entitlement.

Mr. SAYLOR. All right. You take the words "surplus water" to mean "unused water"? That is not surplus water. In other words, the mere fact that the water flows down the stream past Lee's Ferry, more than 75 million acre-feet every 10 years, does not make it surplus water.

Mr. UDALL. If the gentleman is talking of surplus being more than the 7½ million acre-feet lower and upper, and 1½ million acre-feet for Mexico, there have been very few years that we have had surplus water, if any, and I would have to ask my engineers about that. I assume that there have been 1 or 2 years. The engineer tells me that we have had a few years where there was water developed in excess of those quantities.

Mr. SAYLOR. Now, over the period of time since 1922, where did that water go?

Mr. UDALL. Well, some of it was stored, some of it went to California for uses above their allotment under the compact, some of it went into Mexico, I suppose.

Mr. SAYLOR. I notice here a very, very interesting thing, that while you change the treaty in the sense of making it a national obligation, you say absolutely nothing about the quality of the water that is to go to Mexico. Do you know the people of Mexico have had innumerable conferences with the people in this country, particularly since the Bureau of Reclamation has put into effect the Wellton-Mohawk project where you take good, sweet water out of the river and replace it with salt water. Is there anything in this bill that would take care of the quality of the water that goes to Mexico?

Mr. UDALL. Not specifically, Mr. Chairman, but this matter has been substantially resolved. This last year a crash program was undertaken through a special appropriation, and a bypass channel was constructed and is now in operation which takes this salty water from Wellton-Mohawk at the times of the year when it is salty and bypasses Morales Dam, so that this goes directly to the Gulf of California. I think we have satisfied Mexico in this, but I would question the gentleman's statement that the Colorado River water is always clear, as crystal, beautiful water. This area that it drains contributes perhaps as much salt and other impurities to the river as in almost any place else, and by the time it gets down to Arizona it has been so concentrated that there is a substantially higher salt content than in river in other areas.

Mr. SAYLOR. Do not put words in my mouth. I dislike that very much. I did not say anything about pure, blue water.

Mr. UDALL. I misunderstood.

Mr. SAYLOR. That is what you said.

Mr. UDALL. I thought the gentleman used the term "sweet," "sweet water."

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Mr. SAYLOR. There is a great deal of difference between "sweet" and blue" and "pure."

I yield to my colleague from California.

Mr. HOSMER. It is a little bit late. If this act or this project should e enacted so that 8½ million acre-feet of sweet, pure, blue, fresh water rrives in the Colorado River system, would any words have to be dded to the existing compact between the States or any existing words hanged in order to handle that situation?

Mr. UDALL. The answer is "No."

Mr. HOSMER. In other words, it does not change the compact or equire a change in the compact in any way, shape, or form?

Mr. UDALL. Not at all; the compact would still stand, and they would make the basic allocations as before.

Mr. HOSMER. I thank the gentleman from Pennsylvania for his ielding. I feel that he has been magnanimous.

Mr. SAYLOR. All I should say is that if I am to have all of these adectives apply, I hope that you will restrain yourselves.

Mr. HOSMER. The gentleman is deserving.

Mr. SAYLOR. I might make that caustic enough to say that you started this. I can remember bananas and Pike's Peak.

Mr. Udall, on page 33 of the bill, in section 302, it states:

The mainstream reservoir division shall consist of the Bridge Canyon and Marble Canyon units.

And then you describe Bridge Canyon and Marble Canyon units.

In view of the fact that the Secretary of the Interior and the President of the United States in support of this project have said that they did not want Bridge Canyon built, have you cleared this with the administration?

Mr. UDALL. The administration's report stands as it was on this matter last August when we held the hearings. They advocated the construction of Marble Canyon, and they asked that the Bridge Canyon be deferred. The gentleman from Pennsylvania has made many speeches while I have been a member of the committee that the Congress should make these decisions and not the administration. I am following his lead in this particular case.

Mr. SAYLOR. I am delighted, because heretofore I have been successful in stopping some of them and have said that the Congress should do it. I am delighted to know that we have the situation and that this combined front of Arizona disagrees with the President and with the administration, and that they think that they ought to build these two dams.

Mr. UDALL. Yes; I certainly do.

Mr. RHODES. That is unanimous.

Mr. SAYLOR. It is unanimous?

Mr. RHODES. Yes; bipartisan also.

Mr. SENNER. This is the second time the President has made a mistake.

Mr. SAYLOR. The second time he has made a mistake?

When was the first time?

Mr. SENNER. On the first original bill.

Mr. SAYLOR. All right.

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Now, then, to a big extent what you have done in your bill, Mr. Udall, is to provide for all of the projects in the Colorado River Basin that need to be taken care of. Is this not correct?

Mr. UDALL. The immediate needs; yes, sir.

Mr. SAYLOR. The immediate needs?

Mr. UDALL. Yes.

Mr. SAYLOR. The reason I ask the question is that it seems to omit the little old State of Utah. I do not know what you have against Utah, but it seems to me you bypassed it completely. Now, Utah was bypassed when we passed in the 84th Congress the upper Colorado River project. It did not get their central Utah project. They said they were only supposed to study the initial phase of it, and now we come to your project and your bill, and you take care of Wyoming, Colorado—all of these States up there, but you have not said a word about poor old Utah. What is going to happen to my Mormon friends out there?

Mr. UDALL. Well——

Mr. SAYLOR. Are you going to take care of them?

Mr. UDALL. I yield to no man here in the defense of the Mormon people of Utah. I would respond by saying this: First, we have negotiated carefully with representatives of Utah. You will hear from Mr. Bingham shortly in the course of these hearings about Utah's position. We have a couple of rather vocal spokesmen for that State on this committee, but when the Secretary produced the Southwest water plan and said "Let us get busy and handle the needs of this region," he had both the southern Nevada project and the Dixie project in Utah in it, and because of the very urgent needs in those States this committee saw fit and the Congress saw fit to authorize those units, independently. That was last year. This bill provides—and I can find the language if the gentleman wants it—that the Dixie project is integrated into this development fund.

Also I am told that the central Utah project had been going ahead, that they are making certain decisions; that is, that Utah is making certain decisions that they have to make as to the best allocation of their use of the water. We are not overlooking Utah at all.

Mr. SAYLOR. I think you have, because you should have put in another dam. In other words, if you are really going to take care of Utah, you have to put in Echo Dam. Let us not be "chintzy" about this. If we are going to authorize billions of dollars and import water from other areas, let us take care of Utah. Let us see to it that we put Echo Park Dam in this, and take care of the rest of them.

Mr. UDALL. Will the gentleman offer an amendment to that effect? If so, I will second this motion.

Mr. SAYLOR. My position is that we should not have either of these dams in here, but if we are going to have them let us have them all, so the people will have all of these pieces in the jigsaw puzzle, at least, a few more of them can be put together to find out what the total cost is going to be of this.

Also, I like a phrase in here, where you say that things would be done in a businesslike manner. I do not expect the millennium to happen in the Interior Department do you—you do not expect that?

Mr. UDALL. I do not expect the millennium, but I expect the Interior Department and the Bureau of Reclamation to operate on a business-

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like basis. I think this is one of the finest agencies in the country. I think that they have done very well to build the West.

Mr. SAYLOR. If they put out a financial statement, I wish some of you fellows would take a good look at it. You will find that it is not as rosy as you fellows think.

Mr. BURTON of Utah. Will you yield at that point?

Mr. SAYLOR. I will be happy to yield.

Mr. BURTON of Utah. I want to say to the gentleman from Pennsylvania—and I say it very sincerely—I appreciate your concern for the State of Utah and your interest in this matter, but I would not want anybody here to draw the inference that I am not fully capable of looking out for the State of Utah.

Thank you for yielding.

Mr. SAYLOR. The State of Utah is well represented by my colleague from Utah who has just spoke, who had done an excellent job, as he did when he presented the Dixie project last year. To show you an example of this businesslike basis that has been referred to, we had in the Dixie project very favorable report from the Department downtown, and with a good cost-benefit ratio, and I was one of the first that came out and said that I would support the project. I was not only for it in the committee, the subcommittee, but said I would support it on the floor, but it seems that the Bureau downtown did such a lousy job on all of their plans and specifications that they had to change the whole basic concept, and now comes the gentleman from Utah and asks whether or not he cannot arrange it to have a few more hearings, so that we can bring out a bill. This is that kind of businesslike basis.

In your statement, Mr. Udall, at the bottom of the page 6, you have a conclusion where you state:

> The states of the Basin have agreed that a more practicable limitation would be obtained by setting out the size of the aqueduct system between Parker Dam and Granite Reef. Accordingly, we propose to delete the limitation tied to annual diversion as set forth in Committee Print No. 19.

What do you expect to accomplish by this deletion?

Mr. UDALL. We expect to enable Arizona to use its share of the Colorado River water. We will have a certain junior position with regard to California under the provisions of this legislation. We expect the riverflows to vary considerably from time to time. We want to be in a position to get our average annual 1,200,000 acre-feet out of that river, and to do it, you may need a little bit larger capacity.

Mr. SAYLOR. You say you would have a little junior right to California? I have head very carefully, the decision of the Supreme Court, in the case of *Arizona* v. *California*, and I have not seen where they referred in any way to the rights of Arizona as being a junior right. What is this new concept of your being junior to the whole State of California?

Mr. UDALL. We agreed with California in the drafting of this legislation, in order to make a compromise, that up to 4.4 there would be a priority for California in times of shortages. You see, California would take the first burden, as Mr. Ely explained last fall. They would have to cut back once the central Arizona project is inaugurated. They would have to cut from 5.1 to 5.2 that they are using now to 4.4, but then Arizona would give them a priority in times of shortages to

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see that this 4.4 came ahead of the new uses in Arizona, and in order to protect ourselves we have to have a little larger aqueduct so that we can get big flows of water when they are available.

Mr. SAYLOR. Oh, then this concession by Arizona explains the unanimity and the magnanimous gratitude of the combined delegation of California in introducing all of this legislation in support of this project. Heretofore we have had sort of a little fight down there between the two States.

Mr. UDALL. In large part, yes, sir. There were many concessions on both sides, but this was the major concession that I was going to name.

Mr. SAYLOR. I see. So that after the State of Arizona has gone to the Supreme Court and the Supreme Court has said, "You have a right to water in the river." In the sense of this bill, it says: "Folks, you won the fight in the Supreme Court, but you will lose it later."

Mr. UDALL. Our position was that we had some very lovely, very handsome looking paper rights. They had the Supreme Court seal on them. They were nice to look at. But the strange thing is they did not produce any water around Phoenix and Cooley and Florence. In order to get the water, we needed an act of Congress, and in order to get that we needed the support of the States in the basin, and in order to get that we had to look at the needs of all of the seven States and to work out a plan that was fair, and that is what we have done.

Mr. SAYLOR. Of course, you want to give the Supreme Court credit. You also had the red ribbon and the gold seal.

Mr. UDALL. We did, indeed.

Mr. SAYLOR. I am sure that you wanted to say that.

Mr. UDALL. It was very comforting to have all of those things, but we were just as dry after we got them as we were before.

Mr. SAYLOR. If that is the case, you could probably have made that sort of a deal 12 or 14 years ago and would not have found it necessary to go to the Supreme Court.

Mr. UDALL. It was not offered to us. I think, perhaps, we were all a little shortsighted on both sides of the river in fighting for 12 years, instead of being engaged in building during that period of time.

Mr. SAYLOR. The explanation you have on the bottom of page 7 by Commissioner Dominy is also in furtherance of the increased size of the aqueduct; is that correct?

Mr. UDALL. That is correct, Mr. Saylor.

Mr. SAYLOR. Is there any limitation on the size of this aqueduct?

Mr. UDALL. Well, the size of the aqueduct is limited to 2,500 feet, but it, as I pointed out, and as we point out on page 8 of the statement, it shall be built at 2,500 feet, unless the definite plan reported by the Bureau shows that additional capacity will provide an improved cost-benefit ratio, and secondly will enhance the ability of the central Arizona unit to divert water from the main stream to which Arizona is entitled, and then the aqueduct may be constructed at a capacity larger, but the only ceiling on it is, Mr. Saylor, that Arizona will have to pay for it, and this is a rather expensive matter, and we are going to be pretty careful about what we pay for.

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Mr. SAYLOR. If the aqueduct is going to be paid for in the usual manner in which all Bureau projects are paid for, there will not be anything new and startling about it, will there?

Mr. UDALL. No, on the contrary, I think that Arizona will pay for this in any one of several ways which will be genuine, honest, substantial payments, including perhaps increased water charges to our municipal and industrial users.

Mr. SAYLOR. On page 10 of your statement, I am delighted to see the conclusion you have. You say:

We place reliance in the studies and conclusions of the Bureau of Reclamation that the provisions of Title VI do not adversely affect the Lower Basin.

Do you think they will not restrict the lower basin?

Mr. UDALL. Of course, they will, but this was again another compromise and, perhaps, the choice of the language here was not entirely precise. As I pointed out in response to the gentleman from Colorado we had to make some concessions. We cannot just run all over Lake Powell in the upper basin and demand that they release the water just when we want it. We had to work a modus operandi, so that both the upper and lower basins could live with it, and I think that we did. It certainly places some restriction on the lower basin and upon the Secretary.

Mr. SAYLOR. Will the Hoover Dam continue to be able to produce power and pay out?

Mr. UDALL. No doubt, in my mind.

Mr. SAYLOR. And Glen Canyon will be able to produce power and pay out?

Mr. UDALL. There is no doubt in my mind that Glen Canyon will pay out.

Mr. SAYLOR. I am very much interested in a statement on page 11 where you make a remarkable change. You say that you want to change the name of the Bridge Canyon Dam to Hualapai Dam; is that correct?

Mr. UDALL. Yes. We thought that this was only fitting, that this Indian tribe, whose history and activities are so closely connected with the Grand Canyon and this beautiful area, should have this dam named in their honor. We did not think that Bridge Canyon Dam as a name was particularly distinctive or inspiring.

Mr. SAYLOR. You must have a very close working agreement with the people downtown, because they were up here the other day, the Bureau of Reclamation, and they are going to change Old Burns Creek in Idaho, they are going to change the name to Lynn Crandall Dam. But changing the name of the dam will not change the effects of it.

Mr. UDALL. Let me make very clear that we have negotiated with the Hualapai Indians. This was not a bright idea of some Arizona Congressman or a lawyer. This was insisted upon by the Indians from the very first. They have advocated this for 4 or 5 years.

Mr. SAYLOR. But as late as February 9, 1965, you did not give it any credence.

Mr. UDALL. Well, we were still negotiating with the Hualapais at that time. They were making what we felt were rather strong

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demands. We did not know we could do all of the things that they wanted to do. And we finally were able to negotiate a settlement with them.

Mr. SAYLOR. Now, on page 13 of your statement you say:

The country continues to be flooded with misstatements and distortions regarding the various aspects of Bridge and Marble Canyon Dams and power plants which are to be authorized by this legislation.

What are these distortions?

Mr. UDALL. A good summary of them—a compilation of them is collected in an article published by Reader's Digest of April in which even the title is misleading: "Ruin the Grand Canyon?" It is our position that this will not ruin the Grand Canyon.

They talked about two dams within Grand Canyon. Neither one of these dams is within the canyon.

In this article they talked about the loophole in the law which permits Bridge Canyon Dam to be constructed. We in Arizona thought that this was a sacred act of Congress that would preserve for all time the rights of the Western States to build the dam in Bridge Canyon.

We get letters from little schoolchildren saying, "Why in the world, Congressman Udall, are you going to fill up the Grand Canyon with water?" We are not going to do that. And so it goes.

Mr. SAYLOR. You do not deny the fact that the site of Bridge Canyon is within the Grand Canyon itself?

Mr. UDALL. I will not argue semantics with my friend from Pennsylvania. If you talk in terms of geology and natural features, many people call the Grand Canyon that area from Lees Ferry all the way down to the upper reaches of Lake Mead. Of course, if you talk about Grand Canyon as being that part in the National Park Service administration, the monument and the park itself, neither of these dams is within the Grand Canyon.

Mr. SAYLOR. In other words, you and I know that it is not within the confines; that is, neither of these is within the immediate boundaries of the national park or the monument?

Mr. UDALL. Of course.

Mr. SAYLOR. This, you say, is a distortion?

Mr. UDALL. Well——

Mr. ASPINALL. If you will yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. We sit on this committee as a quasi-judicial body. Although we are legislative, too. It seems to be current thinking among the people of the United States that all you have to do in a legislative operation is to write letters and to send telegrams to influence the people who have a great deal of responsibility sitting here. It makes no difference whether they are pro or con. This operation should be treated somewhat with the same respect that you treat a judicial body and that we should not have to be burdened with all of these letters and telegrams saying "I oppose this," or "I support this," without giving any reason.

Just this morning I received from western Colorado this statement that came out over the wires marked "Flash—Urgent—Action":

The Readers Digest reports that they have received a torrent of mail on the Bradley article and that it is running overwhelmingly against the article and in

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'avor of the dams. This could be the result of an organized campaign by dam ›roponents. Nevertheless, the Digest is reluctant to take a strong conservation ›osition on future issues unless it gets some mail opposing the dams and favoring he article. Write today to: The Editors, Readers Digest, Pleasantville, New ſork.

What a silly way to resolve a very important problem, so far as the welfare of an area of the United States is concerned. I can advise the proponents, as well as the opponents, that this, in my opinion, will not influence one whit the decision of this committee.

Mr. SAYLOR. Mr. Chairman, I want to say to the chairman of the full committee, that I am not one of those who would say that we cannot handle this as a judicial matter, but it is not handled as such but as a legislative matter, and as such we are becoming subject to a great deal of pressure from people who think that mail and telegrams are the way to influence our decisions.

I have just one further question, Mr. Udall. It has to do with title VIII, section 801:

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

Do you have any idea of the cost of this bill?

Mr. UDALL. The cost of the bill as drafted in Committee Print No. 19 which had the addition of the Colorado, New Mexico projects, which will be about $1,683 million.

Mr. SAYLOR. This does not include the cost of the transportation of the water from the Mississippi or the Columbia River—the Missouri River, or anywhere else?

Mr. UDALL. No; the cost of the importation of the water will be borne by the development fund from revenues that will be produced by the construction of these two dams, and I hope that my friend will join me in authorizing this construction so that we will not burden the taxpayers with that.

Mr. SAYLOR. And if these dams are not authorized, then where will the water come from?

Mr. UDALL. Well, this is a problem that the Western States and the Congress are going to be faced with.

Mr. SAYLOR. It would come from the U.S. Treasury, would it not?

Mr. UDALL. Not necessarily. It might or might not come from the Treasury. There is very little precedent for authorizing several billion dollars for the importation of water from one area to another. We think we are pioneering a problem here that the rest of the country is soon going to have. We are going to have water shortages all over the country, and the only way we will solve them is on big imaginative things and on a regional basis, and we think that we are pioneering in this field in the most water short area in the country.

Mr. SAYLOR. There is no doubt about that, that you are doing that, but, frankly, we have a water shortage in Texas, we have a water shortage in many of the other areas of the country.

Mr. UDALL. Certainly.

Mr. SAYLOR. And, frankly, there is nothing in here to take care of them. We are just looking out for you.

Mr. UDALL. I think a regional basis is the best way to handle these things. The Colorado River Basin is a very natural and very important section of the country, and the seven States are going forward

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together. I am prepared to support other States and regions if they will come in with large water plans of this kind, because we have a national water situation, and we will have to solve it with some big regionwide program.

Mr. SAYLOR. I thank my colleague for the colloquy we have had.

Mr. ROGERS of Texas. Mr. Johnson.

Mr. JOHNSON of California. Thank you, Mr. Chairman. I have no questions, but I want to commend the Arizona delegation for bringing in a very fine joint statement. I know they have worked very hard on it. As I understand it, they have worked very closely with the people representing the California interests, and so far as I know, California agreed to do something as a part of your program, and you have taken into your consideration our water problems in the southern part of our State, and you are also looking to the other areas of the State for some of the solutions of the import problem.

So far as I know the agreement is still intact. You have brought in this new version here, which includes matters that have been agreed to; and, so far as I am concerned and you and your delegation are concerned, I will go along with that. I hope that this hearing will result in the enactment of this piece of legislation.

Mr. UDALL. On behalf of all three of us, I thank my good friend for that statement.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. Mr. Chairman, I have no questions.

I would like to ask unanimous consent that the staff prepare for our use for tomorrow a list of the changes between the committee print and the original bill.

Mr. ROGERS of Texas. The staff is to prepare such. It has been pointed out that perhaps Mr. Udall will point out the major differences.

Mr. HOSMER. I think that we should have an agreed list before us in a table so that there is no question about it.

Mr. UDALL. If the Chair——

Mr. ROGERS of Texas. Without objection, the request will be granted. Hearing no objection, it is so ordered. I was asking if Mr. Udall would point those out.

Mr. UDALL. I am told that Mr. Gookin and some of our staff people have made this available, and in order that it meet the committee requirements, they could submit this to the committee staff and they could make any corrections or changes as indicated and have it available tomorrow morning. We will be very happy to cooperate.

Mr. HOSMER. Just a list of these—not a comparison, but a list.

Mr. ROGERS of Texas. Do you have any further questions?

Mr. HOSMER. No.

Mr. ROGERS of Texas. Mr. White of Texas?

Mr. WHITE of Texas. No questions.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. I have no questions, Mr. Chairman, but I would like to call to Mr. Udall's attention his statement on page 15 where he says:

> I was supported in my defense of the integrity of this project by former Senator Barry Goldwater who, I believe, stated our position eloquently when he commented:
>
> "I know this river better than most people, and I love it as much as anyone here. This canyon is the greatest natural beauty we have in Arizona, and I

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defend it from harm with all of the strength I have. But I believe a dam at Bridge Canyon would enhance the canyon.

* * * * * * *

"I'd like to see this country without dams any place. But when I have to weigh the lives of millions of people against a remote part of the canyon I love, then I have to take the people.

* * * * * * *

"When you look down that river, I wish you would weigh carefully the value of that water, measuring the human needs against its value for beauty alone."

I am sure that Mr. Udall agrees with the statement. I hope that he remembers this when we take up the Indiana dunes problem.

Mr. ROGERS of Texas. Mr. Roncalio?

Mr. RONCALIO. I have no questions.

Mr. ROGERS of Texas. Mr. Burton of Utah?

Mr. BURTON of Utah. Thank you, Mr. Chairman.

It is the clear intention of your bill, Mr. Udall, that the Dixie project should be a full participant in sharing in the lower basin fund setup by title IV of the present bill, and section 308 of the preceding bill, title III, which says that the Secretary shall integrate the Dixie project and the State of Nevada water supply project heretofore authorized into the project herein authorized as units thereof under repayment arrangements and participation in the development fund established by title IV of this act, consistent with the provisions of this act.

Is that your understanding?

Mr. UDALL. We stand on section 308. We think it is a good section. We think that Dixie and Southern Nevada should participate. We want them to participate. That is the intention.

Mr. BURTON of Utah. Thank you. Utah's entitlement of the Colorado, in terms of actual consumptive use, is second only to my friend's State of Wyoming in its lack of its use of its entitlement, and if this bill is passed in effect, the central Arizona project will utilize some of our water until such time as we are able to construct our own facilities and to use our own. Is that correct?

Mr. UDALL. We covered this in prior hearings, and we concede that in order to make the best use of the river, there will be a time until this full development in the upper basin is finished, when we may be using unused portions of your allotment. At such time as the upper basin is ready to use it, we will cheerfully give it back.

Mr. BURTON of Utah. And in order to accommodate the upper basin States who are not going to be shortchanged in this transaction but will have to wait until they can get their projects coming down the pike, you gentlemen from Arizona have put a point in as to the importation studies in title II, 8(a), and, again, there are important references in section 304 for importation studies, and I would only assume that if this subcommittee in its wisdom should report the bill out, then, in a sense, we would kind of lose control of the situation. In other words, it goes to another committee where, for instance in the Northwest, we may well have some reservations, and it may go to another body, but I would hope that the lower basin will stand shoulder to shoulder with us to see that these sections remain in the bill.

Mr. UDALL. We believe these sections are important. They have been negotiated and agreed upon at great length, after ultimate con-

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sideration of all of these problems, and we stand on them. We stand on the agreed bill, and we will do everything that we can to see that this bill is enacted, or if there are any changes made that they are agreeable to all of the States.

Mr. BURTON of Utah. I would also like to offer an opinion and see if my colleague from Arizona agrees with me. I will ask if you agree with me on this: If the bill in its present form is passed and there are no substantive changes, it would be my opinion that the Congress has more or less taken on the responsibility. If these feasibility studies do prove it is possible and economic, that there is more or less a commitment to undertake these importations and projects. Is that correct?

Mr. UDALL. I hope that the importations come about. I do not want to unduly alarm my Northwest friends, and I have represented to them on many occasions that Congress will have another shot at it. All this bill provides is for studies. You cannot go beyond the studies to actual importation work until Congress has reviewed and studied again the program, but in the other sense that the gentleman talked about, if the studies are feasible—if they can be paid for—if there is surplus waters in other areas that is available for export, then I hope that we would have an agreement to proceed.

Mr. BURTON of Utah. I would substantially agree with that. I think that we are all aware—and we are all reasonably intelligent—that we are going into this with our eyes wide open, and this bill does recognize that, and it does recognize that it may be feasible to import water and that there should be more feasibility studies for that purpose. That being the case, at least the gentleman from Utah interprets it that way that if passed in its present form, there is more or less an obligation in the matter of this feasibility study.

Mr. UDALL. I think that we can distinguish between what may be a moral obligation and an obligation from the standpoint of making the wisest use of the research of this country. As to any kind of legal obligation, the bill contemplates only studies.

Mr. RHODES. Will you yield to me?

Mr. UDALL. Yes.

Mr. RHODES. If I might further answer the question of the gentleman from Utah, which is a very good one, the shortage of water is a national problem. It does not belong just to this particular basin. I think that the gentleman is correct in his assumption, that this is a problem which the Congress will have to face up to and is obligated to face up to, because the Congress, by the Constitution, is given the responsibility of providing for the people of the United States those things they cannot provide for themselves. From my standpoint, as a member of the Appropriations Committee and of the Subcommitttee on Public Works, I see all throughout the country these water shortages. They occur in the East. I am sorry that the gentleman from Florida left, because I wanted to remind him of the very bad water shortage in the Everglades right now.

These water shortages are not confined just to the traditional arid areas of the Southwest. So the gentleman from Utah is absolutely correct. The Congress of the United States must perforce assume the responsibility throughout the country in doing what is necessary to take water in areas where it might be surplus, after determining there is indeed a surplus, and transporting the water to areas of a shortage.

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Mr. BURTON of Utah. This is a national problem, and it has to be treated by the Congress on that basis.

Mr. SAYLOR. Will you yield?

Mr. BURTON of Utah. I will.

Mr. SAYLOR. I want to say to my colleague from Arizona that the shortage of water in the Everglades is a mistake which the Army Engineers made in planning there in the Everglades, and the commitments they made to the Congress, and which they did not comply with, and if they would have taken care of their original shortage, there would not be any shortage in the Everglades.

Mr. RHODES. The gentleman from Pennsylvania is wise as he always is. However, the fact remains that there is a shortage of water in the State of Florida, which has never been known before, and the Army Engineers are now doing the very best they can to alleviate that shortage. How it occurred, I do not know, but I do know that it exists.

Mr. BURTON of Utah. I just want to compliment our three colleagues on an excellent presentation. I can assure them that Utah, speaking for a small piece of Utah, appreciates the help you have given us before, and we want to be the most helpful to you in this case. It is a decision we are faced with. If we can stand together on the language that is here in your bill, we can achieve some positive results.

Mr. UDALL. I think that history is going to remember very kindly the great water people from all of these States, most of whom are here today, who participated in these negotiations. It has been give-and-take. It is an honest compromise. It has been a real foreseeing visionary approach to this, and I think that history will show that the people of this area will have a great gratitude to you and to Jay Bingham and Ival Goslin and to the other people from your State who participated in this.

Mr. BURTON of Utah. I have nothing further, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. Mr. Udall, first, I would like to compliment you upon your presentation. I am very happy that the Arizona delegation stands together on this matter, because I think that it simplifies identifying the issues and bringing the matter to a head.

I certainly recognize the problem that the Southwest has. I am sure you recognize the problem that the Northwest has in attempting to deal with this problem.

I have a few questions that I would like to put to you.

Under title II, section 201, in the first two subsections, 1 and 2, in effect, do these sections authorize the Secretary to make feasibility reports in these areas?

Mr. UDALL. I am not enough of a reclamation technician to say. I think that the feasibility report is probably a term of art in the business of hydrology. What we are instructing him to do in this basic study is to provide estimates of water that is available in the Colorado Basin and then to check this against the best expert projections of every need in the Colorado Basin up to the year of 2030, and then go out and study all of the potential areas and means of supplying water to meet any deficiency there might be. That is what we are talking about in 1 and 2.

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Mr. WYATT. Section 203 provides that the Secretary shall prepare an importation plan proposing allocations, and section 401 provides for that in section 201 and section 202.

Mr. UDALL. Yes.

Mr. WYATT. I am deeply disturbed about the word "an," "an importation plan." This is a mandatory requirement, and it would indicate to me that it would require the Secretary to prepare one plan that is going to be used. It is rather obvious from the testimony that has been given to us last fall and from other information we have that such a plan would be the plan involving the Columbia River. Are you married to the idea that there shall be just one plan submitted?

Mr. UDALL. Let me give my friend my version of this language. I think you have to read it in connection with the language at the top of page 29, the first few lines there. You see, the Secretary is to make this investigation, and he is to investigate all kinds of sources. One is the importation from any source that might be available, and I have said frankly earlier today that your area is one of those potential import sources.

He is also to investigate the desalting of water, weather modifications, and other means.

Then, in the section that you just referred to, he is to come up with a plan. He looks at all of these options, and he says that out of all of the options this is the plan that I recommend to meet the shortage.

Now, my intent in that language is that the plan could have imports, desalting, and weather modifications; it could have imports from one area, or two areas, or more areas, and they would all be encompassed in one plan which is feasible and which would meet the long-term needs.

Mr. WYATT. I do not understand "an importation"—"an importation plan" to be broad enough to include the other items here which you have mentioned at the top of page 29 to include the desalination, to include weather modifications, and other means.

Mr. UDALL. I see the point that is troubling my friend, and if an amendment will cure this, we, no doubt, can take it up at the proper time.

Mr. WYATT. That is something that we can consider. I know that you are looking in my direction primarily, and the requirement that it be a mandatory proposition, for the one plan to be submitted——

Mr. ASPINALL. If you will yield to me?

Mr. WYATT. Yes.

Mr. ASPINALL. It also includes the possible importation from northern California. The whole thing depends on the question of surpluses and the needs of the particular sources.

Mr. UDALL. I can understand my friends' fears, but I want to make it very clear that these, first, would be studies. The experience of the Congress has been that the Secretary submitted the specific Southwest water plan in the final bill that we get to base it on the studies is far different from the original plan. This committee and the other committees of the Congress will have a complete opportunity 5 years from now of plowing it over and changing or altering any plan that he comes up with.

Mr. BURTON of Utah. Will you yield?

Mr. WYATT. Yes.

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Mr. BURTON of Utah. I would like to address one question to the member of the Appropriations Committee, Mr. Rhodes. Would this be a pretty extravagent bill in terms of cost, how does it compare with the cost of putting a man on the moon?

Mr. RHODES. Of course, my colleague from Utah knows full well that the price tag of putting one man on the moon is somewhere in the neighborhood of $40 billion. I am glad that you brought this point up, because I think that it is also important for people to know about this, when they worry about any possible impact that this bill might make on the economy of the country. This project, if authorized, will be built over a period of 10, 11, or 12 years, perhaps. We appropriate by the year. The highest level of annual appropriation probably would be somewhere in the neighborhood of $150 to $160 million. I do not intend to say that is not a lot of money. It is. But comparing it to a budget of $115 to $120 billion, it really is not very much in the way of an impact on the economy. And, certainly, as my friend from Utah suggests, it is not anywhere near the impact of putting a man on the moon.

Mr. ASPINALL. If you will yield there.

Mr. WYATT. Yes.

Mr. ASPINALL. The overall cost of this legislation of $1.6 billion includes five projects, and they are expensive projects, costing someplace between $300 million and $400 million that are a part of the upper Colorado program and they should be related to the lower Colorado River operation and not tied in, especially, as a part of this, in order to make this figure seem out of way. Not only that, from the standpoint of those who watch pennies on this matter, it is a 12-year program and some of the Colorado River projects, in my opinion, will take a bit longer than that, so far as that is concerned, so that I would say that a better figure would be from 14 to 16 years, rather than 12 to 15.

Mr. RHODES. My colleague from Colorado is probably correct. I was trying to get as conservative a figure as I could on the high side of the probable impact that this might have on each year's appropriation. The point I was trying to make is that in the most expensive year it probably would not exceed $175 million.

Mr. ASPINALL. I would say $150 million, keeping in mind what we have done in the last 15 years.

Mr. RHODES. My colleague from Colorado is not quite as conservative as I am in this particular instance.

Mr. WYATT. Just a couple of other questions, Mr. Udall, that I would like to put to you.

Do you have any estimate—or have you heard any estimate as to what the cost of these studies will be, including coming up with the importation plan?

Mr. UDALL. No, I have not any precise estimates. My impression is that these are going to be thorough studies. I think that they ought to be so that you people can study them as to your ultimate needs. I think that this is going to be a very complicated and complex proposition. I would not expect that this would run more than $3 million or $4 million for the most comprehensive study.

Mr. WYATT. You are aware, I am sure, that from the previous testimony last fall the State of Oregon has a study underway which has

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been authorized for $1 million which will not be ready for report until 1970. It is my understanding that the State of Washington has a similar program underway, and I think that Idaho, too, has one.

Are you advocating that the Federal study proceed concurrently with these studies?

We have much logic in wanting to wait until we are satisfied as to our projection and our needs and the inventories of resources, before any studies are commenced.

Mr. UDALL. My feeling on this point is that there is no reason to sit back and wait, when the needs all over the country are so desperate, until the States make a 5-year study, and then at that point begin a 5-year Federal study, rehashing all of the things you have done. It seems to me that the studies should go forward concurrently. It may will be that the Bureau of Reclamation people or whoever makes the Federal study could use the same experts, the same data, and you would not have a duplication. All of this I say with a qualification, that no decision should be made—the Secretary should not come up with any kind of a plan until your State and the other Columbia Basin States have had a full and complete opportunity to finish their studies, to take a look at it, to discuss them, to make recommendations to the Federal agency making the study.

Mr. WYATT. Until the Secretary has the opportunity to consider whatever our plans indicate?

Mr. UDALL. Precisely. Section 203(b) of our bill provides that on or before December 1970, which is 4½ years from now, the Secretary is to submit a report and findings on the affected States. So, you will have until that time to do all of the things that we have been discussing today, and a year after that to comment.

Mr. WYATT. The thing that bothers me on that point is that our report will not be done until then, and it is difficult for me to see on the surface how the conclusions we draw relative to our water inventory and as to our needs in the next several years can be adequately considered by the Secretary in making his report, because our report will not be available to him until that time.

Mr. UDALL. I will not quibble in terms of time. If another 6 months is indicated or if some better way to coordinate your study with the Federal study comes forward, I will not quibble with that.

Mr. WYATT. I have three more questions. I will attempt to be brief.

Recognizing the national water problem, that it is national in scope, are you familiar with the proposal of the administration to create the National Water Commission?

Mr. UDALL. Yes.

Mr. WYATT. What is your position on that relative to the provisions of title II in the new bill?

Mr. UDALL. I think that a National Water Commission is an important thing and probably should be created. I certainly have no objection to it. We do have all of these serious national water problems that we have been talking about, but it is my feeling that because we are the region with the greatest immediate problem, because we are ready to go on with this thing, that we should not be asked to hold up our development while you study Lake Erie and swamps in Florida and the Savannah River, and all of these other things all over the country.

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This particular study ought to be a regional study and it ought to go forward as soon as possible.

Mr. WYATT. The National Water Commission report would be made on or before December 31, 1970; is that your view?

Mr. UDALL. I do not see how the National Water Commission could give this immediate regional problem the attention that it needs and at the same time cover all of the water problems in the country and do the whole thing in 5 years.

Mr. WYATT. Unless I am mistaken I think there is a provision in the proposal to create the Commission—I think that is what it is. The thing that bothers me consistently is the feeling that the Mexican water obligation has become a national obligation by reason of the Mexican Treaty, because I think it is clear that the Mexicans are downstream consumers by certain international water rights which existed prior to the Mexican Treaty, and it has been my feeling that the Mexican Treaty just simply clarified the recognition of the rights they already had, and this being the case, I do not see how the treaty itself makes it a national obligation.

Mr. RHODES. May I respond to the question of the gentleman from Oregon?

The States of the Southwest have always felt, as my colleague from Arizona has indicated, that the Mexican Treaty was an act of statesmanship which was required by a wartime situation and did not necessarily reflect the water uses on the Colorado River. It is true that there were water uses in Mexico. The extent of the uses has never been measured. There certainly has never been any international forum employed to adjudicate previously perfected rights of the Mexican users. Therefore, my point is that because the Government of the United States felt that there was an overriding interest in concluding a treaty at that time for those purposes—and we do not disagree with the reason for which the treaty was concluded—but we do say that it does not reflect the proper water use figures. Therefore, since the river is short and since the treaty took water which would otherwise go to the upper and lower basins, at least, a very large portion should be considered as a national obligation. We feel that very likely the whole obligation should be considered as a national obligation.

Mr. HOSMER. Will you yield?

Mr. WYATT. Yes.

Mr. HOSMER. I think it is important to underline what Mr. Rhodes has just stated. The Mexicans at this time had some rights which were admitted but the extent and the scope of those rights were wholly undetermined. An arbitrary figure was arrived at (1) due to the necessities of the war, and (2) the Rio Grande situation, too, which resulted in a trade-off of some Colorado River water for some Rio Grande water belonging to the Mexicans. As a consequence, this is a totally artificially created obligation that bears no reasonable relationship to the water rights and the actual charges that should have been made upon the river. Consequently, the U.S. obligation pertaining to it should be recognized.

Mr. UDALL. Could I as quickly as possible state that the State Department and the Bureau of the Budget, which are most reluctant to approve things of this kind, say that it should be a national obliga-

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tion. We are not overriding the Bureau of the Budget or the Department on this, because on this they agree.

Mr. WYATT. One final question. What is your feeling on this: I have figures which have been bandied around, that it will cost as much as $15 to $20 billion, from the Columbia to the Southwest. What is your feeling as, say, aside from the Mexican Treaty obligation, to how the balance should be financed?

Mr. UDALL. This is why we need the study to determine the cost of the importation facilities. Some of the California-Arizona experts have been using a very rough, crude rule-of-thumb device which says that you need a billion dollars for 1 million acre-feet of water, so that we are talking in terms of the first 2½ million acre-feet costing $2,500 million. We had figures here this morning that showed the development fund would produce considerably more money than that, so that we could get the $2,500 million for the national obligation. You could then go with the money that is projected from the development fund, perhaps another 2,500,000 acre-feet, so that you would be talking in terms of a first-stage 5 or 6 million acre-feet importation, and qualifying all of this by saying that it is very tentative and we do not have it firmed up—I am just talking off the top of my head, with the limited information we now have.

Mr. WYATT. You have no feeling as to the financing of any balance whatever might be over and above the figures you mentioned?

Mr. UDALL. My figures are pretty close. We come up, just using the rough measures I have given, to something close to 6 billion; but 2 million of those acre-feet in that 8½ are for use from the Columbia, if that is the source, to drop it over into your State, to drop it off in Nevada, and presumably the users there would help out with this, so that we are pretty close. Just talking from the limited information that we have we can project an import project that could pay for itself.

Mr. WYATT. That is assuming the necessity of the $1 billion per 1 million acre-feet.

Mr. UDALL. Yes, this is a working rule of thumb.

Mr. WYATT. In view of the hour, I have no further questions.

Mr. ROGERS of Texas. Mr. Hansen, would you have some questions?

Mr. HANSEN of Idaho. Yes.

Mr. ROGERS of Texas. The time situation is such that we are already over the time, under the rules of the committee. I think, perhaps, it would be better at this time that we recess until 2 p.m. We will ask the witnesses to return for short questioning by Mr. Hansen and Mr. Reinecke, who will then be followed by Gov. John Love and those accompanying him.

The subcommittee will stand in recess until 2 o'clock.

(Whereupon, at 12 noon, a recess was taken until 2 p.m., this same day.)

AFTERNOON SESSION

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation will come to order for further consideration of pending business.

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I believe—Mr. Wyatt, were you through?
Mr. WYATT. Yes, I was, Mr. Chairman.
Mr. ROGERS of Texas. Mr. Hansen is next.

STATEMENT OF HON. MORRIS K. UDALL, A U.S. REPRESENTATIVE FROM THE SECOND DISTRICT OF THE STATE OF ARIZONA; ACCOMPANIED BY HON. GEORGE F. SENNER, JR., A U.S. REPRESENTATIVE FROM THE THIRD DISTRICT OF THE STATE OF ARIZONA; AND HON. JOHN RHODES, A U.S. REPRESENTATIVE FROM THE FIRST DISTRICT OF THE STATE OF ARIZONA—Resumed

Mr. ROGERS of Texas. You are recognized, Mr. Hansen.
Mr. HANSEN. Mr. Chairman, I have a series of questions I think are important at this stage. I would like to ask my colleagues—Mr. Udall, you had four points. Would you reiterate those four points, and what this legislation is supposed to accomplish? Briefly?
Mr. UDALL. The four points that were made in the new committee print as opposed to the bill we heard last summer?
Well, you can divide them up into any number of points, but the major ones that I would emphasize were, first the disagreement between the upper basin and lower basin as to how you operate Lake Powell in relation to Hoover Dam, which one do you draw down and under what circumstances, and when.
We worked out certain operating criteria to govern the Secretary, which both basins are satisfied with.
The second major change would be the inclusion of the Colorado projects, the upper basin projects. One of these is partly in New Mexico.
A third change——
Mr. HANSEN. What was that last statement?
Mr. UDALL. Partly in New Mexico. These are largely Colorado projects but the Animas-LaPlata project is both in New Mexico and Colorado.
Mr. HANSEN. You broadened the scope from the original legislation.
Mr. UDALL. Yes. There were five projects which are added, five upper basin projects added in this committee print.
Next, certain provisions were desired by the Hualpai Tribe, Hualpai Indians, which I summarized in testimony this morning.
Mr. SENNER. Page 11.
Mr. UDALL. On pages 11 and 12. I suppose those are the major points.
There are a number of other changes. The water importation language to protect—as the old bill was, we had one protection, area of origin protection, to pay areas from which water is exported, areas of origin. We added to this a guarantee of perpetual priority for these people as to any such water.
I would say those were the major changes.
Mr. HANSEN. Well, your statement this morning was that you had four main points and I just wanted you to reiterate those briefly. These are the four points you were referring to?
Mr. UDALL. Yes. They are the points that I would emphasize as being the heart of the new committee print.

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Mr. HANSEN. Now, how many dam units are you talking about? I am not swearing at you.

Mr. UDALL. We are talking about building two dams, Bridge Canyon Dam and Marble Canyon Dam. The bill that is before you, provides for a number of smaller dams in connection with these projects—Hooker in New Mexico, and so on.

Mr. HANSEN. Now, you say there will be two major dams. What amount of water is there available for these two dams, primarily, or for the whole series, if you may wish to include them? Do you have enough to operate these primary dams to the maximum capacity, or are you talking in terms of minimum operation on the water that you actually have allocated in the Colorado, without importation?

Mr. UDALL. Well, both of these major dams are largely for the purpose of producing power. They will both be substantially run-of-the-river plants.

Marble Canyon, which is right below Lake Powell, once it is full, will simply be operated as a power producer and you will get it full and it will go up and down, but not very much.

Now, there is no consumptive use connected with either of these dams except for evaporation. Marble is estimated to evaporate about 10,000 acre-feet a year. The Bridge Canyon Dam, once it is full, the bill provides that you must operate it within a regimen of 10 feet. This is part of the protection for the Grand Canyon area. You get a dam and it won't go violently up and down. It is to be held within 10 feet and the Bureau thinks they can hold it within 4 feet, so that once it is full, there will be no losses or uses connected with that dam, except evaporation.

The estimates are that this will be about 85,000 acre-feet a year.

Mr. HANSEN. You say there is no water consumption, as such, out of either one of these reservoirs?

Mr. UDALL. No.

Mr. HANSEN. This is primarily power?

Mr. UDALL. That is right.

Mr. HANSEN. In fact, I should say wholly power?

Mr. UDALL. Well, primarily power. There are certain other benefits in regulating the river, in recreation, and so on, that are specified. But the main function of these two reservoirs is to provide cash registers for the water development of this seven-State basin.

Mr. HANSEN. And are you also talking in terms of importation of water solely for the use of power?

Mr. UDALL. No, no. The importation of water is for use. We are desperately short of water. But the power provides the money by which you can pay for the imports as well as build the features that are authorized in this bill.

Mr. HANSEN. Do you have enough water to power both projects now without borrowing from the Upper Colorado.

Mr. UDALL. We went into this last August in great detail. We had extensive testimony as to hydrology, which I won't attempt to summarize now, but my answer to your question is, yes, there is enough water in the river to operate these dams in addition to the other uses.

Mr. HANSEN. But not at peak efficiency. It would be at minimal efficiency, isn't that correct?

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Mr. UDALL. No, no. We anticipate and I am extremely confident, that there is enough water in the river to operate Lake Powell and Glen Canyon and Hoover and these two new dams because the two new dams, as I pointed out, don't use any additional water except for the small amount of evaporation.

Mr. HANSEN. Then, if you have enough water in the river, where is the need for importation?

Mr. UDALL. Well, now, you have to get down into the Imperial Valley in Los Angeles and Phoenix and Tucson and in the great areas of the upper basin in New Mexico and Utah and Colorado. We are all short of water. There isn't enough water in the river to provide the farmers and the cities with the water that they need now and that they are going to need in the future.

Mr. RHODES. If you would yield to me at that point, the two dams which my colleague has described are upstream from Lake Mead, which is the probable termination point of any water importation. So the operation of the two dams couldn't possibly depend on the water importation.

Mr. HANSEN. Except that you may use water from upstream sources to fill these dams and use water from imported sources to fill up Lake Mead.

Mr. RHODES. Well, that is theoretically possible, but believe me, we don't go through this exercise for the production of power. We do it because we need water very badly and we need more water than there is in the Colorado River.

Mr. UDALL. We pointed out last fall that Arizona is using 2½ million acre-feet a year more than Mother Nature is supplying right now. We are in a desperate situation and it has to be augmented.

Mr. HANSEN. Now, then, if you were to build these two major projects, the Bridge and the Marble Canyon Dams, and it was to be found that there was no way that you could import water feasibly from anywhere, so to speak, what sort of encumbrance would you find that this might have on the projects themselves?

Mr. UDALL. If you never import a drop of water, these dams will fully repay the reimbursable cost to the U.S. Treasury. They will better regulate the river and they will give us a fund of some $3 billion with which to build desalting plants, undertake weather modification, line canals, do all the other things that we would have to do to make the best of a very bad situation.

Mr. HANSEN. Now, if you institute this project with the idea of borrowing from the upper Colorado area, and, at some future date they decide to institute projects of their own which would use their own water and remembering again you are at that time living on borrowed water, so to speak, would this not create, if there was no other source to be found, would this not create a hardship on your people at that particular time?

Mr. UDALL. The answer is "Yes."

Mr. RHODES. Of course, may I repeat also that my colleague mentioned the hydrology study which was included in the last hearings, and the hydrology studies indicate that the project as of the present time will have a full water supply at least until 1995, and after that time, if the situation occurs as my good friend from Idaho has described, the project will be short.

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But there will still be great quantities of water available for the project up to and after 2020, even without any water importation.

So, while importation is needed very badly, still, as my colleague from Arizona stated, this is a feasible project even without it.

Mr. HANSEN. My concern would that should you be living on borrowed water and you find all at once that this borrowed source was cut off and you had no other access, say, feasibility studies didn't prove out, or something else,would you not then be in a pretty awkward position, at least for certain elements of your people who would be depending upon this temporary source of water?

Mr. RHODES. May I say to my friend from Idaho that this was the concern of the upper basin States, too, which is one of the very good reasons why they very properly asked us to sit down with them, as we have done, and work out with them proper safeguards so that their ultimate rights to the water would be protected.

Mr. UDALL. We wish to make it very clear, as we have in the past hearings, that we stand on our word, stand on our agreements, stand on the language and if this dreadful day comes that you describe, we will honor our commitment to the upper basin.

Mr. HANSEN. Now, say that you do find import potential for example, in the Columbia Basin or somewhere else and at a later date, when the Upper Colorado sources are cut off you go to this other source for your water. However, at that particular time or perhaps at a later date, again, you find that maybe the water you sought is being used and that it is impossible to get transported to you an amount equal to or above that which was originally borrowed from the upper basin. Are we creating in this a foot in the door situation without adequate study first? Do we have the cart before the horse, so to speak, by not checking into the possibilities of importation before maybe we set up a project that is based on this consideration?

Mr. UDALL. No. Let me make it clear that this project is feasible, has a favorable cost-benefit ratio, will fully repay the taxpayers' investments, whether you ever import a drop of water or not, so that it is necessary and crucial and important that we go ahead and do it now to relieve a very desperate present situation in Arizona.

If we get down to the end of this hard road that you envision several years from now, and if imports at the conclusion of this 5-year study are deemed desirable and both Houses of Congress pass legislation authorizing imports, and some 20 or 30 or 50 years later you find that the water is needed in the basin from which it is exported, again, we will keep our commitments and turn it back to you.

You are given a perpetual priority under the language of the bill.

Mr. HANSEN. Well, Mr. Udall, I am not so concerned about the taxpayer and the paying off of the project as those who might be needing this and who are accustomed to it and depending upon it and having their source cut off. And another thing, if there is no real necessity for importation in this proposed legislation would it be agreeable to you if this water diversion proposal is put in a separate piece of legislation rather than be tied to these projects?

Mr. UDALL. There is no import language in this bill. There is language which provides for a study——

Mr. HANSEN. Correct.

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Mr. UDALL (continuing). Of imports. And this is a very crucial matter to all of the seven States.

We have agreed that unless we begin to look down the road toward imports, that we are going to find ourselves in endless controversies and lawsuits about who uses what portions of an increasingly short river. And, unless we are agreed in the seven States, and unless the Congress agrees that we are going to go down that road to begin to plan long range for the needs of this basin, that we probably can't get agreement on the bill.

And this provision in the bill for the study of importation is really at the heart of the compromise that has been made between the States. And I would be most reluctant to see it handled in separate legislation.

Mr. HANSEN. I understand this, and I am not talking in terms of a dog-in-the-manger attitude or anything of this nature. I am talking in terms of the fact that you have specific projects set up. I am talking in terms of a study for the tentative possibility of importing water.

I wonder if there is any reason, since we are just talking in terms of what might be, that this couldn't be separated from the legislation at hand?

Mr. UDALL. There are those who advocate this but the things are related. The States are willing to go ahead and authorize the central Arizona project, these other Colorado projects, which will make an additional drain on a limited short river, only if it is clearly understood that we are going to begin immediately the studies that will lead to making the river whole. So the two are in a very real sense inseparable.

If it were possible, if someone could show us a way that this could be done, I would have no objection to it, but I think it would be unwise. I think the study legislation is very important and should be kept in the bill.

Mr. HANSEN. You talk in terms of making the river whole, and you are talking in terms of determination of what the flow of the river normally should be. Is this correct?

Mr. UDALL. Well, I am talking, however, partly in terms of what the people of the basin thought was in the river in 1922. They met after many feuds and lawsuits and arguments and said, "Look, let's stop fighting. Let's divide up the river." They assumed it had enough for 15 million consumptive use, 7½ in each basin, plus some water in Mexico, taking into account all of your losses and evaporation. They didn't have that much water as later events turned out and this is why the river is short.

Mr. HANSEN. Now, what I am getting to is this. Even though, perhaps, the U.S. Government may have erred in giving Mexico a predetermined amount of water, and even though the U.S. Government or those responsible may have erred in determining what the normal flow of the river is, and even though you feel there is some recourse against the U.S. Government because of this in behalf of your people, do you think that this should be accomplished by shifting the burden of responsibility that has been imposed upon you to some other river basin?

Mr. UDALL. Well, if you are talking in terms of water, we are not seeking to impose responsibility on another basin. We look upon

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water as a national resource. Clouds don't recognize State lines and if there is water available in another basin that isn't being used and will never be used and is surplus to every rational, reasonable, foreseeable requirement of that area, we would think that we ought to be able to arrange some kind of a reasonable export scheme, but this would have to be authorized specifically and separately by the Congress.

Mr. HANSEN. Now, two other questions. You say that if this project isn't done by the Federal Government, there will be private licensing requests for dams of the Colorado.

Mr. UDALL. These are pending. They have been pending for many years and there are strong indications they will be granted when this moratorium expires that the Congress imposed.

Mr. HANSEN. Would this be bad?

Mr. UDALL. Yes. We think it would be bad. To take—I happen to think it would be bad to take the last two remaining damsites on the river, turn them over to some other entity to let this entity use it for a local or for one State's benefit, when the ultimate possibility is to put those two damsites to use for the benefit of the whole basin in solving the very real water problem that faces 7 States.

Mr. HANSEN. My last question. You mentioned two items of protection in your legislation for those from which you might import water. Will you describe in your own words, briefly, what the two items are.

Mr. UDALL. Yes. The first one is area of origin protection. That language simply says that if eventually—that, in making his studies, the Secretary must be careful to make recommendations and to determine methods by which any plan he comes up with will have provisions that say to an area of exporting water, if your water is exported and later it is determined that you needed that water, the basin fund which we have set up through the construction of these dams will pay you the difference between what the original water you had would have cost you to put to work and what it cost you to go out and get supplemental water or other sources.

The second protection is a priority. Any area of origin is given a perpetual priority for the water exported from it so it could recapture it some time in the future if it turns out to be needed.

Our rights would be junior to the area from which the water is exported.

Mr. HANSEN. I appreciate my colleague's appearing before this committee and the forthrightness with which you have answered my questions.

Mr. UDALL. Thank you.

Mr. ROGERS of Texas. Mr. Foley.

Mr. FOLEY. Thank you, Mr. Chairman.

Mr. Udall, would you care to characterize this later committee print as far more extensive in its commitment to a diversion plan than the previous draft?

Mr. UDALL. No. I don't—I wouldn't characterize it that way entirely. Previously, we simply had a floor. We were talking in terms of 2½ million acre-feet with such additional amounts as might be utilized. We are now talking in specific terms that seem to impose

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a ceiling on the Secretary's studies at 8½ million acre-feet, but other than that, the provisions are substantially similar to what they were before.

Mr. FOLEY. Directing your attention to page 32——

Mr. ROGERS of Texas. Let the committee come to order. There will be no picture taking in here unless it is cleared through the Chair. Please put the cameras up. That goes for anyone else attempting to take pictures.

You may proceed.

Mr. FOLEY. Thank you, Mr. Chairman.

Directing your attention to page 32 of the committee print, line 7, section 203(a), is there a corresponding section in the previous act?

Mr. UDALL. I am not positive. We will have it for you in just a moment.

The language begins, as I read it on pages 3 and 4 and 5, "Investigations," in title II of the original bill. So that the answer to your question—"No." The direction there that says the Secretary shall come up with a specific importation plan would have to be compared with the language at the bottom of page 4 which says that the Secretary shall recommend to the President and Congress an initial group of projects and programs and projects for authorization and submit feasibility reports, said initial recommendations and feasibility reports shall include the projects planned in accordance with so and so, capable of delivering annually not less than 2.5 million acre-feet. That would be the comparable provision. Bottom of page 4, top of page 5.

Mr. FOLEY. Now, relating to page 32, line 11, section (b), on the same page, line 15, section (c), are those two sections reflective of earlier sections of the bill?

Mr. UDALL. Yes. I think we simply rewrote, restudied the basic plan to have an overall study and the Secretary submitting a plan to the Congress by which the river could be augmented; they are the same. The details vary.

Mr. RHODES. May I say, if you look on page 4, on lines 17 through 20, where the Flood Control Act of 1944 is spoken of, the provisions of the Flood Control Act required that the reports which are set forth in paragraph 203 would be identical. In other words, it was referred to by shorthand method in the previous bill, and spelled out in the present bill.

Mr. UDALL. That is the transmittal report to the States for their comments.

Mr. FOLEY. Directing your attention to page 4, line 16, the Secretary is directed to submit to the President and Congress "reports," plural, whereas on page 32, lines 11 and 12, "shall submit a proposed report," and it speaks of a single plan.

Is that not a significant change in language of the two drafts?

Mr. UDALL. Well, I think the fact in the first draft was that he would make a series of reports from year to year, explaining what he had been doing and what progress had been made. On page 32, in the latest language, we give him 5 years or 4½ years, to come up with a plan rather than a series of reports.

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Mr. FOLEY. Isn't it true that this latest draft calls on the Secretary of the Interior to prepare a standard feasibility report on an importation plan to submit to the Congress for authorization?

Mr. UDALL. I would view that this is probably the result of the present language.

Mr. FOLEY. And you mentioned a moment ago, if I recall your testimony correctly, that the new draft seems to impose a ceiling on the Secretary as to the amount of water to be imported into the Colorado River Basin.

I am struck by the word "seems", which usually carries a connotation of appearance rather than reality, and I would ask you if it is not true that the language does not limit the Secretary in extending the amount of the importation for other purposes than those enumerated in the draft.

Mr. UDALL. My experts tell me that there is no firm ceiling in the language.

Mr. FOLEY. As a matter of fact—excuse me.

Mr. UDALL. If I could finish, last summer you and other members of the committee expressed some fears that we might be talking about 2½, maybe 10, maybe 20, maybe 30. We thought it would be wise and it might allay some of those fears to give the Secretary some general guidelines as to the range of importations that we were ultimately talking about, and this was the reason for this change.

Mr. FOLEY. Well, are you familiar with the letter sent by the Governor of Texas to Senator Tower regarding desires on the part of West Texas.

Mr. UDALL. I have seen this letter.

Mr. FOLEY. As I recall, are the figures not 13½ million acre-feet by 1980, 19 million acre-feet by 2020?

Mr. UDALL. I don't recall the figures. My friend from Washington is an honorable man and, if he states them, I am sure they are correct.

Mr. FOLEY. But you would say, as I understand, that there is no limitation in the bill as to the extent of the Secretary's study and he can study a diversion of 100 million acre-feet if he wishes to, under the language of the bill.

Mr. UDALL. Well, if he finds that that amount of water is surplus to every conceivable need of the Northwest, that it could be used in the Southwest, that there are funds, that a plan could be made by which it could be paid for and all of the other qualifications, yes; he could propose 400 million acre-feet, but it is our best judgment that we are talking in terms of 6 to 8 million acre-feet.

Mr. FOLEY. I noted that you said in your testimony in answer to Mr. Hansen's question. "We look upon water as a national resource."

Mr. UDALL. I so stated.

Mr. FOLEY. Do you have any objection to substituting provisions for that national water commission for the provisions of section 2 of this bill? Title II?

Mr. UDALL. Well, I would want to see the provisions the gentleman refers to. We have no hard and fixed——

Mr. ASPINALL. Mr. Chairman——

Mr. ROGERS of Texas. Chairman Aspinall.

Mr. ASPINALL. Mr. Chairman, this has already been gone over.

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The gentleman from Washington was not here this morning and there is no reason to have repetitive material in this record. If the gentleman wants to find what the witness said, all he has to do is read the hearings tomorrow about this question.

Mr. FOLEY. Thank you, Mr. Chairman.

I don't think I have any more questions.

Mr. ROGERS of Texas. Mr. Reinecke.

Mr. REINECKE. Thank you, Mr. Chairman.

I want to thank my colleagues for a fine statement and indicate that my colleague, Mr. Udall, I think, is an excellent witness.

There are a few things I would like clarified.

You mentioned early this morning that you did not feel the compact would be revised or changed by importation of water.

Mr. UDALL. No. I don't think a compact is changed by the importation of water.

Mr. REINECKE. Then, I would be appreciative if you could tell me how you propose to handle the import where the import in the study, at least, calls for 2 million acre-feet for the upper basin.

Mr. UDALL. Well, the compact relates to a division of the waters in the Colorado River and the Congress, as I view it, cannot change, except in some very rare situations—and Mr. Ely gave us a memorandum last summer on whether or not Congress could change a compact—but Congress just can't go in and set aside a solemn agreement among the States.

The imported water is not governed by the compact. The compact doesn't pretend to divide imported water. They weren't even thinking in terms of imported water. The Congress, which authorizes importations and provides for the payment of the cost of importations, can certainly determine the disposition of those imported waters. If the Congress said that we will import water into Lake Mead only if the lower basin agrees that the upper basin can withhold certain amounts that otherwise under the compact they would have to deliver, and the lower basin agrees to those provisions, you could make the exchange very nicely and the compact would not be endangered or affected.

Mr. REINECKE. It would be affected, more or less, by administrative agreement rather than changing the compact, itself, is that right?

Mr. UDALL. I don't want to argue semantics with my friend. I think you can exchange water and give the upper basin the effective use of some of this imported water without changing the compact.

Mr. REINECKE. How about the cost of the imported water? How about the allocations of that, on the assumption that there is exchange, that more of the imported water will go downstream? Who pays the higher cost of that water that is imported?

Mr. UDALL. Of course, this would be provided in this plan that the Secretary is to come up with, but the language guidelines we gave him for his study contemplate that the lower basin would pay for the lower bain importations. The upper basin would pay for the upper basin importations.

Mr. REINECKE. In the event of exchange, the upper basin would pay for that amount that was exchanged, is that right?

Mr. UDALL. Yes.

Mr. REINECKE. Is that right?

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Mr. UDALL. Well, again, we are asking the Secretary to come up with a plan. We gave him certain guidelines.

Mr. REINECKE. It was a softer "Yes" than the other.

In the event that importation comes, say, from northern California, since that was mentioned this morning, would the same position hold?

Mr. UDALL. Oh, yes. The bill doesn't specify the area from which the importations were to come, and the bill treats all potential areas of export in the same fashion.

Mr. REINECKE. But you would consider northern California as out of the basn, is that right?

Mr. UDALL. Oh, yes; if water is imported from northern California, this is clearly out of the Colorado River Basin. And I might add, northern California would get these areas of origin and perpetual priority provisions of the bill, too, this protection.

Mr. REINECKE. Thank you.

You mentioned a few minutes ago that there was adequate water in the river to operate the central Arizona project, if not a drop was imported.

Mr. UDALL. Yes. Not——

Mr. REINECKE. A full aqueduct.

Mr. UDALL. Not a full aqueduct forever, but enough water in there to operate as a full aqueduct until 1995, with a declining supply thereafter.

Mr. REINECKE. My recollection is you said importation would not be necessary until the year 2000 for the full Central Arizona Project.

Mr. UDALL. The hydrologists differ on the rate it would decline and whether it would be 400,000 or 600,000 in the year 2025.

Mr. REINECKE. In all honesty, don't you feel a feasibility study is tantamount to or, at least, a partial obligation to an authorization?

Mr. UDALL. No. I don't see that a feasibility study obligates the Congress to do anything. I think there are hundreds of feasibility studies kicking around the Bureau of Reclamation that have been made on different projects without being authorized—these are studies which have been made with money authorized by the Congress. I don't think this committee or the other body is obligated to approve any one of them.

Mr. REINECKE. I agree on that basis, but the statement that you just made that this project will not continue to operate past the year 2000 without importation, it pretty well makes it mandatory that importation be authorized.

Mr. UDALL. Well, let us be frank. We hope there will be imports. We see this as a first step toward importation. We see this as a means to assure the Northwest or northern California that they have adequate water to give up a little bit for exports. We hope and believe this will lead to importation. We think the economy of your State in southern California and our State in Arizona is going to be in a bad way if we don't get importations.

Mr. REINECKE. But with the unknown costs of import and import losses, doesn't this leave a rather open end on this legislation?

Mr. UDALL. No. The trigger is held by the Congress and there will be no importation until the Congress pulls the trigger. The studies won't pull the trigger.

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Mr. RHODES. May I supplement that?

Mr. REINECKE. Certainly.

Mr. RHODES. Of course, we have said before—I think we just can't repeat it too often, that the project is feasible with no importation. The taxpayer has no fear as to whether or not his money will be returned or not, whether there is one drop of water ever imported or not. He is secure in his investment.

Mr. REINECKE. Up to the year 2000, and then the project becomes less effective.

Mr. RHODES. No. I am talking about complete payouts. You see, the water supply isn't suddenly cut off after year 2000. It is a diminishing amount after 1995. But the project is completely feasible, will be paid out, if there isn't importation.

Mr. REINECKE. With respect to that 1.7 mills per kilowatt-hour differential on the power chart that you had on the board this morning, I am interested in knowing where you got the figures, if you can cite them easily; that is, the data for the curves.

Mr. UDALL. Could I call on Mr. Alexander to comment on that? He is the specialist that helped us produce this.

Mr. ALEXANDER. I will be glad to. The figures for the coal-fired steam studies were taken from a comparable plant being designed to be built near Davis Dam, the Mojave plant. The figures for the nuclear part of the curve were taken from currently available data on nuclear plants and compiled and placed into the chart.

The reason for using figures for the steam station at Mojave was that it was a likely location for locating a steamplant if a steam alternative were to be decided upon.

Mr. REINECKE. The reason I asked that is Mr. Forman's testimony of last August indicated a range in capacity on the order of $10 per kilowatt plus 3 mills per kilowatt-hour and I don't see where the 1.7 mills differential would come from.

Along that same line, I have here a document from the Office of Coal Research that indicates the capital investment cost on coal and gas oil-fired plants ranges anywhere from $90 to $125 per killowatt and the energy cost is on the order of 3¼ up to 5½ or 6 mills.

This was the reason I wondered about these other data. It appears there is some conflict that will have to be checked out.

Mr. UDALL. There is no conflict when you plug in the plant factor. The cost can be one thing if you are operating these huge coal plants 90 percent of the time and it can be another thing entirely if you are operating it 35 percent of the time.

Mr. REINECKE. Let's not forget to plug in the factor that these other plants are at no cost to the Federal Government and taxpayers of our country. These are, for the most part, built on bonded money.

Mr. RHODES. Will the gentleman allow me to inject, neither are the hydroplants—their costs are paid out over a period of 50 years with interest.

Mr. REINECKE. True, but how about the taxes that the private investor will pay to the local counties?

Mr. RHODES. Well, there are certainly taxes that will be paid but the studies indicate the economic difference involved and, as I understand it, the difference adds up to very little.

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Mr. REINECKE. I was under the impression that the taxes on income and State taxes and property taxes were of a value comparable to the revenues from the power.

Mr. RHODES. I think the gentleman should also realize that these dams last for 100 years or so, and after they are paid out, they are the property of the Federal Government. When you take into consideration the fact that they are still income-producing, I would imagine that a study would show you that before the dams become run-of-the-river, they will certainly have produced income to more than pay themselves off and produce great quantities of profit to the Federal Government.

Mr. UDALL. If my friend will permit me on this point, because he has referred to the charts——

Mr. REINECKE. Certainly.

Mr. UDALL. The coal plant that was on that chart was presumed to be on the basis of so many people recommending that the Federal Government build a steamplant.

Now, the figures are here on the assumption that the Federal Government has built a steamplant, what would the cost be and what would they contribute to a basin fund, so the taxes——

Mr. REINECKE. I see. That is why those steamplant figures would be higher than the utility or private——

Mr. UDALL. That may be a factor, but I bring this up because you raised a question of paying taxes. The Federal steamplants wouldn't ever pay taxes, either.

Mr. REINECKE. Your objective is to produce power at minimum cost for the region. So, we should be, I think, looking at that as an objective.

Mr. ASPINALL. If my colleague will yield——

Mr. REINECKE. Certainly.

Mr. ASPINALL. I would like to ask a question. The objective is not to produce power at a minimum cost. The objective is to produce power at whatever cost is necessary to pay for the facilities that are tied in with the power development; isn't that correct?

Mr. UDALL. I couldn't agree more, Mr. Chairman.

Mr. ASPINALL. The same thing is true in the upper Colorado River Basin. Some people get this all mixed up. I think we ought to keep this perfectly clear.

Mr. SAYLOR. Will the gentleman yield to me?

Mr. ASPINALL. Certainly.

Mr. SAYLOR. I want to comment to my colleague, Mr. Rhodes, from Arizona, don't have any idea that these things are going to last a hundred years. We had one on the floor the other day that isn't 30 years old and several of the units don't work already. So, let's not suddenly dream that this is going to last for 100 years.

Mr. RHODES. Well, my good friend from Pennsylvania isn't trying to indicate that because one apple in the barrel is bad, they are all bad. We are going to build——

Mr. SAYLOR. One apple in a barrel may rot the rest of them.

Mr. RHODES. We have some very good footings for dams. Some of them are built in Chinle shale and they are very good, tight dams.

Mr. REINECKE. On the payout schedules provided for the committee after last year's testimony, it indicates a total cost allocation to water

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that is irrigation and M. & I., $532 million, with the revenues accruing from those same two sources of $620 million over a 53-year period, which is fine. The interesting thing to me was the fact that neither the irrigation nor the cost allocation varied when one study was made with Bridge and one study was made without Bridge, which would lead me to the conclusion that Bridge is not an essential factor in the central Arizona project.

Mr. UDALL. Well, the Bureau of Reclamation, in its reports opposed the construction of Bridge and pointed out that the central Arizona itself is feasible with only Marble Canyon Dam. There is no quarrel on this. But we are trying to do something beyond that. We are trying to solve a regional water problem that is going to get worse and worse and affect everybody in seven States, and this is why a long-range, farsighted, broad-scaled program of this kind needs both dams.

Mr. REINECKE. Well, my point was that the irrigation will stand on its own feet without either dam, apparently, according to the figures presented to us by the Commissioner.

Mr. UDALL. If we wanted to just develop one little area in one of the seven States, probably we could devise a project that would do it. This is not the intent of this bill.

Mr. REINECKE. On the aqueduct you referred to this morning, 1,800 second-feet refers to the 1.2 million acre-feet of water required for the project; is that right?

Mr. UDALL. Well, you have to think in terms of, not just of the capacity of the aqueduct, but in terms of permitting Arizona to use its properly allocated share of the Colorado River. If you had an aqueduct of 1,800 second-feet and if you had it running every day, day and night, I think 11 months of the year, and if you always had water in the river at that time to put in the aqueduct, yes, you could probably get 1.2. What we are trying to do with this aqueduct, because we have a junior position to California under this bill as with regard to the 4.4 priority, is to be in a position if there are spills—if the water supply isn't fully adequate, to maybe 1 month run it at a higher rate, knowing that the next month or next year, we are going to have it run lower.

Mr. REINECKE. Do you know what the differential cost is between the 1,800 second-foot and 3,800 second-foot?

Mr. UDALL. I am told about $50 million.

Mr. REINECKE. Thank you.

Mr. HOSMER. Would the gentleman yield? Will you give us the difference between the 1,800 feet and 2,500 feet?

Mr. UDALL. The difference between 1,800 and 2,500 would be in the order of $50 million.

Mr. REINECKE. I also understood you were considering 3,800.

Mr. UDALL. Well, Commissioner Dominy said in response to a leading question I asked him last fall that the optimum size to be able to take advantage of every possible conceivable hydrology on the river would be 3,800 feet. I don't think anybody is thinking in terms of an aqueduct of that size at this time.

Mr. REINECKE. Do you have any idea what the cost of that would be?

Mr. UDALL. No. I don't think we ever got into pricing that kind of an aqueduct. The incremental costs of a larger aqueduct are smaller as you go up.

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Mr. REINECKE. I am disturbed by one thing, a letter that I received from Commissioner Dominy showing the total acre-feet of water being used. It starts at 1.13 million acre-feet in 1975 and drops down to 564,000 in 2025. This is the central Arizona unit.

Mr. UDALL. Well, the point he is making is that as the upper basin begins to use the waters to which it is entitled, that there would begin to be a decline in the supply available to Arizona consistent with our obligation to California to give them 4.4 ahead of the central Arizona project.

Mr. REINECKE. So that once again, importation is mandatory to the efficient operation of CAP.

Mr. UDALL. It is highly essential to Arizona that we get an import program going.

Mr. REINECKE. You also mentioned this morning that the Hualapai Tribe will be granted recreational management, I believe it was, of the south bank? I don't know how much opportunity for recreational facilities there is going to be in that canyon. But will there be an agreement stipulating what recreational facilities would be expected of the tribe?

Mr. UDALL. Oh, yes; this is not unprecedented. The tribe will be given the full right to develop the south bank of that lake for recreation. They have a lot of imaginative ideas already. They have the right right now, as a matter of fact, to conduct any recreation program they want to. Access is a problem, but there is one particular area that is going to be one of the really choice recreation places in this country, which they will have the right to develop.

Mr. REINECKE. Has there been any thought to causing the water users of Arizona to improve their water management methods as a means of conserving some of this water so we are not in such a tight position.

Mr. UDALL. Yes. This is a matter of overriding importance in Arizona. We put in the record last fall, and I would be glad to give the gentleman the citations later on, the complete rundown on the things we are doing, things we plan to do. I think we have done as much as any State in the Union to make the most of a limited water supply. We recognize there is more to be done and we are doing it.

Mr. REINECKE. Finally, who is to be charged for the seepage or bank storage losses if the two dams are built? Which basin pays for that, rather?

Mr. UDALL. This is strictly a lower basin problem. Both dams are below Lee Ferry. We don't think there are any seepage losses. It seeps around the dam, goes down the river, and eventually to Lake Mead. We don't think this is seeping over into the Congo or the Amazon or the Suwannee.

Mr. REINECKE. According to a letter from your brother, he says there will be 300,000 to 400,000 acre-feet before Marble Canyon Reservation is filled.

Mr. UDALL. I can't quarrel with a member of the family and his figures—once they are in there they stay in there.

Mr. REINCKE. Nevertheless, this would come out of the lower basin.

Mr. UDALL. Yes. The bank storage and evaporation loss, in both Bridge and Marble, are lower basin problems.

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Mr. RHODES. If the gentleman will yield, I am sure the gentleman from California is cognizant of the fact that this is a one-term or one-time water expenditure. This happens once and it is an expenditure only in the year which it occurs.

Mr. REINECKE. Let's say we all hope it is a one-time expenditure.

Mr. RHODES. I don't see how it can be any different unless it does go into the Congo or the Pacific Ocean.

Mr. REINECKE. There are such things as underground caverns which that particular geological formation is noted for.

No further questions, Mr. Chairman.

Mr. ROGERS of Texas. Thank you very much, gentlemen, for your presentation.

Mr. SAYLOR. Mr. Chairman, might I say to my colleague from Arizona, Mr. Udall, I hope he will certainly correct the record, that in response to a question from Mr. Reinecke, he said that he had asked a leading question. Certainly, as a good lawyer, he would never ask a leading question. This is not within his type of practice, I am sure.

Mr. UDALL. The gentleman is correct, and I apologize for suggesting that under any circumstances I might ask any kind of leading question.

(Permission having been granted later in the hearing on p. 1618, the following statements are inserted at this point in the record.)

STATEMENT OF CONGRESSMAN JOHN V. TUNNEY, DEMOCRAT OF CALIFORNIA

Mr. Chairman: It is my pleasure to have the opportunity once again to join with those urging this committee to act expeditiously and favorably on H.R. 4671, the legislation to authorize the Colorado River Basin Project.

It is my understanding that it is the Chairman's wish that the testimony of these supplemental hearings be confined largely to the proposed amendments, which were added this Spring when the Upper and Lower Colorado River Basin states reached agreement on a revised form of this and the 36 identical bills. I am the sponsor of one of these, H.R. 4673.

In keeping with my colleague's desires, I will devote my attention principally to Title II of the proposed legislation, that which directs the Secretary of the Interior to investigate present and future water supplies and needs, possible importation plans and other means to augment water supplies in both Basins, and water conservation and quality. This is a matter of the greatest importance to me and the people of Southern California.

Whenever I hear people ask why California must look beyond her own borders for surplus water, I often think about the statement Daniel Webster once made about the West:

"What do we want with this vast worthless area, this region of savages and wild beasts, of deserts shifting sands and whirlwinds of dust, of cactus and prairie dogs? To what use could we ever hope to put these great deserts and those endless mountain ranges, impenetrable and covered to their base with eternal snow? What can we ever hope to do with the Western coast, a coast of 3,000 miles, rockbound, cheerless, and uninviting, and not a harbor on it?"

Well, for all his wisdom and experience, Mr. Webster could not imagine the possibility of harnessing and applying to beneficial use the scarce but nevertheless very significant water resources of the area. He did not recognize that the application of water could transform the most arid regions ino a suitable home for man and beast and plant. Having missed that great fact of nature, he could not have the second sight to anticipate the then undreamed of development which has since taken place—the agricultural, mineral, forests, and industrial wealth which has been, and will continue to be, produced in that so-called arid region.

The development of the West since Daniel Webster's time has been based largely on wisely putting water and energy to work in many diverse ways. The fact that large parts of the area, now as then, continue as thin forest or extensive grazing land; and, in the more arid areas and drier years, as "shifting sands" or "whirlpools of dust," has not prevented the development of an economy that sup-

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ports over 40 million people and is an important factor in the larger economy of the Nation.

However, it is becoming increasingly clear that the economic future of California and the other Western states depends on continued expansion of industry, low-cost power, business and jobs as well as on intensive farming requiring irrigation. This is possible only if an additional water supply is assured.

In 1985, that portion of southern California which relies on the Colorado River for its water supplies will have a population of about 16 million. This is theoretically a drain on the river of 2.17 trillion gallons a year, or 6.7 million acre-feet. This figure is based on the assumption that about 40 percent of the water used in the southern California area comes from the Colorado River. The Colorado River cannot at the present time supply California with 6.7 million acre-feet.

The urgency of importing additional water into the Colorado is not an exercise in expansive daydreaming, nor is it indulgence in a futile series of mental gymnastics and forensics. It is facing the hard, stubborn facts of a desperate situation.

There are reliable estimates that the Columbia River annually dumps 160 million acre-feet of fresh water into the sea. In fact, I am reminded that Governor Evans of the state of Washington so boasted in an advertisement last year in a national newspaper. At any rate, we in the Southwest would like to borrow about 8.5 million acre-feet of it until such time as our good neighbors of the Northwest are ready to use this priceless commodity. H.R. 4673 provides that adequate and equitable protection must be given to all states and areas of origin, including the Northwest.

We of the Southwest are not asking for a gift; we are asking for a loan of water that will sustain our economy. Without importation, the Southwest faces stagnation.

I believe it is incumbent upon me to state at this point that I also fully subscribe to the principle that the future needs of the areas that have surplus waters must be determined in order to assure those areas proper protection and assistance in their own development. Otherwise, we cannot, and should not, formulate any plans for interbasin transfer of surplus water. The areas of origin rightfully want and deserve something in return for the exportation of their unusable water and the areas of import should pay for this bounty in full measure.

The time when the water problems of the Southwest were suited to a piecemeal approach has long since past, no matter how feasible individual projects are standing alone. A regional effort is essential. The old quarrels and animosities must be consigned to history and forgotten.

Today's problems call for the most astute, the most constructive statesmanship that we can muster and I invite our sister states of the Northwest to join with us in this worthy effort. We owe that much to future generations.

STATEMENT OF CONGRESSMAN ALPHONZO BELL BEFORE THE SUBCOMMITTEE ON IRRIGATION AND RECLAMATION OF THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, MAY 9, 1966

LOWER COLORADO RIVER BASIN PROJECT

Mr. Chairman: I am pleased to join my colleagues in supporting this vital legislation. Although 300 miles away, Colorado River water was first delivered to portions of my District in the early forties and its availability since that time has been an important spur to our economy.

Since the coming of this water, Southern California has not had to turn away potential residents or investors due to a lack of this necessary resource. Continued planning by those responsible for our water supply has assured us ample supplies for the next quarter century. This bill, of which I am a co-sponsor, represents the next step in this planning, the phase that seeks to meet the requirements of 1990 and on into the twenty-first century.

The magnitude and complexity of the facilities that must be built in the near future to meet the demands within the Colorado River Basin are staggering. Congress has never had before it a reclamation bill of this size and scope in the history of the reclamation program. The need is equally great. And past

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history of water development projects have proven that the benefits of these projects accure not only to the area which they serve directly but also to the entire nation. I would also like to point out that this project will improve the quality of water delivered to Mexico which will not have an insignificant effect in our continued good relations with our neighbors to the South.

The benefits from the Projects authorized by this bill are certainly not limited merely to increasing the availability of water. The Southwest's expanding need for additional electric power will be aided through the production of large blocks of hydroelectricity. Also of great importance will be the availability of new areas for water-based recreation afforded by lakes created by the construction of the Bridge and Marble Dams. My District includes a major portion of the shoreline and beaches in Los Angeles County and I am acutely aware of the demand and need for more water-oriented recreation areas.

I want to assure you of California's vital interest in this project. We recognize its importance not only to our own economy but to the economy and well-being of the entire Southwest. Arizona has seen hundreds of thousands of acres of farm land go out of production with the failure of ground water supplies. Faced with a growing world food shortage, the importance of fertile crop land is obvious. The Upper Basin states seek to continue their economic progress with ample municipal and farm water supplies while at the same time seeking to exploit their vast oil-shale deposits, a process requiring the availability of large quantities of water.

To meet these broad requirements, a regional approach with a sound financial basis is essential. Establishing a development fund to assist in the construction of the central Arizona aqueduct and the huge water importation program contemplated in Title II is the basis of the regional concept of this Act. Revenues obtained through the sale of water and power will be returned to the General Treasury for its outlays during the construction period. Only those costs which Congress has determined are for the general benefit of the nation and therefore a national obligation will not be reimbursed.

A program to ensure our future water supplies in the Colorado River Basin must then, be undertaken without further delay. The shortages now occurring in Arizona and the probability that the supplies available to the Los Angeles Metropolitan Water District will be reduced in excess of 50 percent of its present diversion cause us great concern. The West remains a most dynamic sector of the American economy with great potential for further economic development. The possibility that it will not be supported with the most basic natural resource, water, is unthinkable.

Mr. Chairman, I urge your speedy approval of this legislation.

Mr. ROGERS of Texas. Our next witness is the Governor of Colorado, Gov. John A. Love, who will be accompanied by Mr. Felix L. Sparks, director, Colorado Water Conservation Board, and Mr. Quincy C. Cornelius, member of the board.

Governor, it is nice to have you. We are glad to see you in the subcommittee again.

STATEMENT OF HON. JOHN A. LOVE, GOVERNOR OF THE STATE OF COLORADO; ACCOMPANIED BY FELIX L. SPARKS, DIRECTOR, COLORADO WATER CONSERVATION BOARD, AND QUINCY C. CORNELIUS, MEMBER OF THE BOARD

Mr. ROGERS of Texas. Let the Chair make this request before your testimony starts, that in view of the fact that our time is so limited and we have so many witnesses, I would ask the members of the subcommittee to confine their questioning to not more than 5 minutes. Otherwise, we will have to ask for unanimous consent to move that the 5-minute rule be adhered to in order to get along.

Governor Love, you may proceed.

Governor LOVE. Thank you, Mr. Chairman. It is a privilege to be allowed to appear again. I have noted that some of the members of

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this committee have been in the great and beautiful State of Colorado in recent months. I hope that all of you can find the opportunity to get out there soon and see the origin of most of this blue and sparkling water that we are talking about.

During August of last year, I was afforded the opportunity to appear before this committee and express the views of the State of Colorado on the then pending H.R. 4671 and similar legislation. I stated at that time that nothing in my comments was designed to preclude the construction of the central Arizona project. However, on behalf of the State of Colorado, I did set forth several specific principles which we recommended be incorporated into the authorizing legislation.

During the past 2 years, and particularly since last August, innumerable conferences and negotiations have been held among the various States of the Colorado River Basin in an attempt to arrive at a harmonious understanding with reference to the pending legislation. It is understandable that on such a complex matter it probably will never be possible to draft any legislation which will have the unanimous consent of all the many parties involved. Nevertheless, remarkable progress has been made. There is now pending before the committee its Committee Print No. 19, entitled "Recommended Revision of H.R. 4671," dated April 25, 1966, to which my remarks are specifically directed.

The proposed revision represents some departure from the position of the State of Colorado previously presented to this committee. It also incorporates provisions for the authorization of certain projects in Colorado and New Mexico, with feasibility studies of other projects in Colorado, Utah, and Wyoming. While there may not be 100-percent accord on every provision of the bill as revised, I am confident that the revision effects the best understanding that can now be achieved among the States involved. While all of Colorado's previous objections have not been fully met, we consider that the revised bill represents the most practical solution available at this time to achieve a harmonious agreement among the States of the Colorado River Basin.

Mr. Chairman, I am, therefore, pleased to be able to state here today as chief executive of the State of Colorado, and on behalf of our State legislature and the State water board, that the committee print of H.R. 4671 has our complete support. At the conclusion of my remarks I will ask permission to have copies of the joint memorial of our legislature and the policy position of our State water board appended to and made a part of my statement.

This committee, along with previous committees, has been burdened with literally thousands of pages of testimony on the Colorado River Basin project under various titles. I shall limit my comments, therefore, to those new matters in the revised bill which are of particular interest to the State of Colorado. I shall touch only briefly upon those matters, since there are other witnesses who will have more detailed testimony.

I would first like to speak upon title II of the bill as revised. Under this title, among other things, is found a provision directing the Secretary of the Interior to prepare a staged plan for projects to provide for the importation of up to 6½ million acre-feet of water annually

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into the Colorado River system, along with an additional quantity of not to exceed 2 million acre-feet annually for those areas which could be served by importation facilities en route to the Colorado River system. As stated in my previous testimony, we consider this provision to be a necessary part of the pending legislation.

Since the Columbia River should be considered by the Secretary under title II, it is obvious that the States of the Columbia River Basin must have a voice in the development of any plan which will lead to the exportation of water from that basin. It is my own opinion that such importation, even if planned during the next 5 years, is at least 20 years away from becoming a reality. For any project of such magnitude, if 20 years or even 30 years from now is a reasonable goal for achievement, then planning must start now. During the time which will elapse between the commencement of planning and the beginning of construction, there will be adequate time for the States of the Pacific Northwest to completely evaluate the effect of any such construction upon their future needs.

Title V of the committee print of H.R. 4671 is completely new. We previously expressed a fear to this committee that further water resource development in Colorado might be inhibited by the construction of further projects in the lower basin.

The lower basin States have repeatedly stated that it was neither their desire nor intent to deny us the use of water allocated by compact to our State. As evidence of their good faith, the States of the lower basin are supporting the authorization and construction of five Colorado River projects in the States of Colorado and New Mexico, and feasibility studies for further projects in the States of Colorado, Utah, and Wyoming.

When it became apparent to our people that development of our water resources could proceed hand in hand with lower basin development, then an atmosphere was created which made possible the successful negotiations incorporated in the revised bill.

The five participating projects contained in the revised legislation were authorized by the Congress for feasibility investigations 10 years ago. However, the actual planning on most of the projects dates back for more than 20 years. We are convinced that the projects are feasible from both an engineering and financial standpoint. All studies indicate that the necessary revenues from the Colorado River storage project will become available to the States of Colorado and New Mexico to achieve the necessary repayment.

The waters allocated to Colorado and New Mexico, pursuant to the terms of the Colorado River compact and the Upper Colorado River Basin compact, are also sufficient to sustain the project purposes. While there has been some outside criticism of our method of allocating water within our State, we have carefully weighed the many factors involved in establishing a State water plan. We are convinced that our decision to support the Colorado projects contained in the revised bill is sound and represents the best use of our water resources during the foreseeable future.

Section 501(b) of the revised bill contains a special section on the Animas-La Plata project to the effect that construction should be contingent upon an agreement between Colorado and New Mexico

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concerning the project operation. The project is somewhat complex in that the project area is situated in both Colorado and New Mexico and includes lands of the Mountain and Southern Ute Indian Tribes. The project report contains a statement that—

> The project would be operated to distribute shortages as equally as possible over the entire land area.

New Mexico wishes to insure by some type of formal agreement that this provision is observed. Colorado concurs in that position. We see no problem in resolving the matter between the two States.

I would like to point out that all of the proposed projects are located in areas of great industrial potential. Municipal and industrial supplies constitute an important part of each of the projects. With particular reference to the West Divide project, I would like to emphasize the importance of this project in relationship to the emerging oil shale industry in Colorado. Because of the importance of this resource to the economy of our State, I appointed a Governor's Oil Shale Advisory Committee several years ago to keep me posted on current developments in the industry and to advise me as to the important policy questions involved.

The Oil Shale Advisory Committee has closely followed the planning in connection with the West Divide project. It has advised me that this project will make water available in the area where the greatest oil shale research and development is now taking place. In addition to providing water for agricultural purposes, a significant allocation of water has been made for the municipal and industrial purposes. As the oil shale industry develops in the area even the water allocated to agriculture can be converted from that use to urban and industrial uses as required.

The remaining four projects are in areas which already require additional municipal water supplies and which have a tremendous potential for the development of thermal power generation from fossil fuels. Water from all five projects has already been allocated for municipal and industrial uses.

Tax-supported water conservancy districts have already been formed for each of the potential projects. Those districts are ready at any time to enter into a repayment contract with the United States. I shall not dwell at any further length upon these projects, since the potential project beneficiaries can and will present their own cases much more eloquently than I can. Suffice it to say that these projects are fully supported by our State and constitute a primary reason for our support of other provisions of the pending legislation.

Because it is of interest to the State of Colorado only, I would like to call the committee's attention to sections 501(d) and 501(e) in title V of the committee print. We always have an educational problem in Colorado concerning reclamation projects, and I presume the same is true in other States. In planning any project there are always rumors circulated to the effect that the Federal Government is attempting to destroy vested water rights.

While this has never been the case in our State, we feel that the matter is of sufficient importance to justify the insertion of a section directing the Secretary to comply with the priority of water rights established under our State Constitution. Actually, each project has

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always been planned by the Secretary on this basis. Nevertheless, from our viewpoint, it is highly desirable to have the Congress approve the language of section 501(d). We are not attempting in any way to interfere with the discretion of the Secretary in entering into appropriate contracts for the sale and distribution of water from the projects under his jurisdiction.

In the State of Colorado, as in other States, we often have sectional differences which seriously affect harmonious relationships within the State. It was for the purpose of correcting a current misunderstanding that we have requested the inclusion of section 501(e) in the pending legislation.

In the 1st session of the 75th Congress, a publication was issued as Senate Document No. 80. This document, in part, constituted the basis for the subsequent authorization of the Colorado-Big Thompson Federal reclamation project in Colorado.

A section of that document is entitled "Manner of Operation of Project Facilities and Auxiliary Features" and directs the Secretary to observe certain conditions in the operation of the project. This section provides for three principal water components of the Colorado-Big Thompson project; namely, for diversion of water to the eastern slope of Colorado, for storage of replacement water, and for storage of water for use in western Colorado. The replacement water (specified as 52,000 acre-feet) and water for use in western Colorado (specified as 100,000 acre-feet) are stored in Green Mountain Reservoir.

The last sentence of paragraph (g) of this section provides:

> The 100,000 acre-feet of storage in said reservoir shall be considered to have the same date of priority of appropriation as that for water diverted or stored for transmountain diversion.

However, this sentence is later qualified by paragraph (i) of the same section which, in speaking of the Colorado River Compact, states in part as follows:

> Notwithstanding the relative priorities specified in paragraph (g) herein, if an obligation is created under said compact to augment the supply of water from the State of Colorado to satisfy the provisions of said compact, the diversion for the benefit of the Eastern Slope shall be discontinued in advance of any Western Slope appropriations.

The current controversy concerns the meaning of the words "any western slope appropriations." It appears clear enough from the document that such words apply only to the priority of water in Green Mountain Reservoir for use in western Colorado, as set forth in paragraph (g). Any other interpretation would do violence to rights vested by law in prior appropriations.

Since it is a congressional document which creates the problem, we feel that it is necessary to have the matter clarified by the Congress. It is not our intention that any rights in western Colorado to the use of water from Green Mountain Reservoir be diminished or impaired. We ask only that the intent of Senate Document No. 80 be observed by all parties.

To prevent future controversy, we urge that the words "any western slope appropriations" in paragraph (i) of Senate Document No. 80 be held by the Congress to mean and refer to the appropriation heretofore made for storage in Green Mountain Reservoir, as specified in paragraph (g) of the document.

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I would like to turn briefly to title VI of the committee print, and specifically to section 601 of that title. This section contains directions to the Secretary which can be defined as operating criteria for the releases of water from Lake Powell. The lack of satisfactory operating criteria in the original version of H.R. 4671 constituted one of our principal objections to that bill.

It is my understanding that the provisions now incorporated in the committee print are mutually agreeable to all seven States of the Colorado River Basin. I wish to point out that it is our common understanding that these operating criteria would become effective at such time as the pending legislation may be approved by the Congress and the President.

This criteria would replace the Glen Canyon filling criteria previously announced by the Secretary and now in effect, with the exception of that portion of the filling criteria relating to allowances for Hoover Dam powerplant deficiencies. These allowances would continue to be made, with a provision for reimbursement to the Upper Colorado River Basin fund as specified in section 502 of the revised bill.

I wish to emphasize in conclusion that the testimony which I gave before this committee last August still correctly states the principles which the State of Colorado believe should be adhered to in the distribution of water from the Colorado River.

While we have not modified the principles, we have not agreed and do now here agree that the method of implementing those principles, as incorporated in the revised legislation, constitutes the most practical solution to the problems confronting the Colorado River Basin States.

I must point out for the record, however, that the problem of the Mexican Treaty obligation has not yet been resolved to our satisfaction. Nevertheless, we have made our decision to support this legislation on the premise that the water resource development in the seven Colorado River Basin States should not languish pending a final resolution of the Mexican Treaty problem.

Attached to my statement is a copy of House Joint Memorial No. 1008, adopted by the House of Representatives and the Senate of the Colorado General Assembly in February 1966. Also, attached is the policy position of the Colorado Water Conservation Board on H.R. 4671 and similar legislation, adopted by that board on February 8, 1966. This latter agency is the official agency of our State government charged with the duty of protecting and asserting the authority, interests, and rights of the State of Colorado in and to the waters of interstate streams.

These two attached documents constitute the primary record evidence of the support of the State of Colorado for H.R. 4671, as revised. Mr. Chairman, I ask permission to have these two documents attached to and made a part of my statement as though read in full.

And, in addition, Mr. Chairman, if I may, I have five additional statements and I would like to have them made a part of the record, although they will not be read.

Mr. ROGERS of Texas. We will take up your request first, and does the Chair hear any objection to inclusion of this additional information with the Governor's statement?

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If not, it will be included as part of his statement.
(The documents above-referred to, follow:)

FORTY-FIFTH GENERAL ASSEMBLY OF THE STATE OF COLORADO

H.J.M. NO. 1008: MEMORIALIZING THE CONGRESS OF THE UNITED STATES TO ENACT INTO LAW THE "RECOMMENDED REVISION OF H.R. 4671" APPROVED BY THE COLORADO WATER CONSERVATION BOARD ON FEBRUARY 8, 1966, AND ENDORSED BY THE COLORADO GENERAL ASSEMBLY

Whereas there is now pending in the Congress of the United States proposed legislation to authorize the construction, operation, and maintenance of the Colorado River Basin Project, such proposal currently being designated as H.R. 4671; and

Whereas although the original purpose of such proposed legislation was the construction of the Central Arizona Project, a revised draft designated "Recommended Revision of H.R. 4671", dated February 8, 1966, has been modified to:

(*a*) Permit states in the Upper Colorado River Basin to deliver committed water at Lee Ferry without impairment of their own uses;

(*b*) Return to the credit of said states funds which have been or may be expended from the Upper Colorado River Basin Fund to compensate for power deficiencies at Hoover Dam;

(*c*) Program the augmenting of the Colorado River water supply, including a possible importation of water; and

(*d*) Provide for continuing water resource development in the Upper Basin States, including the immediate authorization for construction of five participating reclamation projects in Colorado; and

Whereas in connection with such proposed legislation, every facet of the Colorado River problem has been continuously and thoroughly explored by the Colorado Water Conservation Board, by other agencies of the state and municipal governments of Colorado, including virtually all of the water conservancy districts throughout Colorado; by other states of the Colorado River Basin; and by the federal government; and

Whereas there has been in the past considerable controversy in Colorado pertaining to certain provisions of Senate Document No. 80, 75th Congress, First Session, which now has been resolved in the "Recommended Revision of H.R. 4671" approved by the Colorado Water Conservation Board: Now, therefore, in order to make known to the Congress of the United States that the Colorado Water Conservation Board in approving said "Recommended Revision of H.R. 4671" has the support not only of the various water conservancy districts and water boards throughout Colorado, but also of the Colorado General Assembly, the legislative branch of our state government; be it

Resolved by the House of Representatives of the Forty-fifth General Assembly of the State of Colorado, the Senate concurring herein, That this General Assembly hereby endorses the "Recommended Revision of H.R. 4671", approved by the Colorado Water Conservation Board on February 8, 1966, and strongly urges and memorializes the Congress to enact such legislation into law as expeditiously as possible during the current session of the Congress; and be it further

Resolved, That a copy of this Joint Memorial be transmitted to the President of the Senate of the Congress of the United States, the Speaker of the House of Representatives of the Congress of the United States, and to each member of the Congress from the state of Colorado.

Adopted by the House of Representatives on February 16, 1966.

Adopted by the Senate on February 18, 1966.

COLORADO WATER CONSERVATION BOARD, DENVER, COLO., FEBRUARY 8, 1966

POLICY POSITION ON H.R. 4671 AND SIMILAR LEGISLATION

I. Summary of facts

The Colorado Water Conservation Board is an official agency of the State of Colorado created by the Colorado General Assembly "to promote the conservation of the waters of the State of Colorado in order to secure the greatest utiliza-

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tion of such waters and the utmost prevention of floods". In order to carry out its general responsibility, the Board is charged by statute with certain specific functions. Two of those functions, as they apply to the contents of this document, are as follows:

1. "To confer with and appear before the officers, representatives, boards, bureaus, committees, commissions, or other agencies of other states, or of the federal government, for the purpose of protecting and asserting the authority, interests and rights of the State of Colorado and its citizens over, in and to the waters of the interstate streams in this state."

2. "To formulate and prepare drafts of legislation, state and federal, designed to assist in securing greater beneficial use and utilization of waters of the state and protection from flood damages."

The foundation for our system of government is that it functions through a system of representatives elected by a majority vote of our citizens. Representatives so selected are empowered under constitutional mandates and limitations to create the means to implement the operation of government. It was in this sense that the Colorado Water Conservation Board was created by the Colorado General Assembly, and its actions and recommendations must be regarded as subordinate to those individuals and agencies who have been charged through the elective processes of our government with the primary responsibility for determining the course of governmental affairs. Within the purview of the recommendations contained in this document, those persons and agencies are the Governor of the State of Colorado, the Colorado General Assembly, and Colorado's representatives in the United States Congress.

The waters of the Colorado River are of overwhelming importance to the State of Colorado and its citizens. The average annual flow of that river and its tributaries exceeds the average annual flow of all other river systems in Colorado combined. These facts were recognized from almost the very beginning of our statehood. Departing from the common law doctrine of water rights and usage, Colorado in 1876, through its state constitution, adopted a system of appropriating water rights under the doctrine of "first in time, first in right". In the early part of this century our citizens had the wisdom to foresee that this doctrine could be detrimental to Colorado if applied on an interstate basis. In order to protect ourselves against this situation, we entered into a formal agreement with the other states of the Colorado River Basin in 1922 to effect in perpetuity an apportionment of the waters of the Colorado River System. This agreement, known as the Colorado River Compact, embodies the law upon which our use of the waters of the Colorado River is predicated. Imperfect as the provisions of that compact may now seem to be, they nevertheless afford us a degree of protection which might not otherwise be available.

This state and its citizens since 1922 have become increasingly concerned with their future welfare as it relates to the waters of the Colorado River. Some fifteen years ago the Colorado Water Conservation Board intensified its studies as to the future availability of the Colorado River waters. For this purpose it employed the nationally recognized engineering firm of Leeds, Hill and Jewett. That firm prepared a report to the Board under the title "Report on Depletion of Surface Water Supplies of Colorado West of Continental Divide". The report was subsequently printed in the United States Congress as Senate Document No. 23, 84th Congress, 1st session.

In 1956 the United States Congress authorized for the benefit of the Upper Colorado River Basin states one of the most comprehensive reclamation projects ever yet undertaken in the history of the United States. This project, which will eventually entail a cost of over two billion dollars, was authorized to permit the Upper Basin states to develop their full share of water apportioned by the terms of the Colorado River Compact. Recognizing that great problems would arise as the result of increased uses of Colorado River water, this Board in 1958 constituted a state-wide advisory committee to develop information and make recommendations concerning the state's water policy. The Board authorized employment of leading engineering and legal experts for the development of information and the preparation of recommendations. As a result, the Board published in July, 1959, a document entitled "The Future Operation of Glen Canyon Reservoir as Related to the Colorado River Compact".

Since 1958 every facet of the Colorado River problem has been continuously and thoroughly explored by this Board, by other agenices of our state and municipal governments, by other states of the Colorado River Basin, and by the federal government. In 1965 the State of Colorado, along with the other states of the Upper Basin through the Upper Colorado River Commission, employed the internationally recognized engineering firm of Tipton and Kalmbach, Inc., to

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again inventory present and future water resources of the Colorado River System. This report was documented under the title of "Water Supplies of the Colorado River" under date of July, 1965, and was subsequently included in a formal report by the Committee on Interior and Insular Affairs, House of Representatives, 89th Congress.

In 1965 the Board also authorized the creation of a Colorado River Advisory Committee. The most qualified technicians and experts on the Colorado River problem available in the State of Colorado were appointed to this Committee. Various members of the Committee, along with Colorado's Upper Basin Compact Commissioner, have participated in virtually all sessions and negotiations on the subject of H.R. 4671.

II. Present situation

There is now pending in the United States Congress H.R. 4671 and similar bills to authorize the construction, operation, and maintenance of the Lower Colorado River Basin Project and for other purposes. On August 11, 1965, this Board adopted certain principles on the subject of the pending legislation, designed to protect the interests of the State of Colorado in the waters of the Colorado River. The manner of implementing these principles has been a matter of intense controversy, both within the State of Colorado and among all of the states of the Colorado River Basin.

A major purpose of H.R. 4671 is to authorize the construction of the Central Arizona Project for the benefit of the State of Arizona. That state maintains, that under the provisions of the Colorado River Compact and by the terms of the recent decision by the United States Supreme Court in the case of Arizona *v.* California, it is entitled to the use of a quantity of water from the mainstream of the Colorado River below Lee Ferry. It is the understanding of this Board that Arizona agrees that any use of water by that state from the Colorado River System is controlled and governed by the Colorado River Compact, and that the Supreme Court decision only divides among the Lower Division states the water available to those states pursuant to the terms of the compact. If this in fact is the position of the State of Arizona, then this Board concurs with that position.

During the past history of reclamation development in Colorado, the people of Arizona, through their elected representatives in the Congress, have given to us their most generous support. The historic friendship between our two states is a fact which is not lightly considered by this Board. Problems on the Colorado River are not ones which have been created by the State of Arizona, but are ones which are common to all of the states of the Colorado River Basin. At this time there are serious differences of opinion as to such factors as the rights of the Upper Basin states to accumulate holdover storage in its major storage reservoirs, the propriety of using funds appropriated to the Upper Basin to satisfy power deficiencies at Hoover Dam, the future availability of water apportioned to the Upper Division states, and the future availability of water supplies for all states of the Colorado River Basin.

It is the position of this Board that H.R. 4671, as originally introduced into the Congress, should be revised to more satisfactorily incorporate the following four general principles:

A. To recognize and provide that Glen Canyon Reservoir shall be operated to provide the means by which the Upper Division states can deliver water at Lee Ferry without impairment of their own consumptive uses pursuant to the terms of the Colorado River Compact.

B. To provide an immediate start on a program designed to augment the future water supplies of the Colorado River Basin.

C. To return to the credit of the states of the Upper Division those funds which heretofore have or hereafter may be expended from the Upper Colorado River Basin Fund to compensate computed power deficiencies at Hoover Dam.

D. To provide for the continuing water resource development in the Upper Basin states.

During the past year, innumerable conferences and negotiations have been held both here in Colorado and among the various states of the Colorado River Basin in an attempt to arrive at a harmonious understanding with reference to the pending legislation. This Board understands that on such a complex matter it will probably never be possible to draft any legislation which will have the unanimous consent of all the many parties involved.

There is now pending before this Board for consideration a document under the Board's heading dated February 8, 1966, and entitled "Recommended Revi-

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sion of H.R. 4671". The draft before us represents an extensive revision of the original H.R. 4671. The draft represents some departure from our resolution of August 11, 1965. It also incorporates provisions for the authorization of certain projects in Colorado, with feasibility studies of other projects in Colorado, Utah and Wyoming.

The Board is in receipt of numerous resolutions on the subject of H.R. 4671 from water agencies which represent virtually every segment of the state's geographical area. These resolutions indicate a solid support for the revised version of H.R. 4671, although in many cases some qualifications are expressed. These qualifications have been considered by the Board, and, when found practicable, have been incorporated as Board policy. The Board has also received, considered and adopted the recommendations of the Colorado River Advisory Committee.

It has been represented to this Board that, within the limits of their authority, representatives of the states of the Lower Division have agreed to the provisions of the revised legislation now before us. It has also been represented to the Board that, while there is no complete accord among the states of the Upper Division, the revised legislation affects the best understanding that can be achieved. Any policy of this Board on the revised legislation which departs from the exact wording of the resolution of August 11, 1965, will be considered only in the spirit of a fair compromise, and for no other purpose. In this context, the Board finds that the document which it has reviewed adequately protects the interests of the State of Colorado, and represents the most practical solution available at this time to achieve a harmonious and equitable agreement among the states of the Colorado River Basin.

The legislation proposes to authorize certain projects within the State of Colorado under the authority of the Colorado River Storage Project Act. This proposal is in accordance with long established state policy and is vital to the future development of the state's water resources. However, there has been considerable misunderstanding within the State of Colorado as to the effect of such projects when viewed in light of certain provisions of Senate Document No. 80, 75th Congress, 1st Session. This unfortunate misunderstanding has seriously affected harmonious relationships within the state and has heretofore jeopardized and could continue to jeopardize further water resource development.

While the misunderstanding may be more vexatious than real, it now appears necessary that this Board adopt, as a matter of state policy, an interpretation of paragraph (i) of the section of Senate Document No. 80 entitled "Manner of Operation of Project Facilities and Auxiliary Features". This interpretation is that the words "any western slope appropriations" in said paragrph (i) mean and refer to the appropriation heretofore made for storage in Green Mountain Reservoir. This interpretation defines and observes the purpose of said paragraph (i), and does not, in any way, affect or alter any rights or obligations arising under Senate Document No. 80 or under the laws of the State of Colorado.

The Colorado Water Conservation Board was not a party to nor heretofore has taken any position on Senate Document No. 80. It is now the position of the Board that it ratifies, confirms and accepts all of the provisions of Senate Document No. 80, 75th Congress, 1st Session, as though it were originally a party signatory to said document, subject to the interpretation of paragraph (i) as above set forth.

Taking into consideration all of the foregoing preamble as being incorporated into the following resolution:

III. Resolution

Now, therefore, be it resolved by the Colorado Water Conservation Board in regular session assembled in Denver, Colorado, this 8th day of February, 1966, that it approves and adopts as the official position of the Board the policy position as herein contained and the provisions of the document entitled "Recommended Revision of H.R. 4671", as amended, dated February 8, 1966, with the following understanding:

1. That the revised legislation reflects some departure from the resolution of this Board under date of August 11, 1965, which will only be agreed to by this Board if the revised version is acceptable to the States of the Lower Division.

2. That the staff of this Board is directed to take every reasonable action designed to preserve, execute, or implement the provisions of Senate Document No. 80 in accordance with the Board's interpretation of that document. The staff is further directed to consult and cooperate to the fullest possible extent

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with any and all parties affected by the provisions of the said document, in the interest of the greatest possible harmony within the State of Colorado.

Be it further resolved, that the Secretary of this Board be authorized and directed to transmit a copy of this resolution with an appended copy of the revised H.R. 4671 to the Governor of the State of Colorado, to Colorado's elected representatives in the 89th Congress of the United States, and to the President of the Senate and to the Speaker of the House of the Forty-fifth General Assembly of the State of Colorado; and

Be it further resolved, that the staff of this Board be authorized and directed to maintain close and continuous liaison with the Governor of the State of Colorado, the members of Colorado's congressional delegation, the members of the Colorado General Assembly and Colorado's member of the Upper Colorado River Commission, to the end that the greatest possible unity on the subject of the pending legislation can be achieved within the State of Colorado.

CERTIFICATE

I do hereby certify that the foregoing is a true and correct copy of a statement of policy and resolution on the subject of H.R. 4671 adopted by a unanimous vote of the members of the Colorado Water Conservation Board at an adjourned regular meeting of the Board held in Denver, Colorado, on February 8, 1966.

FELIX L. SPARKS, *Secretary.*

Mr. ROGERS of Texas. Now, the other statements you refer to, Governor, who are they from?

Governor LOVE. Let me take them up one by one.

First, is a one-page statement of the city of Colorado Springs, Colo., pertaining to the bill.

Mr. ROGERS of Texas. Would you submit that so that we can see it. Let the Chair say this in the interest of time. If you will call off the names, these instruments will be received by the subcommittee and will be placed in the record if appropriate. If not, they will be included in the file.

Governor LOVE. All right.

The next one is a statement of J. R. Barkley, manager of the Northern Colorado Water Conservancy District, State of Colorado.

The next one is a statement of J. Sid Nichols, president, Southeastern Colorado Water Conservancy District.

The next one is a statement of R. S. Shannon, Jr., president of the Denver Board of Water Commissioners, State of Colorado.

And the last one is a statement of Grand Valley Irrigation Co., Grand Valley Water Users Association, Orchard Mesa Irrigation District and Palisade Irrigation District, County of Mesa, State of Colorado.

Mr. ROGERS of Texas. Thank you, Governor.

Governor LOVE. And, then, one final one. I have a statement here prepared to be given by Mr. Ival V. Goslin, the executive director of the Upper Colorado River Commission. Even though he is listed as a witness, rather than take the committee's time, he has suggested that I introduce this since it covers repetitively, to some extent, some of the things that my statement includes and some of the things that Mr. Udall's statement includes, with the provision that he will be present at these meetings if at a later time questions need to be asked.

Mr. ROGERS of Texas. The clerk advises the Chair that the statements have been submitted in advance. He has gone over them. They are acceptable for the record.

Is there objection to their inclusion as requested? If not——

Mr. SAYLOR. Mr. Chairman, reserving the right to object—Governor, I suppose they all support the project.

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Governor LOVE. Yes. That is true.

Mr. ASPINALL. Just a minute. If the gentleman will yield to me, the statement from the irrigation district in Grand Valley is a statement that is somewhat critical, is it not? The one that Gene Mast forwarded to us? It brings up another problem. We can't say that it is entirely in support although it supports the legislation with certain reservations.

Mr. SPARKS. This is correct, Mr. Chairman. These statements deal mostly with the provisions contained in Senate Document 80.

Mr. ROGERS of Texas. The gentleman from Pennsylvania withdraws his reservation.

Do you reserve the right to object, Mr. Foley?

Mr. FOLEY. Mr. Chairman, reserving the right to object, do I understand that the unanimous consent request offered by the Governor would be accepted on the contingency that Mr. Goslin and others would be present and available to answer questions by members of the committee?

Mr. ROGERS of Texas. As far as the statement is concerned, yes, they will be available, Mr. Foley, if you desire to question them. Certainly, we will call them to permit you to question them.

Mr. FOLEY. I withdraw my reservation.

Mr. ROGERS of Texas. Is there objection to the unanimous consent request? Without objection, the documents will be included.

(The documents follow:)

STATEMENT OF THE CITY OF COLORADO SPRINGS, COLORADO BEFORE THE IRRIGATION AND RECLAMATION SUBCOMMITTEE OF THE INTERIOR AND INSULAR AFFAIRS COMMITTEE, HOUSE OF REPRESENTATIVES, PERTAINING TO H.R. 4671 AND RELATED BILLS, WASHINGTON, D.C., MAY 9, 1966

The City of Colorado Springs filed a statement with this Committee in August, 1965 relating to H.R. 4671, declaring its present and future dependence on the water resources of the Colorado River and its consequent interest in this Bill.

Since that time the City has worked with all Colorado water agencies in the preparation of the revised Bill which is now before this Committee as Committee Print No. 191.

The City of Colorado Springs indorses this Bill in this form which represents the official position of the State of Colorado. Section 501(e) of the Bill as shown in the Committee Print No. 191 is of particular interest to the City. It correctly reflects the understanding of the City of Colorado Springs of the meaning of paragraph (i) of Senate Document No. 80 and the City gives its full support to the subject legislation as now drafted with the inclusion of this necessary clarification of said document.

Respectfully submitted.

F. T. HENRY, *City Attorney.*

STATEMENT OF J. R. BARKLEY, MANAGER, NORTHERN COLORADO WATER CONSERVANCY DISTRICT, STATE OF COLORADO, BEFORE THE IRRIGATION AND RECLAMATION SUBCOMMITTEE OF THE INTERIOR AND INSULAR AFFAIRS COMMITTEE, HOUSE OF REPRESENTATIVES, PERTAINING TO H.R. 4671 AND RELATED BILLS, WASHINGTON, D.C., MAY 10, 1966

Mr. Chairman and members of the committee, my name is J. R. Barkley. I am the Manager of Northern Colorado Water Conservancy District, a political subdivision of the State of Colorado. The District was organized in September 1937 to develop a project for transmountain diversion of water from the Upper Colorado River Basin to the basin of the South Platte River and its tributaries in northeastern Colorado. On July 5, 1938, the District executed a contract with the United States of America for the construction of the Colorado-Big Thomp-

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son Project by the Bureau of Reclamation. The contract provides the terms under which Northern Colorado Water Conservancy District is repaying the costs of the irrigation and water distribution facilities of the project. The contract also sets forth the detailed arrangements for the operation and maintenance of the project by the District and the Bureau of Reclamation.

The District's purpose in the development of the Colorado-Big Thompson Project was to provide a supplemental water supply of about 300,000 acre-feet per annum to some 750,000 acres of land which had been under irrigation in the South Platte River Basin for more than 50 years.

As the Project was designed to export surplus waters of the Upper Colorado River, certain additional water collection and storage facilities were required to protect the water rights which existed downstream on the Colorado River in Colorado. In addition, the citizens of the basin of water origin were most desirous of having those additional Project facilities constructed to a size and capacity which would provide protection for future water development in the Upper Colorado River Basin of Colorado. Therefore, Northern Colorado Water Users' Association, the predecessor of the present District organization, negotiated an agreement with the Western Slope Protective Association representing the Colorado River area that I have mentioned. The agreements, which might be broadly described as operating criteria, were embodied in Senate Document No. 80, 75th Congress, 1st Session, under the title of "Manner of Operation of Project Facilities and Auxiliary Features." The same agreements under the same title were likewise embodied in the decree of the United States District Court for the District of Colorado, entered on October 12, 1955, in the consolidated cases, Civil Numbers 2782, 5016, and 5017. Further, Section 11 of Public Law 485, 84th Congress, 2nd Session, provides that the Final Judgment, Final Decree and stipulations incorporated in those enumerated consolidated cases "* * * are approved, shall become effective immediately, and the proper agencies of the United States shall act in accordance therewith * * *."

As frequently happens in the case of many written documents, misunderstandings arise over the interpretation of language. Such is true of a paragraph numbered (i) in that portion of Senate Document No. 80 under the title "Manner of Operation of Project Facilities and Auxiliary Features." In order to set at rest any future controversies between the Colorado-Big Thompson Project and those projects in Western Colorado which would be authorized by the passage of H.R. 4671 or other similar legislation, Title V, Section 501(e) of H.R. 4671 sets forth the interpretation of paragraph (i) in a manner which has the official approval of the State of Colorado and which I hereby strongly support in behalf of Northern Colorado Water Conservancy District.

On the condition that the language now embodied in Section 501(e) remains an unaltered part of any Colorado River Basin Project legislation, Northern Colorado Water Conservancy District can agree to the authorization of any or all of the Colorado projects enumerated in Section 501(a) and, therefore, can concur with the position of the State of Colorado in support of H.R. 4671 as set forth in your "Committee Print No. 19, Recommended Revision of H.R. 4671," dated April 25, 1966.

STATEMENT OF J. SID NICHOLS, PRESIDENT, SOUTHEASTERN COLORADO WATER CONSERVANCY DISTRICT, BEFORE THE IRRIGATION AND RECLAMATION SUBCOMMITTEE OF THE INTERIOR AND INSULAR AFFAIRS COMMITTEE, HOUSE OF REPRESENTATIVES, PERTAINING TO H.R. 4671 AND RELATED BILLS, WASHINGTON, D.C., MAY 9, 1966

Mr. Chairman and gentlemen of the committee, my name is J. Sid Nichols and I am President of the Southeastern Colorado Water Conservancy District which is the sponsor of the Fryingpan-Arkansas project and the corporate entity which has contracted with the United States Bureau of Reclamation for the construction and repayment of the reimbursable costs of the Fryingpan-Arkansas project located in the State of Colorado. The Fryingpan-Arkansas project diverts waters from tributaries of the Colorado River to the drainage of the Arkansas River basin in Colorado by means of a transmountain tunnel. This water enters the Arkansas River at its head where it is commingled with Arkansas River waters and the combination is stored in various reservoirs and regulated for the benefit of cities, farmers, and also provides flood control and generates electricity. By virtue of the Fryingpan-Arkansas project, the South-

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eastern Colorado Water Conservancy District is directly and vitally interested in projects which concern the Colorado River.

H.R. 4671 has been subjected to the closest scrutiny by our District. Our late project manager, Charles Boustead, and our directors have spent many days in their efforts to refine and rephrase the early drafts of this proposed legislation so that the same could be rewritten in an acceptable form. The present form of H.R. 4671 is a compromise effected as a result of great effort and it has been officially approved by the State of Colorado and the Southeastern Colorado Water Conservancy District. In its present form, it represents unified thinking of the water interests throughout the entire State of Colorado.

Our District has a genuine interest in two specific sections of the revised bill, the same being sections 501(d) and 501(e) of Title V of H.R. 4671. 501(d) is the result of the endorsement of our District adopted at its Board of Directors meeting held on October 14, 1965, at which time the resolution of our District provided:

"Resolved, that the basic premises of the draft of 9/20/65 of H.R. 4671 be approved.

Resolved further, that said bill be strengthened to:

(1) Protect Upper Basin future use as against the temporary use of water by the Lower Basin.

(2) Legislation authorizing Colorado Projects listed in such Bill based on future feasibility reports by the Secretary of the Interior contain specific provisions protecting now existing or authorized Colorado Federal Reclamation Projects as against the requirements of such future projects in Colorado."

501(d) relates to the operating principles of the Fryingpan-Arkansas project (House Document 130, 87th Congress, 1st Session). Paragraph 6(a) on page 2 thereof provides that the replacement capacity of Ruedi Reservoir of the Fryingpan-Arkansas project is limited to the protection of water decress in western Colorado *existing at the time of adoption of the operating principles* (December 9, 1960). 501(d) avoids future possible controversies in Colorado such as arose in connection with Senate Document No. 80. Colorado projects authorized by H.R. 4671, which projects did not have water rights decreed on or before December 9, 1960, do not have protection from Ruedi Reservoir storage. This has been agreed to in Colorado and is crystalized by this provision.

501(e) relates to the relative rights of priority of diversions to eastern Colorado under the Colorado-Big Thompson project as against the rights of western Colorado to store water in Green Mountain Reservoir of the Colorado-Big Thompson project. The Fryingpan-Arkansas project is not affected or concerned. 501(e) settles this issue to the satisfaction of western Colorado and eastern Colorado. It is solely an intrastate policy matter that arose under Senate Document No. 80 of the 75th Congress.

I would like to urge that H.R. 4671 be approved in its present form.

STATEMENT OF R. S. SHANNON, JR., PRESIDENT, DENVER BOARD OF WATER COMMISSIONERS, STATE OF COLORADO, BEFORE THE IRRIGATION AND RECLAMATION SUBCOMMITTEE OF THE INTERIOR AND INSULAR AFFAIRS COMMITTEE, HOUSE OF REPRESENTATIVES, PERTAINING TO H.R. 4671 AND RELATED BILLS, WASHINGTON, D.C., MAY 5, 1966

Mr. Chairman and gentlemen of the committee, my name is R. S. Shannon, Jr. I am the President of the Board of Water Commissioners of the City and County of Denver in the State of Colorado. The Board of Water Commissioners provides the municipal water supply for Denver and its metropolitan area. More than half of the people in Colorado live in this area and the Board of Water Commissioners serves two-thirds of these people.

During August of last year a statement was submitted to this Committee by Mr. Glenn G. Saunders, Chief Counsel of the Board of Water Commissioners which describes in some detail the dependence of the Denver metropolitan area for its continued prosperity and growth upon the waters of the Colorado River.

Our August, 1965 statement was directed toward the draft of H.R. 4671 which was then before this Committee and sets forth certain basic principles, which the Board of Water Commissioners felt and still feel are necessary for the protection of the Compact apportioned water resources of the Colorado River while providing for the needs of the growing populations of the Colorado River Basin states.

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Since the hearings of this Committee in August of last year, significant new concepts have been added to H.R. 4671 as a result of lengthy and fruitful negotiations among representatives of the Colorado River Basin states. While the Denver Water Board still adheres to the belief that its August statement of basic principles outlines the best long-range solution to the interstate problems of the critically water short Colorado River Basin, it is satisfied that the compromises which are now a part of the recommended revision of H.R. 4671 provide for a workable interim solution to those problems.

One of the significant new concepts which evolved from the negotiations on the interstate problems was the provision (now incorporated in Title V of the Recommended Revision of H.R. 4671 of April 25, 1966) for the authorization of five Reclamation projects which would use the waters of the Colorado River in western Colorado. The proposal for the authorization of those projects brings into focus an unresolved question affecting the stability of the eastern Colorado economy now dependent upon water from the Colorado River. The Denver metropolitan area is a part of this eastern Colorado economy.

The problem centers on the meaning and import of Senate Document No. 80, 75th Congress, 1st session, as that document defines the conditions of operation of that part of the Colorado-Big Thompson reclamation project known as Green Mountain Reservoir which is located on the Blue River, one of the major tributaries of the Colorado River. Denver's rights to the use of the waters of the Blue River, created by the people of Denver at a cost of more than 70 million dollars, are closely tied in with the operation of Green Mountain Reservoir under Senate Document No. 80, by reason of the incorporation of certain provisions of that document in the decree of the United States District Court for the District of Colorado which evidences Denver's rights in the Blue River. That decree does not purport to interpret Senate Document No. 80, but makes its terms the governing principles for the operation of Green Mountain Reservoir, whatever those terms may mean.

Doubt having arisen as to the true intent of Paragraph (i) of that section of the Document entitled "Manner of Operation of Project Facilities and Auxiliary Features" and in order to set at rest any such doubt which might cause internal disharmony within Colorado, representatives of water users and development agencies throughout the state agreed on what had been meant by those terms when they had originally been the subject of consideration in Congress. This harmonious interpretation was so universally received throughout the state that both houses of the Colorado Legislature, without a dissenting vote, adopted the agreed interpretation as the official policy of the State of Colorado just as that interpretation was adopted unanimously by the Colorado Water Conservation Board, the official water development agency of the State of Colorado composed of representatives of all the river basins in the state whose deliberations are presided over by the Governor as Chairman. This officially approved interpretation is offered to the Congress for adoption as Section 501(e) of the revised H.R. 4671.

The construction of the five proposed Colorado projects would materially benefit western Colorado and could not help but produce substantial, though incidental, benefits to eastern Colorado and the Denver metropolitan area. If there are elements in the Denver metropolitan area opposed to the full development of western Colorado within the available water resources of that area, they are not official, and I am not aware for that matter, of any such private attitude.

The major developments of western Colorado reclamation projects now in their completion stage, found their strongest support from a state-wide organization sparked by the Manager of the Denver Chamber of Commerce and totally supported by the Denver Board of Water Commissioners of which I am the current President. Even today we take the view that there must be positive action by the Congress for broadly based development of Colorado's water resources, giving full protection to varying and even conflicting interests. Thus we feel justified in insisting that Colorado development occur only under conditions that afford such protection to all elements of the state and that to accomplish this purpose, the construction of the five proposed reclamation projects in Colorado should be authorized by the Congress only on condition that Section 501(e) of the revised version of H.R. 4671 is also enacted by Congress into law. Such an enactment would be consistent with conditions already created by the Congress and intrudes on no other area of Federal authority.

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STATEMENT OF GRAND VALLEY IRRIGATION COMPANY, GRAND VALLEY WATER USERS ASSOCIATION, ORCHARD MESA IRRIGATION DISTRICT AND PALISADE IRRIGATION DISTRICT, COUNTY OF MESA, STATE OF COLORADO

DIRECTED TO THE IRRIGATION AND RECLAMATION SUBCOMMITTEE OF THE INTERIOR AND INSULAR AFFAIRS COMMITTEE, HOUSE OF REPRESENTATIVES, PERTAINING TO H.R. 4761 AND RELATED BILLS, WASHINGTON, D.C., MAY 9, 1966

Mr. Chairman and gentlemen of the committee, the undersigned are attorneys for Grand Valley Irrigation Company, Grand Valley Water Users Association, Orchard Mesa Irrigation District and Palisade Irrigation District. These water organizations represent the users of approximately 2,300 cubic feet of water from the Colorado River all of which is represented by stable, senior, established rights. The organizations are all centered at Grand Junction in Mesa County, Colorado.

Mesa County is in the extreme western portion of the State of Colorado and is contiguous to the State of Utah. This entire area is in the arid part of the West, and water is the basis of its economic and social structure. All of the water supplied by these companies and projects mentioned comes out of the Colorado River. Over 75,000 acres of land is irrigated from the Colorado River. The land irrigated from this Colorado River water is commonly regarded as highly productive. The area supports a population of 57,500. The economy is prosperous and expanding.

Paragraph 501(e) of the committee draft of H.R. 4671 relates to the Green Mountain Reservoir. This reservoir is the important installation in connection with the Colorado-Big Thompson Project and is most important to Western Colorado users of Colorado River water.

By Agreement with the United States and other water users in Colorado, certain trans-mountain diversions were made, which made less Colorado River water available for use in Western Colorado. This is compensated for by the Green Mountain Reservoir and in one irrigation season these organizations called for and used 67,000 acre feet of the storage in the reservoir. Anything which would lessen the amount of water available for retention in Green Mountain Reservoir would have the effect of lessening the water available for diversion in Mesa County, Colorado to fill the present Decrees. The basic understanding regarding the usage of Green Mountain Reservoir is embodied in Senate Document 80 of the 75th Congress, 1st Session. We regard Senate Document 80 as an inviolable compact between the United States and Western Colorado users of Colorado River water.

In addition, Senate Document 80 provided for the retention of water in Green Mountain Reservoir to be used for the future development of Western Colorado. This compact recognizes that, without additional water, the resources of Western Colorado cannot be developed.

We direct your attention to paragraph 501(e) of the committee draft of H.R. 4671. Without any intent or desire to comment on what we understand the effect of this wording to be, we take the following position:

1. We question whether the Congress should now say what the intention of the United States Senate, 75th Congress, First Session, was when it adopted Document No. 80;

2. Senate Document No. 80 has been interpreted by the United States District Court for the District of Colorado as being a contract. (Consolidated cases 2782–5016–5017). Accordingly, it is our position that only the United States Courts can interpret this Senate Document.

We further take the position that the water rights adjudicated for use out of the Colorado River are property rights created by Colorado State Law; they are vested rights and cannot lawfully be decreased by action of any legislative body. It has been represented to us that the proposed definition of language used in Senate Document No. 80 will have no affect on Green Mountain Reservoir and its working relationship with these organizations, or upon vested property rights. If this representation is correct, and if the Congress is of the opinion that such definition is not an attempt on its part to tell the United States Courts how vested property rights shall be treated, we have no objection to the proposed language.

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We submit this statement of position to record our beliefs and position. We urge the Congress of the United States to take no action which would purport to diminish existing adjudicated water rights.

Respectfully submitted.

GRAND VALLEY IRRIGATION COMPANY,
By EUGENE H. MAST,
Attorney at Law, Grand Junction, Colo.
GRAND VALLEY WATER USERS ASSOCIATION,
ORCHARD MESA IRRIGATION DISTRICT,
PALISADE IRRIGATION DISTRICT,
By ANTHONY W. WILLIAMS,
Attorney at Law, Grand Junction, Colo.

STATEMENT ON H.R. 4671 BY IVAL V. GOSLIN, EXECUTIVE DIRECTOR, UPPER COLORADO RIVER COMMISSION, BEFORE SUBCOMMITTEE ON IRRIGATION AND RECLAMATION, COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, HOUSE OF REPRESENTATIVES

Mr. Chairman and members of the committee, my name is Ival V. Goslin. I am Executive Director of the Upper Colorado River Commission. Our Commission was created by the Upper Colorado River Basin Compact. It is an interstate, administrative agency of the Upper Division States of the Colorado River Basin. These states are Colorado, New Mexico, Utah, and Wyoming.

Fundamentally our Upper Colorado River Commission is interested in H.R. 4671 and related bills to authorize a Lower Colorado River Basin project, or a Central Arizona unit, because of the imbalance that exists between the water supply of the Colorado River Basin and its other natural resources. Water resource development in this basin has reached the stage where any new, large project could have an impact on the future of other areas in the basin. Due to the present water shortage in the Lower Colorado River Basin and the impending shortage in the Upper Basin these two regions are more closely interrelated with respect to water development than they have ever been in the past. For instance, as emphasized at the hearings on H.R. 4671 last August, the operation of a large, water consuming project in the Lower Basin is possible only by temporarily utilizing in part, presently unused water apportioned in 1922 to the Upper Basin by the Colorado River Compact.[1]

When the 1922 compact was negotiated a consumptive use of 7.5 million acre-feet of water was apportioned to the Upper Basin. We are now faced with the hydrologic reality that even with the extensive hold-over storage facilities, Upper Basin development is destined to a permanent shortage of about 20% of its anticipated use of Colorado River water.[2] Our neighbors in Arizona, California, and Nevada are also encountering painful impediments to their expansion because there is not enough Lower Basin water available for another large-scale project after taking into consideration the Mexican Treaty obligation, existing consumptive uses in the Lower Basin, evaporation, and other losses.

There is broad and general agreement that the water supply of the Colorado River is deficient for potential requirements of both the Upper and Lower Basins, as well as with respect to compact allotments. Therefore, the Upper Basin water people are apprehensive that without protective measures in the pending legislation, the Upper Basin would be forced to stand alone against the adverse effects of nature's failure to supply the amount of water contemplated when the Colorado River Compact was written in 1922.

There are currently extensive storage dams and reservoirs on the Colorado River. Their primary purpose is for regulation of the river in order to fulfill the compact guarantee to deliver 75 million acre-feet to the Lower Basin in each period of ten years while consumptively using upstream as much of the water as needed within the Upper Basin's apportionment. With the river under controlled conditions, the most important factor, so far as the water supply for the Lower Basin is concerned, is the amount of water released from Upper Basin reservoirs for delivery at Lee Ferry, Arizona.

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[1] Hearings before Subcommittee on Irrigation and Reclamation, House of Representatives on H.R. 4671, Tipton Report, 1965, p. 476. Also, see testimony of Mr. W. Don Maughan, p. 531.
[2] Hearings, p. 475.

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Due to the above-outlined situation, described in detail at the hearings in August 1965, the Upper Colorado River Commission at the previous hearings suggested several amendments to the pending legislation for the consideration of this Committee.[3] Last August there was not complete agreement among the seven states, nor between the two Basins, with respect to these amendments; although there was close to general consensus on several fundamental factors, or certain principles with respect to the rights, obligations, and requirements of each basin as against the other.[4] Since the hearings of last summer there have been many meetings and conferences of representatives of the seven Colorado River Basin States in attempts to attain a final agreement on all particulars that could be presented to this Committee as being unequivocally supported by all of the Basin States. Although the goal of complete agreement was not reached, it is believed that we have a much better understanding of each other's problems in the basin than has ever existed in the past. Certainly it was in recognition of this spirit that Committee Print No. 19, a recommended revision of H.R. 4671 that came from the negotiations among the Colorado River Basin States, was prepared and presented to this Committee for its consideration. The Upper Colorado River Commission on February 22, 1966, adopted a resolution by a four to one vote, New Mexico being opposed. In this resolution the Commission stated that it regards a predecessor draft of Committe Print No. 19 (a *Recommended Revision* of H.R. 4671 dated February 8, 1966, subsequently slightly revised and dated February 22, 1966) "as one vehicle for implementing its resolution of August 16, 1965, to be submitted to the Interior and Insular Affairs Committees of the United States Congress for their consideration and aid in formulating and enacting a law that will include, among other features, the principles and criteria expressed in said *Recommended Revision*."[5] A copy of the Commission's resolution of February 22, 1966, is attached to this statement. Therefore, in the light of testimony by representatives of the Lower Basin that has already been heard, the Committee Print is intended to reflect the results of negotiations that have been achieved between the Upper and Lower Division States.

Conferences among the States and between the two basins have produced several recommended changes in the language of the original H.R. 4671, as shown in Committee Print No. 19. It is my purpose to cite the major modifications made by the Committee Print and to briefly describe their meanings and objectives.

(1) Title I has been changed from Lower Colorado River Basin Project to Colorado River Basin Project in order to more adequately describe the true nature of the Bill. The Bill is now intended to be for the benefit of the entire Colorado River Basin. As our studies and negotiations progressed it became more and more evident that close interrelationships of operational procedures involving water storage and regulating facilities in the Upper and Lower Basins require the solution of problems for the entire river—not for only part of it. In the future this close interrelationship will play an even more important role. Each of the changes made in Title I has as its purpose the conversion of H.R. 4671 into a Bill with basin-wide implications.

(2) In Title II of the original H.R. 4671 the Secretary of the Interior was to investigate present and future water supplies and needs, and the possible importation of water into the Basin, as well as other means of augmenting the water supplies. He was also to submit to the President and Congress within three years a plan to import not less than 2.5 million acre-feet per year into the Colorado River. He was to suggest means to protect areas of origin of the imported water.

In the Committee Print the Secretary is authorized and directed to investigate present and future water supplies and needs, possible importation plans, and other means to augment water supplies in both the Upper and Lower Basins. He is also to submit to Federal, State, and other agencies by the year 1970 a first-stage of an importation plan for not less than 2.5 million acre-feet of water per year. He may also plan, as part of the first stage, facilities to include two million acre-feet of imported water for the Lower Basin, two million acre-feet for the Upper Basin, and two million acre-feet to be used in other States along the importation route. The Mexican Treaty water-delivery obligation is declared to be a national obligation. The Colorado River Basin States would be relieved of this burden when not less than 2.5 million acre-feet of water are imported into

[3] Hearings, pp. 506–511.
[4] Hearings, Hon. Morris Udall, p. 39, and I. V. Goslin, p. 500.
[5] Hearings, pp. 511–512.

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the Colorado River. Greater protection is also given to areas of origin of imported water by giving priority of right in perpetuity to uses of water to the State within which the water originates, as against the uses of water delivered by means of exportation facilities.

(3) In Title III, Section 303 (a) adds a provision covering the capacity of the diversion works to carry water to the Central Arizona Project by providing that such works shall be of sufficient size to deliver "an average annual diversion of 1,200,000 acre-feet of Colorado River system water * * *." This language refers only to the size of the diversion works and has absolutely nothing to do with the amount of water to which the Central Arizona Unit may be entitled. For instance., as the Upper Division States increase their uses of water in the future the amount of water that will be available for use in the Lower Basin and for the Central Arizona Project will correspondingly be reduced as borne out by testimony of witnesses at previous hearings on this Bill.[6] Also the amount of water available to the Lower Basin will be subject to the operating criteria established in Title VI of the Bill.

(4) Under the terms of Section 306 of the original H.R. 4671 the Southern Nevada Water Supply unit would have been authorized for construction. Because this project has heretofore been authorized, in Section 308 of the Committee Print it is integrated into the Colorado River Basin Project as a unit thereof under repayment arrangements and participation in the Development Fund established by Title IV.[7]

(5) Title V of the Committee Print reflects the results of part of the negotiations among the Basin States since the hearings of last August. Section 501 of Title V of the Committee Print amends the Colorado River Storage Project Act (70 Stat. 105) by authorizing the construction of the Animas-LaPlata Project in Colorado and New Mexico, and the Dallas Creek, Dolores, San Miguel, and West Divide Projects in Colorado. In order to fund the cost of construction of the foregoing five projects, Section 12 of the Colorado River Storage Project Act is amended by increasing the sum authorized to be appropriated by $360,000,000.

(6) The Secretary of the Interior will be authorized to establish land classification standards and land class equivialents for the one-ownership, irrigable acreage of farm units on the five Colorado participating projects to be authorized and for the Seedskadee project in Wyoming. The Seedskadee project is included at the request of the State of Wyoming because past experience and preliminary studies currently being made at a development farm indicate the necessity and advisability of adjusting the acreage of farms in the area in order to provide an adequate living for a farm family.

Other projects in Colorado, Utah, and Wyoming are to be given priority of planning status in the same manner as those potential projects in Section 2 of the Colorado River Storage Project Act.

(7) Section 502 provides for the use of the Colorado River Development Fund created by Section 2 of the Boulder Canyon Project Adjustment Act[8] to reimburse the Upper Colorado River Basin Fund for expenditures made in connection with the diminutions in generation by the Hoover Dam Powerplant attributed to the filling of reservoirs of the Colorado River Storage Project. After June 1, 1987, the termination date of the Colorado River Development Fund, if there is any deficiency remaining in repayment of the costs of power diminutions, the amount of that deficiency shall be transferred to the Upper Colorado River Basin Fund from the Lower Colorado River Basin Development Fund that is to be created under the terms of paragraph (d) of Section 403 of H.R. 4671.

(8) Governor Love has already described for you the nature and necessity for Sections 501(d) and 501(e) of the Committee Print that apply only to the State of Colorado.

(9) A new Title VI has been incorporated into the Committee Print. It, too, is the result of the interbasin and interstate negotiations of the past eight months. The primary purpose of Section 601 is to require the Secretary of the Interior to promulgate equitable criteria for coordinated long-range operation of reservoirs on the Colorado River after an exchange of views with the Seven Colorado

[6] Hearings, Hon. Floyd E. Dominy, Commissioner of Reclamation, p. 236. R. J. Tipton, p. 476. W. Don Maughan, p. 534.

[7] The Southern Nevada Water Supply Project was authorized by the Act of October 22, 1965 (79 Stat. 1068).

[8] U.S.C., 1940 ed., title 43, sec. 618a (d), as amended (62 Stat. 284).

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River Basin States and parties to affected contracts with the United States. These criteria relate to the storage of water in Storage Units of the Colorado River Storage Project Project and releases of water from Lake Powell. The storage and releases of water are subject to certain specified priorities, the first of which is to supply half the deficiency described in Article III (c) of the Colorado River Compact relating to the Mexican Treaty burden of the Upper Colorado River Basin States, if such burden exists, and is chargeable. The second is to release water to comply with Article III (d) of the Colorado River Compact, i.e., to supply 75 million acre-feet of water at Lee Ferry in any period of ten consecutive years. The third is the storage of water not required for the two purposes mentioned above to the extent that the Secretary, after consultation with interested parties, shall find to be reasonably necessary to assure deliveries at Lee Ferry without impairing consumptive uses in the Upper Basin apportioned to that Basin by the Colorado River Compact. Water not required to be stored to enable the Upper Basin to meet its Mexican Treaty delivery, if it is determined that it has this obligation under Article III (c) of the Compact, or the 75,000,000 acre-feet delivery in ten years under Article III (d), or for consumptive uses in the Upper Basin, shall be released from Lake Powell: (i) when it can reasonably be applied in the Lower Division States to agricultural and domestic purposes, but no such releases shall be made if the active storage in Lake Powell is less than the active storage in Lake Mead; (ii) to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell; (iii) to avoid anticipated spills from Lake Powell.

The administration of Section 7 of the Colorado River Storage Project Act[9] is to be in compliance with the above-outlined procedures.

It should be noted that the criteria of Section 601 are of importance in the protection of compact rights of those Upper Division States that still have Colorado River system water remaining to be developed. They are also of importance to the Lower Division States in that they describe the equitable manner in which the river shall be operated. The directives to the Secretary with regard to consultations with the States in storing and releasing water at reservoirs under certain specified criteria seem highly desirable to all interests in the Basin.

This section places some degree of responsibility for a continuing study and cooperative action in the hands of State officials. It should lead to improved Federal-State relationships on the River. It also provides for integrated and coordinated operation of all major Federal dams and reservoirs in the Colorado River Basin. When considered in relation to other portions of H.R. 4671 and the Colorado River Storage Project Act the new provisions of Title VI should maximize the consumptive use of water and generation of hydroelectric energy for the benefit of both the States and the Federal government.

It should be particularly noted that under the terms of Section 601 water may be released from Lake Powell to supply one-half the deficiencies of the Mexican Treaty burden, if any such deficiencies exist, and are chargeable to the States of the Upper Division. The determination of the existence and magnitude of such a deficiency remains for the future, unless the Mexican Treaty burden is filled by water imported into the Colorado River Basin before the obligation under the Mexican Treaty curtails the water development in the Upper Basin.

In response to the request of engineers of several Basin States, representatives of Regions 3 and 4 of the Bureau of Reclamation, the Office of the Bureau's Chief Engineer, and representatives of the Washington office of the Bureau have studied the effects of the terms of Section 601 on the operation of dams and reservoirs on the Colorado River. The Bureau of Reclamation has indicated that it can satisfactorily operate the reservoirs on the Colorado River under the criteria of Section 601. The Bureau suggested several modifications in the original draft of this Section, and these changes are incorporated in the language of the Committee Print. A copy of a letter from Commissioner Floyd E. Dominy, dated February 9, 1966, and the original comments of the Bureau of Reclamation on Section 601 are attached to this statement. It was on the basis of *these* comments that substantial agreement on the language of Section 601 was reached by six of the seven Basin States.

The operating criteria of Section 601 will become effective upon enactment of H.R. 4671. They will replace the Secretary's Glen Canyon reservoir filling criteria except for that portion relating to allowances for "deficiencies" in genera-

[9] 70 Stat. 109.

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tion at Hoover Dam.[10] These "deficiencies" will continue to be computed, but their cost will be paid as specified in Section 502 of the Committee Print.

As stated by Governor Love, one of the principal objections of the majority of water interests in the Upper Basin to the original H.R. 4671 was the lack of guide lines for the Secretary of the Interior to follow in his operation of the river. It is my personal opinion that, although the language of Committee Print No. 19 indicates some departure from the terms of our Commission's resolution of last year, it does represent one means of implementing the principles of that resolution. It also appears to be a practical solution to some of the many problems facing water users on the Colorado River.

(10) In conformity with the often-expressed statements of water people of the Lower Basin that they have no desire to adversely affect, impair, or preclude water development in the Upper Division States, Section 602 specifies that "rights of the upper basin to the consumptive use of water apportioned to that basin from the Colorado River system by the Colorado River Compact shall not be reduced or prejudiced by any use thereof in the lower basin."

(11) New provisions in Section 604 of Committee Print No. 19 authorize and direct the Secretary of the Interior to report to the President, the Congress and the seven Governors of the Colorado River Basin States on annual consumptive uses and losses of water from the Colorado River System. Such reports are to be made at five-year intervals after consultation with the Basin States. The Secretary is also required to condition all contracts for delivery of Colorado River water upon its availability under the Colorado River Compact. If the Secretary fails to comply with the terms of the laws, compacts, treaty, and the recent decree in *Arizona* v. *California* that constitute the "law of the river" provision is made for suit in the U.S. Supreme Court. Under the original language, if the Secretary failed to comply there was authority for such a suit, but it could be remanded to the Federal District Court of the District of Columbia for trial.

(12) The Colorado-Pacific Regional Water Commission has been expanded in Title VII of the Committee Print to include representatives of Colorado and Wyoming. Also, if an investigation is made involving a proposal to export water from the Columbia River each State in that Basin shall be represented by a member of the Colorado-Pacific Regional Water Commission.

Although there are others, the foregoing twelve numbered items constitute the major differences between Committee Print No. 19 and the originally-introduced H.R. 4671 and companion Bills.

Mr. Chairman, thank you for the opportunity to present this statement to your Committee.

RESOLUTION BY UPPER COLORADO RIVER COMMISSION

(Re: H.R. 4671 Recommended Revision)

Whereas the Upper Colorado River Commission at an adjourned regular meeting assembled at Salt Lake City, Utah on August 16, 1965 by formal resolution approved without endorsing any specific legislation and supported proposed federal participation in the further development of the Colorado River Basin: *Provided*, certain principles to protect the future water resources development program in the Upper Division States under the Colorado River Compact are incorporated into any authorizing legislation; and

Whereas for many months members of the Upper Colorado River Commission, its Legal and Engineering Committees, its Staff, et al., representing the States of Colorado, New Mexico, Utah, and Wyoming have participated in extensive negotiations with like representatives of water resource and hydro-electric power generating entities of the three Lower Division States in efforts to have included the principles of the Commission's resolution in H.R. 4671, a Bill currently pending in the United States Congress which, if enacted, among other things, would authorize the Secretary of the Interior to construct, operate and maintain a Lower Colorado River Basin Project; and

Whereas a certain draft of H.R. 4671, dated February 8, 1966, and described as a *Recommended Revision* is the result of many difficult negotiations: Now, therefore, be it

[10] "General Principles to Govern, and Operating Criteria for, Glen Canyon Reservoir (Lake Powell) and Lake Mead During the Lake Powell Filling Period," approved by the Secretary of the Interior on April 2, 1962 (27 F.R. 6851), together with any amendments or modifications thereof.

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Resolved by the Upper Colorado River Commission at an adjourned annual meeting assembled at Cheyenne, Wyoming this 22d day of February, 1966, That it regards the February 8, 1966 *Recommended Revision* of H.R. 4671 as one vehicle for implementing its resolution of August 16, 1965 to be submitted to the Interior and Insular Affairs Committees of the United States Congress for their consideration and aid in formulating and enacting a law that will include, among other features, the principles and criteria expressed in said *Recommended Revision;* be it further

Resolved, That the Upper Colorado River Commission instruct its staff: (1) to continue liaison with appropriate representatives of the Colorado River Basin States and members of the Congressional delegations of those States, (2) to closely follow all events in the Congress related to H.R. 4671 or similar legislation and keep the Commissioners and their advisers currently advised, (3) to cooperate with all necessary and interested parties and agencies in attaining the enactment of reasonable and practicable legislation that will accomplish the major purposes of H.R. 4671 and at the same time protect the rights of the Upper Basin States to their future consumptive-uses of Colorado River under the water by implementing the intent and purposes of and operations under the Colorado River Storage Project Act (70 Stat. 105).

CERTIFICATE

I, Ival V. Goslin, Executive Director of the Upper Colorado River Commission, we do hereby certify that the above Resolution was adopted by the Upper Colorado River Commission at an Adjourned Annual Meeting held at Cheyenne, Wyoming on February 22, 1966.

Witness my hand this 23rd day of February, 1966.

IVAL V. GOSLIN, *Executive Director.*

U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D.C., February 9, 1966.

Mr. IVAL GOSLIN,
Executive Director,
Upper Colorado River Commission,
Salt Lake City, Utah.

DEAR MR. GOSLIN: In fulfillment of the commitment made by representatives of the Bureau of Reclamation at the meeting of Colorado River interests in Los Angeles on January 27, there are enclosed copies of "Comments of the Bureau of Reclamation on Section 601 of Proposed Revision of H.R. 4671—Draft of January 27, 1966."

These comments comprise our technical evaluation of how the language of Section 601 would affect reservoir operations in the Colorado River Basin. They are not intended to express a policy position.

Time did not permit the running of detailed reservoir operation studies to test various conditions, and shortcut methods of evaluation were used. We are confident, however, that the evaluations made permit valid conclusions.

We would appreciate your distributing copies of these comments to your colleagues in the Upper Basin.

Sincerely yours,

FLOYD E. DOMINY, *Commissioner.*

COMMENTS OF BUREAU OF RECLAMATION, FEBRUARY 9, 1966, ON SECTION 601 OF PROPOSED REVISION OF H.R. 4671 DRAFT OF JANUARY 27, 1966

At the culmination of a meeting in Los Angeles among representatives of the seven Colorado River Basin States and of other Basin interests on the Colorado River Basin Project, a Proposed Revision of H.R. 4671 (Draft of January 27, 1966) was prepared. As indicated on page 31 of the draft, the language of Section 601 is in abeyance pending receipt of the comments of the Bureau of Reclamation on the language stated in that section of the draft. The comments which follow comprise a technical evaluation of how the language of Section 601 would affect reservoir operations in the Colorado River Basin. They are not intended to express a policy position.

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Section 601 would direct the Secretary of the Interior, in consultation with the official representatives of each of the seven Colorado River Basin States and with affected contractual interests, to promulgate equitable criteria for the coordinated long-range operation of reservoirs constructed under the authority of the proposed act, the Colorado River Storage Project Act, and the Boulder Canyon Project Act. It sets forth the broad objective to be attained by such criteria and, in that portion of Section 601 through the middle of the sentence on line 15, page 33, it outlines in broad terms guiding policies to be followed. That portion of Section 601 beginning with the middle of the sentence on line 15, page 33, through line 3, page 34, sets forth more specific and detailed provisions to be incorporated in the criteria.

Subject to some comments for clarification which shall be made later, we believe that that portion of Section 601 through the middle of line 15 of page 33 is clearly stated. The intent of the broad guidelines presented therein is readily understandable and the effect of their application can be anticipated.

That portion of Section 601 encompassed from the middle of line 15 of page 33 through line 3 of page 34 sets forth specific criteria that will apply to a myriad of conditions in the future. It is impossible to anticipate all of the combinations of hydrologic sequences and economic and financial factors that will occur in the future and to evaluate precisely the effect of applying rigid criteria under all such conditions. Strict adherence to these specific criteria under some future conditions might require, temporarily, a reservoir operation which would not be the optimum operation, given those conditions. We believe, however, that such occasions would be rare, of a few months duration at the most, and of minor consequence.

Section 601(a) is clear. In promulgating equitable criteria for the coordinated operation of reservoirs, such criteria, as we interpret this subsection, will cover all aspects of reservoir operation, including water supply, power, flood control, and others, for which the reservoirs were constructed.

Under 601(a), the criteria would become effective upon termination of the Glen Canyon filling criteria or upon initiation of delivery of water through the Granite Reef Aqueduct of the Central Arizona Unit, whichever event first occurs. We interpret this section to mean that, should the filling criteria not be terminated prior to initiation of delivery of water through the Granite Reef Aqueduct, the filling criteria would continue until terminated at some later date. We anticipate there would be no change in the manner of determining deficiencies in Hoover generation during the remainder of the filling period, but that the matter of payments for such deficiencies would be governed by Section 502 of the bill. To the extent that we can foresee, reservoir operations under Section 601 would not be inconsistent with reservoir operations permitted under the filling criteria. It is noted, however, that the filling criteria provide greater flexibility to the Secretary in reservoir operations than does Section 601 and this could result in an earlier termination of the filling criteria.

It has been suggested that Section 601 become applicable upon enactment of the bill. The comments made above would apply in this instance. Should Section 601 become effective as provided in the draft of January 27, we believe there is better than a fifty-fifty chance that the filling criteria could be terminated by fulfillment of hydrologic conditions by 1975. Should Section 601 become effective immediately, the chances of such termination would be much less. We do not believe that decision one way or the other on the effective date of Section 601 is critical.

Section 601(b), lines 4 through 13, contains a clear, concise statement of objective.

Section 601(b) (1) and (2) are, we believe, self-explanatory. However, as the first obligation on the river is the delivery of water to Mexico as required under the Mexican Water Treaty, we believe that it should have first priority. Consequently, we suggest that (1) and (2) be reversed in order. We cannot conceive that this will have any practical effect on reservoir operation under Section 601 as a whole.

Section 601(b)(3), line 4 through the middle of line 15, provides that, after meeting the releases required under (1) and (2) preceding, priority shall be given to the storage of water in the storage units of the Colorado River Storage Project to the extent reasonably necessary, considering all relevant factors, to assure deliveries under subparagraphs (1) and (2) without impairment of the consumptive uses in the Upper Basin pursuant to the Colorado River Compact.

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We believe this to be consistent with the intent of the Colorado River Storage Project Act and, that the language provides the Secretary, after consultation with Basin interests, the necessary latitude in determining the extent of storage reasonably required. Among the relevant factors to be considered in making determinations, major emphasis certainly will be given to critical periods of streamflow record. As the Upper Basin depletions increase with time, the controlling critical periods will lengthen and the required amounts of carryover storage will increase. The establishment of requirements for carryover storage based on critical period considerations alone could lead to a risk of reservoir spills and wastage, or overdelivery of water to Mexico. Therefore, it would be proper to consider also probability of water supply as provided in Section 601(b)(3). Also, the production of power and energy is a relevant factor that must be considered if the financial feasibility of Federal developments in the Colorado River Basin is to be reasonably assured.

The remainder of Section 601(b)(3) sets forth specific criteria for the distribution of water available in excess of that required for (1), (2), and the first part of (3) preceding. This is by far the most difficult portion of Section 601 to understand and evaluate. Before commenting specifically on the language involved, some general comments would appear appropriate.

During prolonged periods of low runoff, there would be no available excess water and this latter portion of (3) would not apply. During prolonged periods of high runoff when excess water is available, the problems of reservoir operation are not critical and the application of this latter portion of (3) would not be of particular significance. Thus, it is only within the remaining ranges of runoff sequences that the criteria specified would be particularly meaningful. Furthermore, based on our projection of future Upper Basin depletions, the requirements for carryover storage in the Upper Basin reservoirs would, within 20 to 25 years, be such that only on rare occasions would there be available excess waters to which the criteria of the latter part of (3) would apply. Therefore, both the conditions and the period under which these criteria would have practical application would be much less than might appear on the surface.

The latter part of Section 601(b)(3) contains three specific operating criteria, all qualified by the proviso beginning on line 23. As developed hereafter, it appears to us that the proviso should be a limitation only to the first listed criterion. It is not clear from the draft that the order of listing establishes a priority for their application. This might well be clarified, but as a practical matter it appears irrelevant.

The first listed criterion (i) provides that excess water available as defined above shall be released from Lake Powell to the extent it can be reasonably applied in the States of the Lower Division to the uses specified in Article III(e) of the Colorado River Compact. This appears to be consistent with Article III(e) of the Compact. The proviso beginning on line 23, however, would modify this criterion to the extent that no releases would be made when the active storage in Lake Powell is less than the active storage in Lake Mead. The proviso would have as its objective the equalizing of active storage in Lake Powell and Lake Mead and would establish the firm policy that water in Lake Powell not needed to meet the requirements of 601(b) (1), (2), and the first part of (3), would not be made available to meet Lower Basin consumptive uses when active storage in Lake Mead is greater than active storage in Lake Powell.

The second listed criterion (ii) has as its objective the distribution of available excess water in such manner as to equalize as nearly as practicable active storage in Lake Mead and Lake Powell. This general objective has been basic to past studies of the Bureau of Reclamation involving Colorado River reservoirs and we believe it should apply generally in the future. We can visualize conditions, however, where it would be desirable and to the advantage of all concerned to operate over a limited period of time in a manner different than that specified in (ii), particularly when both Lake Powell and Lake Mead have substantial reserves of storage. However, we do not regard this as serious. The proviso beginning on line 23 appears to be redundant when applied to (ii).

Two questions were raised at the Los Angeles meeting relating to the effect of (ii):

(a) Would it be possible for Lake Mead power facilities to be inoperative because of application of (ii) due to the lake level being below elevation 1083 while at the same time Glen Canyon power facilities would be in operation and Lake Powell would be storing excess water?

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(b) Would it not be more equitable to acquire equal amounts of water in Lake Powell and Lake Mead above respective minimum power pools in both reservoirs under (ii) rather than above the respective dead storage levels?

In answer to question (a), we believe that if Section 601 does not become effective until such time as provided in 601(a), the condition described could not occur. If Section 601 were to become effective immediately, it would be theoretically possible, although practically impossible, for such a condition to occur. During the next seven years it will be necessary for Lake Powell to release at least 59 million acre-feet to meet the Upper Basin obligation under Article III(d) of the Compact for the decade 1963–1972. Absent this requirement, the possibility that the condition posed in question (a) could occur within the next seven years would be much more serious. During this period the required releases from Hoover are estimated to be slightly less than the minimum Lake Powell releases. Therefore, it is expected that Lake Mead will gain storage over the next seven years, or through the year 1972. By the end of 1972, the amount of storage required in Lake Powell for assurance of delivery of water required under Section 601(b) (1) and (2), taking all relevant factors into consideration, would almost certainly be close to or at 10.7 million acre-feet, the minimum active storage required for power production at Lake Mead. By 1975, the required storage would be subsantially above 10.7 million acre-feet. When 10.7 million acre-feet or more of storage are required, the priority granted to such storage by the first portion of Section 601(b)(3) would eliminate the possibility that item (ii) could cause the condition posed in question (a) to occur.

In respect to question (b), we ran comparative operation studies on the two bases for a selected average period of 30 years (1923–1952). The pertinent results of these studies are as follows:

Powerplant	Average power generation (billion kilowatt-hours)	
	Equalizing storage above dead storage level	Equalizing storage above minimum power pool
Hoover	3.84	3.88
Glen Canyon	4.14	4.08
Total	7.98	7.96

As can be seen, the differences are very small.

The third listed criterion (iii) is obviously consistent with sound principles of reservoir operation. The proviso beginning on line 23, as presently placed, would modfy (iii) and under certain circumstances would defeat the very objective of (iii). As stated earlier, it should be a limitation only on item (i).

Section 601(c) simply states that Section 7 of the Colorado River Storage Project Act shall be administered in accordance with the foregoing criteria. We can see no objection to this provision.

UPPER COLORADO RIVER COMMISSION,
Salt Lake City, Utah, April 5, 1966.

Memorandum to: Ival V. Goslin, Executive Director.
From: Paul L. Billhymer, General Counsel.
Subject: Bridge Canyon and Marble Canyon vs. Grand Canyon National Monument and Grand Canyon National Park.

Conservation interests, under the leadership of the Sierra Club of California, seek to secure the removal of authorization for Bridge and Marble Canyon dams from H.R. 4671. In summary, the chief objection is directed primarily toward Bridge Canyon Dam for the reason that it creates a reservoir which invades the National Monument and a small sector of the National Park. This group argues that this proposed invasion violates the announced national policy as found in

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the Antiquities Act (34 Stat. 225), the National Park Act (39 Stat. 535), and the Grand Canyon National Park Act (40 Stat. 1175). This national policy is that there is to be no invasion by reservoirs of the national parks or monuments which in any way destroys the pristine primitiveness of such national shrines. This group seeks to avoid the exception in Section 7 of the Grand National Park Act (16 U.S.C. 227) which authorized the utilization of the park for the development and maintenance of a governmental reclamation project by the suggestions that (a) the Section 7 exception is subject to the requirement that the reclamation project use of park area must be consistent with the primary use of the park and such invasion cannot be considered as consistent with park purposes; (b) Bridge Canyon Dam is purely a power dam and does not provide any needed reclamation purpose, and in fact is not a reclamation purpose; (c) there is no exception provided in the creation of Grand Canyon National Monument under the Antiquities Act in that the proclamation of President Hoover (47 Stat. 2547) does not authorize monument invasion; (d) a precedent of park invasion should not be permitted. This, in a summary way, sets forth the conservationists' position.

It is obvious from the above that their position is fundamentally a demand for a single-purpose use of Federal property. The question is—Has Congress announced by statutory enactment a national policy that national parks and monuments system are to be limited only to a single-purpose use?

It is to be remembered that the statutory enactments upon which the conservationists rely are but a facet of a total conservation program which began to develop at the beginning of this century. Under the aegis of Theodore Roosevelt a concerted effort toward a conservation program was started. Part of this program was the Reclamation Act of 1902 which called for national participation in the development of western public lands under a multiple-use concept. This conservation concept has continued to this day, and H.R. 4671 is but a part of the continuing stream of conservation measures enacted by Congress. Certainly the philosophy of multiple use in the conservation of our national resources is part of the "warp and woof" of this legislative fabric.

Another interesting enactment, which was a part of the conservation program, was the statute which provided for rights-of-way through public lands, enacted in February 1901 (31 Stat. 790, 16 U.S.C. 79), which provides as follows:

"The Secretary of the Interior is authorized and empowered, under general regulations to be fixed by him, to permit the use of rights-of-way through the public lands, forest, *and other reservations of the United States*, and the Yosemite and Sequoia National Parks, California, for electrical plants, poles, and lines for the generation and distribution of electrical power, and for telephone and telegraph purposes, and for canals, ditches, pipes, and pipe lines, *flumes, tunnels, or other water conduits, and for water plants, dams, and reservoirs used to promote irrigation or mining or quarrying*, or the manufacturing or cutting of timber or lumber, or the supplying of water for domestic, public, or any other beneficial uses to the extent of the ground occupied by such canals, ditches, flumes, tunnels, reservoirs, or other water conduits or water plants, or electrical or other works permitted hereunder, and not to exceed fifty feet on each side of the marginal limits thereof, or not to exceed fifty feet on each side of the center line of such pipes and pipe lines, electrical, telegraph, and telephone lines and poles, by any citizen, association, or corporation of the United States, where it is intended by such to exercise the use permitted under this section for any one or more of the purposes herein named: *Provided*, That such permits shall be allowed within or through any of said parks or any forest, military, Indian, or other reservation only upon the approval of the chief officer of the Department under whose supervision such park or reservation falls and upon a finding by him that the same is not incompatible with the public interest: *Provided further*, That all permits given under this section for telegraph and telephone purposes shall be subject to the provision of sections 1–6, and 8 of Title 47, regulating rights-of-way for telegraph companies over the public domain: *And provided further*, That any permission given by the Secretary of the Interior under the provisions of this section may be revoked by him or his successor in his discretion, and shall not be held to confer any right, or easement, or interest in, to, or over any public land, reservation, or park. Feb. 15, 1901, c. 372, 31 Stat. 790; March 4, 1940, c. 40, Sec. 2, 54 Stat. 43." [Emphasis supplied.]

Attention is called to the fact that Section 5 of the Grand Canyon National Park Act (16 U.S.C. 225) was specifically made subject to the 1901 Act wherever its applicability is consistent with the purposes of the Grand Canyon National

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Park. Note that in the above quoted portion of this Act the Secretary is specifically authorized to grant rights-of-way for dams and reservoirs "used to promote irrigation * * *." This would indicate that since Bridge Canyon will promote irrigation by the use of its power revenues to pay part of the cost of such feature it can be meaningfully connected with the Colorado River Basin Project (H.R. 4671). Certainly it would indicate that some of the sting of the conservationists' argument is ameliorated by this particular provision. This Act would also indicate that Congress was seeking to insure multiple use of Federal property without regard to the type of Federal property.

Turning now to the Antiquities Act it should be pointed out that the legislative history of this Act would indicate that perhaps President Hoover more than somewhat stretched the purpose of this Act when he created Grand Canyon National Monument. When the Antiquities Act was before the House in the 59th Congress an interesting dialogue took place between Mr. Stephens of Texas and Mr. Lacy, the sponsor of the Bill, with respect to the scope of this Act. This discussion appears in Volume 40, Congressional Record, page 7888, 59th Congress, First Session, and reads as follows:

"Mr. STEPHENS of Texas. Mr. Speaker, I desire to ask the gentleman whether this applies to all the public lands or only certain reservations made in the bill?

"Mr. LACY. There is no reservation made in the bill of any specific spot.

"Mr. STEPHENS of Texas. I think the bill would be preferable if it covered a particular spot and did not cover the entire public domain.

"Mr. LACY. There has been an effort made to have national parks in some of these regions, but this will merely make small reservations where the objects are of sufficient interest to preserve them.

"Mr. STEPHENS of Texas. Will that take this land off the market, or can they still be settled on as part of the public domain?

"Mr. LACY. It will take that portion of the reservation out of the market. It is meant to cover the cave dwellers and cliff dwellers.

"Mr. STEPHENS of Texas. How much land will be taken off the market in the Western States by the passage of the bill?

Mr. LACY. Not very much. The bill provides that it shall be the smallest area necessary for the care and maintenance of the objects to be preserved.

"Mr. STEPHENS of Texas. Would it be anything like the forest-reserve bill, by which seventy or eighty million acres of land in the U.S. have been tied up?

"Mr. LACY. Certainly not. The object is entirely different. It is to preserve these old objects of special interest and the Indian remains in the pueblos in the Southwest, whilst the other reserves the forests and water courses."

From the above quoted dialogue it seems obvious that the sponsor of this bill, which became the Antiquities Act, did not anticipate the use of the authority granted in the same to create reservations of the size of Grand Canyon National Monument. Undoubtedly at this late date this issue could not be raised, particularly in view of *Cameron* vs. *United States*, 252 U.S. 450, 64 L. Ed. 659. It does not indicate that Congress was here establishing a policy such as claimed by the Sierra Club and its followers.

Turning now to the National Park Act it is interesting to note that during the debate in the House on this very Act the question of the Grand Canyon National Monument being converted into a National Park was considered. Mr. Hayden, then a Representative from Arizona, indicated the desirability of such change in status, and at page 10364, Volume 53, Congressional Record, 64th Congress, First Session, had the following to say:

"Mr. HAYDEN. I am also satisfied that the water power and mineral resources can be made available for use without detracting from its grandeur in the slightest degree."

It is obvious from Mr. Hayden's statement that he had no intention of creating a park which would forever preclude multiple-purpose development of the national resources.

When the Senate considered this same bill it is of further interest that it struck the House provision which authorized grazing in the national parks—an obvious multiple use. From the debate it seems that the Senator from Wyoming was most concerned about the House provision authorizing grazing in Yellowstone National Park. His chief concern was not that the grazing would be an invasion of park purposes but rather that such grazing in Yellowstone might have deleterious effects upon the browse for wild animals. In Conference grazing was allowed in national parks except for Yellowstone.

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See section 3, 16 U.S.C. 3. Attention is also called to the fact that Section 4 of the National Park Act (16 U.S.C. 4), specifically provides that the provisions of the Act were not to in any way modify the provisions of the Act of 1901 previously cited. Note further that the Act of March 4, 1911 (36 Stat. 1253), as amended by the Act of May 7, 1952 (66 Stat. 96, 16 U.S.C. 5), authorizes the granting of multiple use of Federal public lands and reservations in granting rights-of-way for certain activities therein named.

It seems obvious that the National Park Act did not intend to create a system of single-purpose use of federal reservations of this type. Of course the multiple use authorized by the various provisions above outlined had to be consistent with the primary purposes of the reservation, but it is also obvious that Congress never intended that the federal national parks should be maintained in their virginal condition.

The "Conservationists" are fond of citing the last sentence of Section 1 of the National Park Act, particularly that part which reads "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 House Report No. 700, 64th Congress, First Session, which accompanied H.R. 15522, the Bill which became the National Park Act, it is clear that the House Committee on Public Lands was intent upon creating parks for the use and enjoyment of the people of the United States. Yet with this major purpose in mind there is indication in the action of Congress that this enjoyment was not to be such as to preclude other types of use of park property. For instance—in the Conference Report, House Report 1136, 64th Congress, First Session, in dealing with the question of livestock grazing in National Parks, the House Managers had the following to say:

"The provision which the commitee of conference recommends authorizes the Secretary of the Interior to grant the privilege of grazing live stock in any national park, monument, or reservation, except Yellowstone National Park. It has long been recognized that live-stock grazing in the mountains protect forests from fire. Again, it is well established that there are certain remote sections of the various parks which at the present time are not visited by tourists, and that there are grazing lands in these remote sections which are not used for any purpose now. It is believed that in these sections of the parks live stock should be permitted to graze upon the payment of reasonable fees. Certain revenues would thus accrue to the park administration, as well as providing an additional protection against forest fires. Whenever the needs of tourists make the granting of grazing permits inadvisable the Secretary of the Interior would, of course, deny admission of live stock to the park."

Note particularly the last sentence where the preservation of pristine beauty was not the prime consideration, but rather the multiple use (grazing) was not to interfere with the needs of the people visiting the parks. It would appear that so long as Bridge Canyon does not interfere with the people's use of the Park there could be no objection to the "invasion" of this park and monument, particularly in the light of the exception provided in the Grand Canyon National Park Act hereinafter mentioned.

Turning now to the Grand Canyon National Park Act (40 Stat. 1175), we find Mr. Hayden, then the Representative from Arizona, at page 1770 of Volume 57, Congressional Record, making the following statement:

"Mr. HAYDEN. The provision continued in the bill would authorize the Secretary of the Interior, when consisted with the primary purposes of the park—that is, not to impair its scenic beauty—to allow storage reservoirs to be constructed for conserving the water of the Colorado River for irrigation purposes. I understand that there are in the canyon a number of reservoir sites where it is proposed in time to come, when full utilization is made of that stream, to build reservoirs for the storage of water. If that can be done without disturbing the primary purpose of the park, there is authority in this bill to do so."

It seems obvious that Mr. Hayden was intent on preserving the possibility of reservoirs within the park for the multiple-purpose use of the resources of the Grand Canyon area. Of course he sought to indicate that the primary purpose of the park was not to be disturbed. It is just as obvious that there was no understanding that a reservoir would in any way disturb the primary purpose.

The nearest Congress ever came to specifically declaring any policy such as enunciated by the Sierra Club was Section 3 of Public Law 485, 84th Congress,

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Second Session, which reads: "It is the intention of Congress that no dam or reservoir constructed under the authorization of this Act shall be within any national park or monument.", and that part of Section 1—"That as part of the Glen Canyon Unit the Secretary of the Interior shall take adequate protective measures to preclude impairment of the Rainbow Bridge National Monument." Subsequent action by Congress clearly indicates that this, in fact, is not the national policy. When Congress was confronted with the costs for the necessary construction for such protection there was open rebellion and specific provision were provided in the Appropriations Acts with respect to the construction of Glen Canyon Dam which provided "that no part of the funds herein appropriated shall be available for construction or operation of facilities to prevent water of Lake Powell from entering any national monument." Clearly Congress was more concerned with the multiple-use possibilities of Federal property and refused to allow the protection of a single-purpose concept to be used as a means to dissipate the Federal Treasury.

One further word is needed with respect to the argument that the Bridge Canyon Dam would set a precedent which in future years would desecrate the whole Federal Park system. This argument is an insult to the integrity and ability of the Congress of the United States to carry out its legislative function under the Constitution. Congress is always called upon to make choices and distinctions in establishing policies with respect to Federal property. History indicates that choices have been made which have preserved the welfare of the citizens of this country. In fact, the whole conservation program is testimony to the ability of Congress to preserve and use the resources of the country in a manner consistent with great benefits to all of our citizens within the framework of competing demands. There is, therefore, no reason to fear that Congress will not in the future be able to distinguish and act upon this so-called precedent-setting situation so as to insure the integrity of the uses of Federal property.

From a study of the era when the concepts of national conservation developed it is obvious that Congress wished to provide ways and means of benefiting people. The Parks were created for the enjoyment and use of the people of the United States, and concurrently a reclamation program of public lands was developed as a part of the national conservation program for the benefit of people. In areas where it was necessary to use the public domain for both of these purposes, Congress indicated that both purposes should be expressed and made compatible as a part of an awakening consciousness for the need of a total conservation program.

Mr. ROGERS of Texas. Does that conclude your statement?

Governor LOVE. That concludes my statement, Mr. Chairman.

Mr. ROGERS of Texas. Do you have a statement, Mr. Sparks, to insert in the record?

Mr. SPARKS. None, Mr. Chairman. Mr. Cornelius is with us and does have a short statement.

Mr. ROGERS of Texas. Do you want that included in the record, Mr. Cornelius?

Mr. CORNELIUS. Yes, sir; I do.

Mr. ROGERS of Texas. Without objection, your statement will be included in the record, too.

Do you want to read your statement, Mr. Cornelius?

Mr. CORNELIUS. If you so desire.

Mr. ASPINALL. Mr. Chairman, the Colorado Water Conservation Board and the Governor determines the policies and Mr. Cornelius is here representing the Colorado Water Conservation Board, and I think he should present his statement.

Mr. ROGERS of Texas. Yes. Mr. Cornelius, you may proceed.

Mr. CORNELIUS. Thank you, sir. Chairman and members of the committee.

My name is Quincy C. Cornelius. I own and operate an irrigated farm located at Hooper in the Rio Grande River Basin of southern

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Colorado. While I do not farm in the Colorado River Basin, the location of the proposed projects, I can say from experience a dependable irrigation water supply is necessary for successful farming in Colorado.

I am appearing here on behalf of the Colorado Association of Soil Conservation Districts, of which I am now president. The association represents 94 member districts in Colorado with a farm population in excess of 150,000 and a farm and ranch area of about 57 million acres of land.

I am serving as a member of the Colorado Water Conservation Board. I was appointed to this board on May 12, 1963, by Governor Love. My appearance here before the committee is a very distinct privilege and a pleasure to me personally.

The Colorado Association of Soil Conservation Districts strongly endorses the Colorado River Basin project legislation, H.R. 4671. The construction of the five Colorado projects proposed for authorization by this legislation is a most vital and necessary step in a well-planned, correlated development of the soil and water resources of the Colorado River Basin in Colorado. This type of development is extremely important to the State.

A large part of our soil conservation work involves counseling on the use of irrigation water and the construction and rehabilitation of irrigation works on irrigated farms and ranches. Water conservation and soil conservation are very closely interrelated, and both are important to the continuation of a healthy and prosperous agriculture for the growing of the food requirements for the rapidly expanding population of the Nation.

We who are engaged in agriculture in Colorado know from experience the importance of a well-engineered, firm irrigation water supply. The fixed operating cost of irrigated agriculture requires that the annual variations of usable waters existing in the project areas be eliminated. A stable supply of water is absolutely necessary each and every year. The proposed projects will provide such a supply of water.

Historically, agriculture, including livestock and livestock products, has been the number one source of State income in Colorado. This income is largely dependent on the irrigation of land. Figures developed by the Bureau of Reclamation indicate that the five proposed projects, if fully developed, will provide for an increase in farm income of approximately 20 percent in the Colorado River Basin in Colorado. This increase will consist primarily of livestock and livestock products.

We in soil conservation work are happy to note that the Colorado projects incorporate many features which provide municipal and industrial water. We have always been advocates of the multipurpose principles of reclamation which lends considerable support to a balanced economy.

As President of the Colorado Association of Soil Conservation Districts, and as a member of the Colorado Water Conservation Board, I can assure you no water legislation has received greater study and consideration than this act. I am pleased to report that all sections of the State interested in soil and water conservation are unanimous in their endorsement of H.R. 4671.

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In conclusion, the Colorado Association of Soil Conservation Districts urges favorable action on this very important legislation for Colorado and the entire Colorado River Basin. It has been a pleasure to appear here and present the views of the membership of soil conservation districts.

Thank you, sir.

Mr. ROGERS of Texas. Thank you, Mr. Cornelius.

Mr. Aspinall?

Mr. ASPINALL. Mr. Chairman, I wish to commend the Governor and those associated with him for the statement that has been made and the way that it has been correlated with the statements of other representatives of Colorado.

Now, Governor, if I understand the position of Colorado, it is to this effect: Colorado supports the legislation set forth in the committee print, or something similar to the language of the committee print, providing the legislation calls for a study of importation into the Colorado River, providing that there are authorized the five participating projects of Colorado, and providing, further, that the operating criteria as set forth in 4671, the committee print, is a part of the legislation. Is that correct?

Governor LOVE. That is correct, Mr. Aspinall, with the further provision that we want the language that deals with Senate Document No. 80, in order to support the legislation, but what you said first certainly is correct, with that addendum.

Mr. ASPINALL. And with this understanding, Colorado's support would have to be withdrawn if any one of these important parts of the bill were left out of the legislation.

Governor LOVE. This is certainly true. We have had, as you know well, a great many meetings in Colorado in which the people attending, representing various vitally important and legitimate interests, have come to this agreement and, as a matter of Colorado policy, unless these are included, we cannot support the legislation.

Mr. ASPINALL. The assembly's action is dependent upon these principles, also.

Governor LOVE. This is certainly true.

Mr. ASPINALL. That is all.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Governor, first let me say it is always a pleasure to see you. Glad to have you here before us.

Governor LOVE. Thank you, sir.

Mr. SAYLOR. I have a number of questions which your statement has raised in my mind.

First, let me say that you folks from Colorado are pretty good bargainers. I always like to find a man who places $360 million as a price tag for support. I congratulate you, Governor. The people of your State are shrewd bargainers.

Now, as your statement went forward, Governor, and I listened to it with interest, it is very evident that you, as the Governor of a great State that creates most of the water that flows into this river realize that even in your State water is a tremendous problem, is that correct?

Governor LOVE. This is certainly true. I can't think of a more important subject to the citizens of Colorado than water.

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Mr. SAYLOR. Do you agree with the statements that were made by our three colleagues from Arizona that water is a national problem.

Governor LOVE. Yes. Based on the information I have and the statistics I have seen that indicate increases in population and the increased use of water per capita, and the supplies that are available, I think it is an increasing national problem.

Mr. SAYLOR. Now, then, Governor, if it is a national problem, the approach you have taken, the approach that the supporters of this legislation have taken, is that you are supporting a national problem on a fragmented basis of taking care of the needs of the seven States in the Colorado Basin.

Do you not think it would be a great deal better approach if this problem of water, being a national problem, was studied as a national problem, and the conclusions reached would affect the entire country and not just this little seven-State area?

Governor LOVE. Mr. Saylor, I would submit that I don't believe the two approaches are mutually exclusive. Certainly, I fully agree that there is a national problem and certainly, the Congress of the United States has a legitimate interest and concern. I would point out that we in the so-called semiarid West have lived with this problem more currently, more immediately, than the other portions of the United States, many of which are better watered.

As a consequence, we can point out with a good deal of statistical understanding to the immediacy of the problem in the Southwest and in the States of the Colorado River Basin. I believe that, therefore, we should not wait on comparable kinds of work nationwide. I think that this study and any solution to it would be a major contribution to the national solution.

Mr. SAYLOR. Now, Governor, let me ask you this. Is the entire deposit of oil shale in the United States within the confines of your State?

Governor LOVE. No, sir; it is not. There are portions of the oil shale deposits in the State of Utah and in Wyoming.

Mr. SAYLOR. I notice you appointed an oil shale advisory committee several years ago to keep you posted. I want to say that I saw some figures not long ago that indicate that there are probably several trillion barrels of oil involved in this oil shale.

Governor LOVE. I would correct it by saying it is big enough if you just say a little over a trillion barrels of oil, not several. That is more oil than you can think of.

Mr. SAYLOR. More oil. Let me tell you it is enough to make the situation a little greasy.

Now, my understanding is that if this oil shale industry is to continue operating in your State, it is going to need a good bit of water; isn't that correct?

Governor LOVE. That certainly is true.

Mr. SAYLOR. And I notice you say here that, on the bottom of page 6 and at the top of page 7, if the oil shale industry develops, you are going to take the water allocated to agriculture and convert it to urban industrial use. Is that anticipated?

Governor LOVE. Yes. I think that this indeed might well happen. In the State of Colorado, under the law that exists in regard to water, we have priorities of use, also, that is, the domestic and municipal uses in most instances are superior to that of agricultural.

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Mr. SAYLOR. Now, Mr. Cornelius, you have heard the Governor, and I read with interest your statement and your support, and the support of your organization is based on the agricultural development. Now, would you continue to support this if, within a very short period of years, you would see that all the water allocated to agriculture was converted to industrial and urban support?

Mr. CORNELIUS. Well, sir, it is well known that you can pay more for a drink of water than you can to irrigate with it. This is a truth that we must face. As the more valuable uses occur, the agricultural water will be bought to be applied for the more valuable uses.

Governor LOVE. Might I add, Mr. Saylor, to that, Mr. Sparks calls to my attention that the west divide project as now planned already allocates 77,500 acre-feet to industrial uses.

Mr. SAYLOR. Now, is this the only project that would allocate water to oil shale?

Governor LOVE. The oil shale industry as we expect it to develop is on the Colorado. The west divide project is the one that is in the position to serve it.

Mr. ASPINALL. If my colleague will yield, some time in the future the Yampa and White River projects might be brought into being. Then, of course, the possibility exists that water for oil shale development might be involved in that project.

Mr. SAYLOR. Now, Governor, I congratulate you on trying to get this west slope appropriation controversy settled. This is a big bill, but aren't you giving it a pretty big job to carry this, too? I see you want us to solve the problem of the Green Mountain Reservoir rights.

Governor LOVE. I think the problem is the language of Senate Document 80. Some people thought at least it was capable of expansion beyond the Green Mountain Reservoir. I know that the position of various interests in Colorado is that this controversy should be put to rest. I am sorry to have to bring it to the Congress, but it was a problem created by a congressional document and it needs to be brought back here for correction.

Mr. SAYLOR. Now, in section 501, in addition to the projects which are authorized, there are a number of projects which are authorized for study. Is it anticipated that within the foreseeable future, and by that, I mean, probably by the year 2000, that the State of Colorado will be in a position to use or to put into operation all of these projects?

Governor LOVE. Yes, sir; it is. I think, again, that depends on the understanding of the amount of water that is allocated to Colorado under the compact and the percentage that actually has be put to use as yet.

Mr. SAYLOR. And, of course, you heard our colleagues from Arizona say they were going to import water and I don't know where they are going to put it but perhaps near Pikes Peak, probably to grow those bananas referred to some time ago. You will have a couple of million more acre-feet up there.

Now, then, on page 11 of your statement you want the Secretary of the Interior to change the criteria for operating the releases of water from Lake Powell.

Governor LOVE. Yes, sir; that is so. We want it changed in conformity with the provisions of 4671 as revised.

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Mr. SAYLOR. Not only in the bill do they want them changed, but they want them reviewed annually. You don't have much confidence in that river out there or the water in it, do you?

Governor LOVE. It fluctuates as far as the amount of water that it does produce.

Mr. SAYLOR. Well, it says in section 601 that the Secretary is to promulgate equitable criteria for the coordinated long-range operation of the reservoirs under the authority of the various acts. Then, they want him to review it—have the Governor review it annually or his representative. It seems to me that instead of trying to settle things in the Colorado River Basin, nobody has much confidence, if you are going to review it annually. What do you think about that?

Mr. ASPINALL. If my colleague will yield to me, I think this is right down my colleague's line of thinking, because my colleague has always suggested that the operations of the Bureau of Reclamation be subject to review all the time, and inasmuch as the administrative responsibility is in the Secretary. All that the people in the Colorado River area or the Upper Colorado River Commission are asking is that they know from year to year what is involved.

Mr. SAYLOR. I didn't say that I disagree with what was proposed. I just wanted to know whether or not the Governor wanted to review it every year.

Governor LOVE. I think it would be helpful. I think, too, in connection with the criteria of the amount of storage water, that this is a thing that needs to be done continually.

Mr. SAYLOR. In other words, I just overheard a little comment that might be corrected, that it isn't the river you are worried about, it is the Secretary. [Laughter.]

Governor LOVE. How was that stated, that it might be true?

Mr. SAYLOR. No. In other words, this section says that you don't worry so much about the river, but you do worry about the Secretary. That might be a political question.

Governor LOVE. Let me answer it this way. I am concerned about the water.

Mr. SAYLOR. And, on the last page, at the bottom of page 11, you say that the problem of the Mexican Water Treaty has not been resolved to your satisfaction. What is the problem as you see it with regard to the Mexican Water Treaty that has not been resolved?

Governor LOVE. Very briefly, under the terms of the compact, the upper basin can be called upon to share in the providing of necessary waters when there is a shortage.

Now, when there is a shortage is a thing that is perhaps in dispute. It is possible that the—at least, Arizona may claim that the Gila is not part of the Colorado River system and does not need to be accounted for in determining whether there will be a call on the upper basin.

Mr. SAYLOR. Well, Governor, I might say the Supreme Court has already decided that for us.

Governor LOVE. I don't believe so.

Mr. SAYLOR. I think they were wrong, by the way, but they had the last guess.

Governor LOVE. No. I don't believe that for the purpose of the entire compact and for the purpose of the Mexican Treaty that there is

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any decision by the Court on the Gila as to whether it is part of the Colorado or not.

Mr. SAYLOR. Governor, once again, I want to thank you for your statement, your forthright answers to the questions I have given you. It is always a pleasure to see you.

Governor LOVE. Thank you, Mr. Saylor.

Mr. ROGERS of Texas. Mr. Johnson?

Mr. JOHNSON. Thank you, Mr. Chairman.

I have no questions but I, too, would like to congratulate the Governor here on a very fine statement.

Governor LOVE. Thank you very much.

Mr. JOHNSON. I have visited your State on some of the smaller projects and some pretty good-sized ones, and I am sure you are vitally interested in those that are included in this legislation, new projects in Colorado. Certainly, you, like the people in California, have had a great deal to resolve in bringing about an agreement on this particular piece of legislation. I think you are to be congratulated on that, too, for getting the people in the ring there who have been able to come out with some sort of an agreement.

While yours might be a little more conditional than ours, ours has some conditions, too.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Governor Love, I simply commend you on a very terse, very forthright, and very constructive statement, and I congratulate you and the other leaders in your great State, in behalf of all the people of Arizona for the most constructive way you have gone about settling these problems. I don't know where we would be if we didn't have at this crucial time in history the kind of people in all of the seven States who are willing to look to the future, forget old grievances, give and take a little here on this entire problem.

My friend from Pennsylvania has been anxious throughout the day to promote unity within the States, and unity within the basin, and I wouldn't want you to leave here without asking one further question. He implied that Arizona gave away the ball game to California, that the lower basin gave away the ball game to Colorado, and the upper basin. Would you think that in these negotiations and final draft that we have before us, that Colorado both got and gave some things?

Governor LOVE. The leaders of the various States have brought to this the best sort of thinking available. There has been give and take, and I believe that the proposed bill is one that will work for the benefit of the basin without specific harm that I can see to any one of the States.

Mr. UDALL. I thank you. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of California. Governor, would you enlarge a little bit on this sentence of yours on page 6 which states in part, "I would like to emphasize the importance of this"—meaning the West Divide project—"project in relationship to the emerging oil shale industry in Colorado."

Governor LOVE. Yes. As we discussed briefly, a few minutes ago, the location of this project is such that the area in which we expect this

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oil shale industry to develop can be served by water, which will be held by the dams, the facilities here involved, in the West Divide project.

Does this answer your question or do you want to know——

Mr. BURTON of California. In what respect? You mean the communities that will grow up as a result of this, or the industrial uses?

Governor LOVE. As far as the use of water by the oil shale industry, we don't know for sure yet. It depends in part on what process is used. Basically, we are thinking about the communities, the areas, the urban areas that will grow up around the oil shale industry, rather than so much water being used by the industry itself, although there will be that kind of use.

Mr. BURTON of California. Do you have anything that would be responsive to this concern of mine that we—the Congress have not yet dealt with this entire oil shale matter, and to what extent, if at all, would this project be in effect subsidizing with national taxpayer dollars, this projected industry?

Governor LOVE. I don't believe at all, just on a very brief review of the oil shale situation. The oil shale deposits were withdrawn from claim in 1920, was it? Some such time. And they have not yet—the great bulk of them—been released for mineral claims. There has been an industry that is getting a start on the more or less fringe areas that are under private ownership in which title did solidify. We also have under Government supervision a fine experimental plant that has been examining some of the processes of removing the oil from the shale at Rifle, Colo.

It would seem to me that, one, West Divide will stand on its own, as far as the benefit-cost ratio and the benefits it will produce. If it is used for domestic water, let us say, down the line, I am sure it will be, there will be repayment of proper and appropriate amounts for that use.

Mr. BURTON of California. What percentage of the water would you estimate would be the maximum percentage that the industry itself, as distinguished from the surrounding communities, would utilize?

Governor LOVE. About 50 percent, Mr. Sparks advises me. They are talking about at least two possible ways of developing oil shale. One is a mining process by which the shale itself is mined and hauled to a plant where it is processed. Another is refining in place, the processs in which heat, one form and another, would be placed down a hole, whether it be nuclear energy, whether it be steam and this, in turn, would depend upon how it works experimentally. But I think 50 percent, as far as we can tell, is an accurate figure now.

Mr. BURTON of California. No further questions.

Mr. ROGERS of Texas. Mr. Burton of Utah.

Mr. BURTON of Utah. Thank you, Mr. Chairman.

I would likewise to welcome the Governor. It is a pleasure to have you here, Governor.

Governor LOVE. Thank you very much.

Mr. BURTON of Utah. I have no questions, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Foley.

Mr. FOLEY Thank you, Mr. Chairman.

Governor Love, in your testimony and in answer to the chairman of the full committee's questions, you stated you would oppose this legis-

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lation without provisions for importation of water and authorization for the five participating projects in the Upper Colorado Basin. That is correct, is it not?

Governor LOVE. Maybe it is a basic quibble—nonsupport and oppose may be just semantics, but, now, we do not support the bill unless it does include these various things.

Mr. FOLEY. Would you oppose the bill if it did not include these thing?

Governor LOVE. Well, I would say that I would return to the State of Colorado and take it to the water conservation board and find out what action we would then take.

Mr. FOLEY. I ask the question because on page 5 of your testimony, you say:

> We are convinced that the projects are feasible from both engineering and financial standpoint.

And later that there is sufficient water—

> pursuant to the terms of the Colorado River Pact and Upper Colorado River Basin Compact.

for the project purposes.

Would it be possible for you to tell me what objection you would have to the project if it did not include importation provisions or authorization for Upper Colorado River Basin projects, considering your statements on these two items?

Governor LOVE. Mr. Foley, you will remember perhaps that the last time I appeared at these hearings there was testimony to the effect by Mr. Tipton and others well qualified, that there would be sufficient water for the central Arizona project until 1995, or the year 2000. But beyond that time and the upper basin did put its water to good use at that time, that there would be an insufficient supply. Very frankly and very plainly, I believe that it is of the greatest importance to Colorado that its allotted share of the water be put to use, and this is what we intend to do as quickly as we can.

Mr. FOLEY. I take it that you would understand the attitudes of other States in that same regard.

Now I refer to your testimony on page 3 at the bottom of the page, last paragraph.

You refer to the Columbia River as being an area which should be considered by the Secretary under title 2.

If this bill were enacted, as presently written, do you have any doubt yourself that the report called for on page 32 by the Secretary as to the feasibility of the plan for importation would be aimed at the Columbia River Basin?

Governor LOVE. I do not think there is any doubt that in any response for comprehensive studies that the Secretary should, of course, look at the Columbia River and the amount of water it does produce. I would not expect his investigation to be limited to that. I have listened with interest earlier in the day here to the others with regard to the desalinization projects. One that has not been mentioned—there is a far-reaching plan about bringing water—the NAWAPA program that you may have heard of that talks about bringing water from far distant northern rivers into the United States.

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So there are many areas, but then of course I would come back to the beginning that the Columbia River is obviously in the minds of a great many people. It is my understanding, and maybe you can tell me whether it is true, that there is something of the magnitude of 150 to 160 million acre-feet which is discharged into the ocean annually by that river.

Mr. FOLEY. Well, we quarrel somewhat with those figures, Governor, but they are the figures that are given.

Governor LOVE. Yes.

Mr. FOLEY. One question was the fact—and I do not mean to press you on this—do you have in mind basically the Columbia River when you think about importation of water?

Governor LOVE. Well, I do not know whether I can answer it more directly and plainly, in that I would say we want a study, a plan for importation of water. In planning I certainly would agree with you that one of the first places that any responsible study would look to is the Columbia River.

Mr. FOLEY. Well, I would prefer, if you would, not to state that as an agreement with me. I do not think that reflects my own attitudes, Governor, for the record.

I would assume from your testimony that you share the opinion of Mr. Udall that water is a national problem and national resource, and I listened with interest to your answers to Mr. Saylor's questions in that regard. Specifically, if there were a substitute provision calling for a national water commission study in place of the provisions of title 2 now in the committee print, would you oppose the bill if so amended?

Governor LOVE. My answer at the moment has to be, yes, I would not support it unless a plan for importation into the Colorado River is a part of it. Let me say that I believe that Colorado has some understanding of the problems faced by the State of Oregon. Of course, as it has been said, we produce most of the water in the Colorado River. I know of the great problem, great fears, that are involved in the State of Oregon. Let me reassure you, if I may, that it would not be our intent to urge a plan which would take from Washington or from Oregon water for which there is any kind of demonstrated need, or take it up high enough where it would hurt. The plan, I think to be feasible, must fully protect the State of Oregon.

Mr. FOLEY. Well, actually, is it not true that your attitude as the Governor of Colorado with respect to further projects in the lower basin is that you are not going to be responsible for any risks of inadequate water supply for Colorado?

Governor LOVE. Yes; this is essentially correct.

Mr. FOLEY. And I take it, then, that you would fully sympathize with the similar concern of other Governors in the Pacific Northwest with regard to the Columbia River?

Governor LOVE. Yes. I have, of course, discussed it with the Governors of Oregon and Washington. I have been very pleased to note that in both States studies are going ahead to attempt to determine what the needs are and if there is any possible surplus.

Mr. FOLEY. Would you be satisfied as the Governor of Colorado with the provision in the bill to guarantee from funds derived from the

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Colorado Basin projects a reimbursable fund for the State of Colorado and the Upper Colorado River Basin should waters used by the central Arizona project be necessary for future Upper Colorado Basin projects?

Governor LOVE. You mean trade water for dollars?

Mr. FOLEY. Yes.

Governor LOVE. No.

Mr. FOLEY. You would not feel that to be an adequate kind of guarantee?

Governor LOVE. No.

Mr. FOLEY. But you would regard this as precisely the guarantee that is offered to the Pacific Northwest, would you not, under the bill?

Governor LOVE. Not to my knowledge, sir. In what way?

Mr. FOLEY. Well, is it not correct that the bill provides on page 31 that the Secretary shall make provision for adequate and equitable protection of the interests of States and areas of origin, including assistance from the development fund to the end that water supplies may be available for use herein adequate to satisfy the ultimate requirements at prices to the users, not adversely affected by the exportation of water to the Colorado River system?

Governor LOVE. I would assume that that was talking about the development of funds to use some of the water perhaps in eastern Oregon, funds to put that water to use in eastern Oregon, eastern Washington.

Mr. FOLEY. Well, my question is, as I read this section 202 about the origin offered as a guarantee is that the Secretary will take steps to see that funds are available to provide all the additional water supply in case the areas subsequently need the water that is exported.

Governor LOVE. Well, I cannot speak with knowledge on the specific language. Let me simply state that it is my intent to testify that we are sympathetic with the problem of the States of origin and that I do not insist or would not want something that would attempt to form a plan which would take away water which was needed in the foreseeable future in Washington or Oregon.

Mr. FOLEY. But it is your testimony, as I understand it, that this sort of guarantee would not be sufficient for Colorado?

Governor LOVE. Again, I do not know that language well enough. I would say that to attempt to guarantee us with dollars rather than tying down the water, I would not find acceptable.

Mr. FOLEY. Thank you, Governor.

Mr. SAYLOR. Will the gentleman yield to me?

Mr. FOLEY. I yield to the gentleman.

Mr. SAYLOR. Governor, I notice several of the statements which you submitted, one from Eugene H. Mast, and Anthony W. Williams, attorneys for the Grand Valley Irrigation District and the Grand Valley Water Users Association, Orchard Mesa Irrigation District, and Palisade Irrigation District, as well as the statement of F. T. Henry, city attorney for the city of Colorado Springs—I am afraid that section 501(e) which you have referred to in interpreting Senate Document 80 gets us right into the middle of a good lawsuit, and I will have to agree with my colleague from Colorado that Mr. Mast and Mr. Williams do not like to have it included. And I think that if Mr. Henry had it included, he would have this group deciding the lawsuit in his favor. I think this is something we want to avoid.

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Governor LOVE. Mr. Saylor, if I may, let me ask Mr. Sparks to speak to that. I do not believe there is any pending lawsuit that would be affected by it.

Is that right?

Mr. SPARKS. That is correct. There have been lawsuits in the past with reference to this document, but not with any reference to the words that have been pointed out in the Governor's testimony.

Mr. SAYLOR. The reason I think that—in other words, in Mr. Mast's and Mr. Williams' statement they state on page 3 that Senate Document No. 80 has been interpreted by the U.S. District Court for the District of Colorado as being a contract (consolidated cases 2782-5016-5017). So that if this is true—apparently, it is a question of the amount of water to be retained in the Green Mountain Reservoir.

Governor LOVE. I do not think there is any remaining quarrel on the Green Mountain Reservoir. The difference of opinion—I am sorry to say I have not read in detail this declaration here—whether or not that language is bad enough to indicate that any east slope diversion should be junior to any west slope use.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. Governor, I appreciated very much your statement this afternoon as I did last fall. I would ask you if you studied the proposal of the administration to create the National Water Commission?

Governor LOVE. I have not studied it, Mr. Wyatt, no.

Mr. WYATT. Would you mind telling me whether or not you have intended to testify or to submit a statement at the hearings in the other body in connection with the authorization of the National Water Commission?

Governor LOVE. I have no present intent to testify or submit a statement.

Mr. WYATT. As far as you know, then, the State of Colorado will not take your position at least in the present hearings over there?

Governor LOVE. I am not informed as to one that is set for a hearing.

Mr. WYATT. My understanding is that it was this morning, but that they were postponed.

Governor LOVE. No; certainly we are not going.

Mr. HOSMER. Would the gentleman yield?

Mr. WYATT. Yes.

Mr. HOSMER. On that point, Governor, you go to some of these national Governors' meetings, do you not? Do you find that almost every Governor has some kind of water problem back home, too much, too little, too dirty, and so forth?

Governor LOVE. Yes.

Mr. HOSMER. There are different problems in each State or each region, is that it?

Governor LOVE. Yes, I think that is right.

Mr. HOSMER. And then there is no national water problem is there?

Governor LOVE. Well, I think in speaking about the national water problem, the thing I am referring to is that there is a problem that is national.

Mr. HOSMER. It is a national problem, but it is composed of individual components that are characteristic and unique to each and every area of the country, right?

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Governor LOVE. I think that is true. I think, too, Mr. Hosmer, that the solution in most of them is limited geographically, that is, I do not think that there is much you can do out of northern California for the Everglades.

Mr. HOSMER. That is correct. And with pollution one fellow's solution might or might not be applicable some place else, right?

Governor LOVE. I think that is true.

Mr. HOSMER. But east coast water is not going to do any good for the west coast?

Governor LOVE. No; I do not know of any way to take the Hudson River.

Mr. HOSMER. So what we initially have is a series of problems on some kind of a sectional basis or a State basis or even a locality within a State basis. Each one of those has to be looked at as to its own particular location, is that right?

Governor LOVE. It seems right to me. Of course, that has been our tradition in our history in that we have been approving these things for some time now on a river basin approach, on a regional approach. And I think that the solutions certainly lie with the continuance of that.

Mr. HOSMER. Thank you. I think that it is important that we not get ourselves in a semantic trap conceiving the so-called national water problem as an entity. Rather, it is a collection of many problems from all areas of the country.

Thank you, Mr. Chairman.

Mr. WYATT. Governor, in the same context, you are taking the position, are you not, that certainly it is possible that water originating in Canada and—and I am talking about the Columbia River—would help solve a problem in an area that is adjacent to the Republic of Mexico. It is at least that broad in scope, is it not?

Governor LOVE. It is that broad in scope, certainly.

Mr. WYATT. Thank you, Governor.

I have no more questions.

Mr. ROGERS of Texas. Governor, to get this maybe in a state of oversimplification, the situation is simply that the pie that was cut up in this compact just was not all there. In other words, the river would not produce the amount of water which was divided and has not over the past 12 years, has it?

Governor LOVE. No. When the compact was originally entered into, the framers of the compact thought that there would be 7½ million for the upper basin and 7½ million for the lower basin and some water for the Republic of Mexico. And they thought even beyond that that there would be a surplus, and that they would meet later on to divide that surplus. Historically to date, this has not proven to be true.

Mr. ROGERS of Texas. Yes.

Now, if the river would produce 16½ million acre-feet of water, there would not be any need for this bill to be here in this form?

Governor LOVE. I believe that there would be. I am not sure that 16½ million acre-feet——

Mr. ROGERS of Texas. Let's put it this way. Instead of the 16½ million acre-feet, if the river would produce enough water to meet the needs of upper basin and the lower basin, in your mind, there would be no need for this bill?

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Governor LOVE. Well, we would still be coming to the Congress for authorization for our reclamation projects.

Mr. ROGERS of Texas. I understand, but this bill in its form, let's put it that way. The point I am making is this, Governor. You told Mr. Foley that you were, of course, supporting importation and if importation was not in this bill, then you would oppose this bill.

Governor LOVE. Yes.

Mr. ROGERS of Texas. Now, the reason you have to support importation is because the water is not there and if you meet the needs of the Colorado and the lower basin, you are going to have to import water, are you not?

Governor LOVE. This is true.

Mr. ROGERS of Texas. And I presume you would support that general logic for any other area of the United States that might need water?

Governor LOVE. Yes. If I may add, even if we had enough water to satisfy these present projects, any kind of projection of the growth rate in Colorado and Arizona, New Mexico, and so forth, California certainly, indicate that the time is not too far off when even if it were 16½ million acre-feet or 17, there just is not enough water in the Colorado River.

Mr. ROGERS of Texas. Yes.

Governor LOVE. If there is water that is surplus in another area, that can feasibly be brought to an area of need, I think this is a good principle, and one which I support.

Mr. ROGERS of Texas. And to carry this just a little bit further, if the same situation prevailed in the Columbia River Basin and the Colorado River had plenty of water, how would you feel about letting them have a little water?

Governor LOVE. Under the same criteria, they are welcome to it.

Mr. Sparks reminds me that if we could keep all the water that there is in the Colorado, we would not be involved in any of these problems. But we already have entered into an agreement with our sister State which divide up the river, not only the Colorado River but the Rio Grande and the Arkansas.

Mr. ROGERS of Texas. Regardless of all of these statements and all this talk and everything else, there is one word that you finally get back to and that is "importation," if you meet the needs of the Colorado River Basin.

Governor LOVE. That is right. It is needed.

Mr. ROGERS of Texas. Are there any other questions?

Mr. Saylor?

Mr. SAYLOR. Mr. Chairman, I just wanted to say that I looked at the map opposite page 516 during the hearings that were held August 23 and September 1, last year.

Governor, the people who represented Colorado in that compact back in 1922 were not very good bargainers because they let California and others, who made little contribution to the drainage area, take the lion's share of the water. It seems to me what we have been doing is simply trying to give some explanation as to why those bargainers of your State made such poor deals. And I can only tell you that you referred to the Hudson, but you know the Ohio that is up

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in my area had a water level that is pretty high. It cannot get up there as high as Pikes Peak, but we can pump it up there, we could get it down into your basin. If you fellows start looking as far north as the Columbia, and your plan looks up to the Red River and the Hudson Bay, I am not so sure that we at least could not equal them.

Mr. ASPINALL. Would my colleague yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. I do not want it left out here in the open. Colorado did receive something in return for joining in the compact, because of the way Arizona and California have developed in the last 25 years. Without the Colorado River compact, under the doctrine of appropriation to which we give allegiance, the upper basin would have been without protection of its water. This is the benefit that came to the upper basin States and it is a very, very sizable contribution that we were able to receive in that compact negotiation. All the upper basin States are asking for in this particular legislation is that they be permitted to develop their water in accordance with the provisions of that compact. That is what we are after. In addition, we have, of course, this question of importation, which the gentleman from Texas has brought to our attention, because it seems like the biggest mistake that was made back then was the erroneous engineering data that led them to believe that there was present in the Colorado River Basin at least 16½ million acre-feet of water. That is where the mistake was made. Maybe some of these days nature will be good to us again and we can get additional water.

Governor LOVE. I certainly would agree that without that compact that first in use, first in right, and there were prior appropriations in southern California. The compact has indeed been a protection to the basin and to Colorado specifically.

Mr. ROGERS of Texas. The Chair will take quasi-judicial notice of the fact that since the gentleman from Colorado sitting to the left has been in Congress, Colorado has not been giving anything without getting the value received.

Do you have something, Mr. Foley?

Mr. FOLEY. Just one question, Governor. Is it not true that basically you are not going to approve any legislation which risks the adequacy of water for the State of Colorado on any projected possibilities? You ought to be sure, in other words that there is adequate water to meet all the needs of the Colorado before you will approve any legislation, is that correct?

Governor LOVE. Yes. Let me say that it is our policy, our firm intent, as far as the Colorado River is concerned, that we will not willingly risk the loss of water which has been allocated to the State of Colorado under the compact.

Mr. FOLEY. That is within the same basin. And I assume that your attitude would be even stronger with reference to diversions of water from Colorado outside of the Colorado River Basin?

Governor LOVE. Well, we have, of course, moved water from the Colorado River into other basins, but responding to your question, certainly we will intend to protect Colorado. And if I may answer the question of the gentleman from Texas by saying we would be glad to

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give Oregon anything she needs but we do not think that she needs more water.

Mr. FOLEY. Thank you, Governor.

Mr. ROGERS of Texas. Are you through, Mr. Foley?

Mr. FOLEY. Yes.

Mr. ROGERS of Texas. The subcommittee is going to adjourn until the morning. And let the Chair say that the first witness to be heard briefly will be the Honorable George Mahon, of Texas, and the Honorable Al Ullman, of Oregon, who will be followed by a California group headed by Mr. Ely, and those accompanying him.

Mr. BURTON of Utah. Mr. Chairman, as a point of inquiry we have the Representative of Utah that was scheduled today. Will he be allowed to appear tomorrow morning, if there is time?

Mr. ROGERS of Texas. Yes. Let the Chair say this; that we will not be able to meet tomorrow noon, so we will do the very best we can to get to these witnesses just as fast as we can, even if we have to start using the 5-minute rule in order to try and finish this week, because the Chair expects to do it.

The subcommittee will stand adjourned until 9:45 a.m. tomorrow morning.

(Whereupon, the hearing adjourned at 4:15 p.m. to reconvene tomorrow, May 10, 1966, Tuesday, at 9:45 a.m.)

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LOWER COLORADO RIVER BASIN PROJECT

TUESDAY, MAY 10, 1966

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

The subcommittee met, pursuant to notice, at 9:45 a.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation will come to order for the purpose of consideration of the pending business.

The Chair wants to state that we are very pleased with the testimony that we have received on yesterday from the Arizona congressional delegation and also the testimony of Governor Love of Colorado.

The importation of water is a very important subject into the water deficit areas from the water surplus areas. Whether this be surplus water, whether it be in the United States or in foreign countries.

I think it was pointed up very well that it is a national problem that is being attacked on a regional basis at the present time.

I want to make the announcement now that at the appropriate time I intend to offer an amendment to include those sections of the regions under the investigation and any studies that are to be made. I think that this should be done in all fairness to those areas—and I am speaking, particularly, of west Texas and I would, also, add the people representing the several other States who are in water-shortage areas, and who are before us in this hearing—the fact that the Federal Government moves into these areas, whether on a construction basis, or on a study basis, does not relieve the States of their obligations to the entire State that they are representing, and I, for one, cannot condone the use of the State machinery to develop one section of the State and to try to turn the rest of it over to some other body, whether it be the Federal Government or someone else.

I think that is the responsibility of the State 100 percent, insofar as that State is concerned, but I did want to make it very clear that if we are going to attack this problem and make any headway in it that we will have to include in these areas, and in these studies, all of the areas that could be involved, whether this involves the importation or the exportation of the water, whether it involves the transportation or diversion of water to one or two or three basins.

I make this statement so that there will not be any misunderstanding as to what we are trying to do here and I hope that everyone will get it clear.

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We have before us this morning two Members of the Congress. First is the Honorable George H. Mahon, chairman of the House Appropriations Committee, who desires to make a statement on this subject.

You are recognized, Mr. Mahon, at this time. We are glad to have you before the subcommittee.

STATEMENT OF HON. GEORGE H. MAHON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. MAHON. Thank you, Mr. Chairman, for this opportunity of appearing before this subcommittee.

I want to commend the Chair for the statesmanshiplike references he has just made.

It is perfectly obvious that with the great demand for water throughout many regions of the United States, that we are going to develop a great deal of interest from many sections. As we write a mammoth water plan for the Nation, I am sure that large areas in need of water do not want to be omitted. In the west Texas area, from which I come, we are grasping at every possibility which offers any hope of helping solve our long-range water problems. At the present, we are one of the most productive agricultural areas in the world. This results from the fact that we do have, and have had, large resources of underground water and we are pumping from the underground sources more than 5 million acre-feet per year to irrigate more than 6 million acres of land.

This is a way of life which supports our economy. We are not recklessly mining this water. We are not unmindful of the future requirements. We are trying to conserve our underground water resources. We are making some progress but the fact remains that the utilization of this water for the cities and for irrigation is a way of life that has brought our economy to the fore.

The fact is that these water resources are being depleted. And there is the further fact that these underground water resources are not being recharged. In most areas of the Nation the rains do recharge the underground water reservoirs but it happens that in a large portion of the area I represent, only a very minor recharge is accomplished.

Now, we have a very peculiar underground water formation in much of this area in western Texas represented by the gentleman from Amarillo, Mr. Rogers, and by myself, and by Mr. White of Texas. This overall formation in a portion of the area is unusual in that it is more or less like a reservoir of oil or hard minerals.

When it is taken out, it is not actually being replaced, except to a very insignificant degree. We need additional water for the whole west Texas area.

We have very little surplus water. We have limited rainfall. We have very little surplus water from runoff, so in a general way the flow of the rivers offers us no real hope. And we have few rivers.

We are building, thanks in part to the work of this Committee on Interior and Insular Affairs, a $90-million dam which will provide a quantity of water for towns like Lubbock and Amarillo and 9 or 10

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other towns of this area, but this is only a limited answer to the problem which confronts us.

So we have to look outside this west Texas area which lies generally west of 99 degrees longitude.

We will look, of course, first to the State of Texas, but the Texas Water Development Board has made an exhaustive study and they have written us off, and this, of course, hits a sour note with me as a Representative of this large area in western Texas, but nevertheless, that is the fact that confronts us.

I hope that we will not remain written off, insofar as Texas is concerned, because we do not want to be a stepchild in our own State.

We have looked outside of the area for years. A number of years ago I introduced a bill requiring a study of the possibility of bringing some of the surplus waters of the Missouri River Basin into this high plains area of Texas. Eventually, that may develop. I think that eventually, to support the burgeoning economy and the exploding population of this part of the Nation, we will have to use the surplus waters of the Missouri River and the Mississippi River and other rivers with surplus flow.

One of the greatest sources of water is the Columbia River. We are well aware of that, as you are. That is what in part prompts this legislation and prompted this study. And a great many water-hungry people from many areas are in this hearing room now because there is a lot of water there to be tapped. And when you study the tapping of the surplus waters of this vast river, we do not want to be dealt out. That is the reason I am here testifying.

This study, which may very well be expanded—in fact, the chairman has already announced that it would be expanded, in his judgment—may lead to more ambitious water programs to tap the unused water resources of the northwestern portion of the continent.

Here we are on the threshold of a great new day in the field of providing water for needy areas for irrigation. We are interested in irrigation; and for industry; and for municipal use, generally.

We have a very unusual situation in our area. This underground water cavern, so to speak, is being depleted. It offers a tremendous possibility for the underground storage of surplus waters that will not be needed at a given moment. This is a unique asset. This offers special hope for the long-range future.

I know that this bill poses a difficult problem for the committee. I know if I were in the far West or in the Northwest, I would look with a jaundiced eye upon any attempt to take away needed waters from those regions. We are not advocating that we take away needed waters from the areas of the West and the Pacific Northwest. What we are advocating is that we be included in the study and that we share in the distribution of surplus water.

And I believe, certainly, that this is only the beginning of much more ambitious efforts to find water to meet the requirements of these people of the Nation.

These programs will cost money and the taxpayers will have to bear a large portion of the cost, and we will be expected in our area of Texas to pay our part in whatever cost may accrue, but we want to get in the boat with the rest of the people who find their future

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somewhat in doubt as a result of the lack of assurance of a long-range water supply to support the region.

Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Thank you, Mr. Mahon.

Let the Chair state that he has long been impressed with the efforts of the gentleman from Lubbock in his interest in Texas in trying to solve these water problems. And what he has told this committee with regard to this underground source of water is true.

First, he realizes that it is only recently that we have been able to work out on a tax base how to charge for the depletion of these waters. Heretofore we had not received the depreciation allowance that they have on oil and other minerals. And now they have awakened to the fact that this is a depleting resource and I think that since it has been recognized for that purpose, it should be good groundwork for convincing these people that these resources are not to be with us forever, if we use them up.

The Indians, when they inhabited this country, could live on the creeks and the lakes around them. That is not true today.

I think the gentleman from Lubbock has made an able presentation of the problems we have in our area.

Mr. MAHON. Thank you very much, Mr. Chairman.

Let me say this, that Mr. Joe Moore of the Texas Water Development Board has a statement to submit to this committee. He will appear, I believe, on Thursday.

Mr. G. H. Nelson of the West Texas Water Institute is scheduled to appear before you. They will talk in more technical terms about our interest in this highly important legislation. And I hope and believe that the committee will be glad to give their testimony consideration.

Mr. ROGERS of Texas. Thank you very much.

Mr. Aspinall, do you have any questions?

Mr. ASPINALL. I have no questions.

I welcome our distinguished chairman of the Appropriations Committee.

May I say, Mr. Mahon, that I commend you on your statement pointing out the significance of water resources in your area. Throughout my 46 years of elective office, I have always represented a minority area myself, so that I can understand just how you feel.

Mr. MAHON. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. There is a question whether or not the study involving the water resources of the basin itself, and the areas of potential importation will be allocable against the basin funds or will it be a general obligation of the United States. If it turns out to be the former, Mr. Mahon, would you contemplate an approved method of having the beneficiaries of this study pay the allocable cost thereof?

Mr. MAHON. Well, I have not undertaken to explore that, but it seems to me that, insofar as the study is concerned, that would, probably, be an out-of-pocket cost of the Nation rather than of the region. But the importation of water is a different matter.

Mr. HOSMER. It may not be--it may be charged against the basin States, in which event I do not think that Texas is looking for a free

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ride on these other States for this study. All I want to receive is an indication from you that if the cost is so allocable, that it would—that your State would be in some manner prepared to pay the bill.

Mr. MAHON. I would hope that Mr. Moore, the executive director of the Texas Water Board, could speak more authoritatively for the State in that respect. I cannot myself.

Mr. HOSMER. Let me put my question this way then: If, in fact, the cost is allocable against the basin accounts of the Colorado River Basin States, would you, in principle, approve of a condition that any additional incremental expenses caused by the inclusion of west Texas be paid for by the beneficiaries?

Mr. MAHON. Well, I, frankly, have never been confronted with a problem—with the problem, before. I would want to give it more thought than I am able to give it at this moment, before firmly committing myself in regard to that. It would not seem unreasonable if you charged to the areas invloved a portion of the cost of the study, that all portions of the area should share in the cost. That would be my off-the-cuff reaction.

Mr. HOSMER. In other words, you would not be recommending to this committee that west Texas take a free ride on the States that are involved in the Colorado River Basin?

Mr. MAHON. The States to the west have been pretty well taken care of as you know, and have been pretty well considered throughout the years.

Mr. HOSMER. I understand that.

Mr. MAHON. And I do not know who has taken a free ride on whom but I think that this is a national problem. We have got to confront it from a national viewpoint.

Mr. HOSMER. There are seven States in the Colorado River Basin and through a series of actions there have been funds created into which power revenues go and from which some of these expenses are paid. But you would not think it fair for west Texas to ride on this fund, would you, for a study like this?

Mr. MAHON. I would let the people who speak for the States make their own statement on that, because I have no authority to commit them.

Mr. ROGERS of Texas. Would you yield?

Mr. HOSMER. I am not asking you to commit yourself to any payment but I am asking you for only a commitment to a principle. Utah, California, Nevada, the rest of the Colorado States involved have some right to protect their basin funds. I do not know how much your study will cost. It may cost $100,000 or $500,000. All I am trying to get from you is a commitment as to the fairness of the proposition that the beneficiaries pay whatever costs are involved.

Mr. ROGERS of Texas. Will you yield to the Chair?

Mr. HOSMER. Let him answer first.

Mr. MAHON. All I am trying to do is to get our area included in these studies, and let the committee upon which the gentleman is a member, decide on how these matters shall be handled, costwise. We can, I think, live with whatever the committee and the Congress may determine in regard to that matter.

Mr. HOSMER. I yield to the gentleman.

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Mr. ROGERS of Texas. I think that the record ought to show at this point that west Texas has never taken a free ride on anybody but, as a matter of fact, the Canadian River Dam has a larger reimbursable than any other reclamation program that has ever been authorized or built by the Bureu of Reclamation. Certainly, I would subscribe to the policy that we not be placed in a position of having a free ride. The same thing can be said of some other sections, but I will not refer to that now.

Mr. HOSMER. Let me assure the chairman that I have not made any implications, or any allegations, or otherwise intended to infer that west Texas has ever taken a free ride on anything, but I want to make certain that it does not in the future, to the detriment of the States in the Colorado River Basin. I think that Mr. Mahon has indicated that he is generally in agreement with the fairness of such a proposition.

Mr. MAHON. We are not so much concerned with the free ride. We just want to ride. [Laughter.]

Mr. HOSMER. Thank you. That is all.

Mr. ROGERS of Texas. Mr. Johnson of California.

Mr. JOHNSON. Thank you, Mr. Chairman. I do not have any questions but I want to commend the gentleman from Texas, who is the chairman of the Appropriations Committee, for his very forthright statement, so far as the study is concerned.

We, in our State, have asked for a lot of things in the way of studies and investigations on projects. The Congress has been very kind to us in this respect.

I happen to represent an area that has surplus water and we are sharing it with other parts of the State, but only after a thorough study has beeen made, for the simple reason that we wanted to make sure that it was surplus water. We are involved in this piece of legislation here, too. My State is very much involved. We are in favor, too, of making certain studies and we hope that the studies go through. I hope very sincerely that we do find surplus water somewhere.

If we are going to transfer it from one basin to another basin, from one State to another State, it will take a lot of study.

I know your area is as you say it is. I have been through it several times. I know what it looks like. And I know how much you are interested in water.

I, for one, would have no objection to having studies made to include your State. But that will have to be worked out.

If there is a cost to be allocated to the State of Texas, let it be allocated to the State of Texas. I am sure that Texas will meet that.

That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Skubitz.

Mr. SKUBITZ. I want to apologize to Congressman Mahon for not being here. Your proposal intrigues me. I think that perhaps Kansas also ought to be included. [Laughter.]

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Mr. Mahon, I am a great admirer of yours. I think that you are one of the most outstanding men who have served in the Congress that I have observed.

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Mr. MAHON. I am glad that I came here. Thank you very much.

Mr. UDALL. You represent your area very well.

I have great admiration for you and great respect for west Texas. I have spent considerable time in the State and am somewhat familiar with that fine part of our country.

When you talk about the need of water for west Texas, I think that you outlined it as being a part of the congressional area of several of your colleagues.

Mr. MAHON. Generally speaking, it would extend more or less from Abilene westward to El Paso and northward of this line. This includes the panhandle and the south plains area of Texas. Some of this area, as you know, is underlaid with this so-called ogallala formation. Some of it is not. Some of it has extensive irrigation. The whole area is in need of water for domestic purposes and for industry and for agricultural. The agricultural implications are very tremendous in the area.

Mr. UDALL. I am aware of that, generally, Mr. Mahon, but—what are the ranges of elevation above sea level?

Mr. MAHON. The range of elevation—oh, about, maybe, 1,400 feet up to about 3,500 feet or more.

Mr. UDALL. What is the elevation of Lubbock?

Mr. MAHON. Lubbock is about 3,300 feet, I believe.

Mr. UDALL. And Abilene?

Mr. MAHON. Well, Abilene is, well, around 1,800 feet. That is one of our problems. The need for lifting the water. That is one of the reasons for this study as to whether or not we could fit into this picture.

Mr. UDALL. I understand.

As to the agricultural development in this broad area, what percent of this gets the water supply from pumping and what from surface, such as the streams?

Mr. MAHON. Well, in the whole area, maybe one-third gets its water from irrigation, but in the most heavily productive area of the south plains, and the lower part of the north plains, the irrigation is responsible for a preponderance of the production. The district which I represent produces one-seventh of the cotton of the Nation, as the gentleman knows, and, of course, it is a heavy feed grain producer.

And, also, there is considerable wheat.

This is not something that has come before us recently. We have had this situation for quite some time. We are very apprehensive about the future, as we should be.

Mr. UDALL. What has been done in this area with regard to ground water codes to protect the area against overuse, of new lands coming in, and the water table sinking even lower than it is.

Mr. MAHON. We have a High Plains Water Conservation District and representatives of that district are here now in this hearing room, I believe. I am referring to Mr. Tom McFarland, district manager of the High Plains Underground Water Conservation District, and Mr. Bill Waddle, and they are trying to police the use of this water and avoid waste. They are trying to find ways and means of producing

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with less water. There are a lot of conservation measures but these things come slowly. It is very difficult thing.

Mr. UDALL. I appreciate your appearance here and your comments. I simply want to make a couple of observations and then I will conclude.

I do not often object to amendments that are offered by the chairman of the subcommittee. I do not know what position I will take on his proposed amendment. He nearly always offers amendments in the best interests of the country and of the taxpayers and of everyone else, but the amendment which he has outlined here this morning poses a lot of real serious problems to us. I want you to be aware of them and have it spread upon the record, because I like your area. I want to see it develop. I think that the study should be made, and I want to see that every possible step is taken to give you the kind of permanent water supply that you need for your industry and for your agriculture and for your people.

But whether this is the vehicle for this particular study, gives me pause to think. As I understand it, Governor Connally played a role in studying this particular movement that brought you here today. I was furnished, through the courtesy of Mr. Rogers, a letter dated February 17, 1966, that the Governor wrote. You are familiar with that letter?

Mr. MAHON. I am familiar with it. I had it earlier this morning but I do not have it with me now.

Mr. UDALL. I have a copy of it. And I think that in order to make the hearing record complete, we should have this in the record, and I would ask unanimous consent that Governor Connally's letter of February 17, 1966, be made a part of the record at this point.

Mr. ROGERS of Texas. Is there objection to the inclusion of the letter and to the unanimous consent request of the gentleman from Arizona, Mr. Udall?

If not, it will be granted; the letter will be inserted in the record.

(The letter dated February 17, 1966, follows:)

FEBRUARY 17, 1966.

Hon. JOE POOL,
Congressman-At-Large,
House of Representatives,
Washington, D.C.

DEAR JOE: As you know, the State of Texas is presently engaged in preparing a comprehensive State Water Plan to be completed during 1966. One of the more complicated problems for which the Plan must find solutions is that of providing a dependable water supply to the High Plains of West Texas, an area of excellent irrigable lands stretching from Midland-Odessa to the Oklahoma panhandle. We have considered the overland transbasin diversion of water from East Texas, but the quantity of water necessary is not available from these in-state sources. As a consequence we find it necessary to look outside our borders for an adequate source of supply.

As used herein, the term "West Texas" encompasses the High Plains Area and the other irrigable areas in the upper portions of the Red, Brazos and Colorado River basins which lack adequate local water resources and which could be served by gravity where water brought into the High Plains and the Rio Grande Basin including the Pecos. In this same area some 5.7 million acres were irrigated in 1964. Texas A&M University in its studies conducted for the Water Development Board, concluded that sufficient market demand will exist to justify expansion of this irrigated acreage to 8.6 million acres in 1980 and 10.7 million acres in 2020 provided sufficient irrigation water could

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be made available at about the same cost relative to the other costs of production as the irrigators are now paying.

The diversion requirement for supplemental water with full irrigation of these projected acreages in the entire West Texas area would amount to some 5.2 million acre feet per year for 1980 and in the order of 18 million acre feet per year for 2020, over and above the amounts available with full exploitation of local sources. Water in large amounts must be imported from out-of-state sources if Texas agriculture is to maintain its position as one of the State's leading industries.

If sufficient water at reasonable cost cannot be imported, the irrigated acreage is expected to decrease to 2.2 million acres in 2020, with perhaps a concurrent expansion of dry-farming, but with a net overall loss of substantial magnitude. The supplemental water diversion requirement for full irrigation of these future acreages might amount to 3.1 million acre feet per year for 1980 and 14.2 million acre feet per year for 2020, even with maximum utilization of all available local water sources.

The values of possible future irrigated acreages quoted above are based on the assumption that irrigation elsewhere in Texas will continue to expand. Should this not be the case, the potential for increase in West Texas would be greater, if an adequate water supply were provided.

In considering the need for importation of water to West Texas, one other facet is significant. The accumulated deficiency due Texas in the Rio Grande under the Rio Grande Compact now amounts to about one million acre feet.

Potential, but not necessarily feasible, sources of water for importation for irrigation in West Texas, include the Columbia River Basin, streams in Canada and, possibly the Missouri. All possible sources are at great distances from West Texas.

It is obvious that Texas could not "go it alone" to import water; the cost would be far too great. Any importation plan for West Texas, to be feasible, must be part of some larger regional plan for conservation and redistribution of water resources. Even then, some subsidy, such as that provided under Federal Reclamation Law, would be necessary to bring the price of water down within the payment capacity of the irrigators.

Several such regional plans are under active consideration at the present time, and one such study has already been authorized by Congress, the Northeast Water Supply Study, authorized by the Rivers and Harbors Act of 1965 to be done by the Corps of Engineers, which study encompasses much of the Northeastern part of the United States.

Perhaps the widest known and most ambitious of the current regional proposals is the *North American Water and Power Alliance*, sponsored and promoted by the *Ralph M. Parsons Company*. It is proposed to develop several of the major rivers of western North America, *starting with the Yukon and Tanana in the north, into an integrated system and redistribute the waters for a multiplicity of purposes over much of Canada, the United States including West Texas, and Mexico.* This proposal has attracted considerable attention and comment in Congress. *However, because of the international problems, particularly the publicly announced reluctance of Canada to even consider any such proposal until her own water requirement and development plans are formulated,* which *will take perhaps twenty or twenty-five years in itself, it would be well into the next century before such a plan could be of benefit to Texas.*

Pending before Congress now is *HR 4671, the Lower Colorado River Basin Project Act, which was introduced in the 1st Session, 89th Congress.* Among other things, this bill would authorize and direct the Secretary of Interior to investigate and prepare feasibility reports on means of augmenting the supply of water supply available for use in Colorado River Basin, including the alternative of importing water from sources outside the natural drainage area of the Colorado River system. The feasibility reports on the initial group of projects would be submitted within three years from the effective date of the Act.

At the hearings on HR 4671 last year, the Secretary of the Interior stated that the needs of all the eleven western states should be considered in this regional plan. Both he and the Commissioner of Reclamation stated that the Columbia River below Bonneville Dam is one of the principal sources of surplus water for importation that would be studied.

Both Arizona and California are aggressively supporting HR 4671, because of the shortage of water in the Colorado River Basin to meet the anticipated

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demands thereon and, insofar as California is concerned, also because of the decrease in its rights in and to the waters of the Colorado under the decision of United States Supreme Court in Arizona v California et al. It is understood that agreement has about been reached with the Upper Colorado River Basin States on amendments to HR 4671 which will make the bill supportable by water interest in those States. No agreement has yet been reached with the Columbia River Basin States. California interests are confident of favorable action by Congress this year.

It is presently contemplated that as much as 8.5 million acre feet per year might be imported from the Columbia River into the Colorado River system for use within the Colorado River Basin States. Much more than that amount could be diverted from the Columbia below Bonneville Dam without damage downstream to either Oregon or Washington.

If, as the Secretary of Interior has stated, this regional plan is to consider the needs of eleven of the western States, it would appear logical that the West Texas area should also be included in the study. Sufficient additional surplus water for West Texas' needs is available in the Columbia, to name but one potential source. There are several physically feasible methods by which water could be rediverted from the Colorado and delivered into the Rio Grande, the Pecos River Basin and the High Plains area, some of which would benefit other states as well. The distances, however, are long and the pump lifts great.

I would hope that the Texas delegation would agree that immediate action is necessary to include West Texas in any western regional water development planning studies to be undertaken by the Federal Government. *This could be accomplished by amendment to HR 4671, or by a separate bill of course.*

I understand the Subcommittee on Irrigation and Reclamation of the House Committee on Interior and Insular Affairs is planning to finish its hearings on *HR 4671 this month (February) and report a bill out in March, so time is of the essence.*

As you know, the acreage limitation provisions of Federal Reclamation Law would strictly apply to any irrigation water delivered in West Texas under a project built by the United States, unless specific provisions to the contrary were inserted in the authorizing Act, or the basic Reclamation Law were amended. It is probable that agriculture in West Texas would not be economically feasible if limited to 160 acres in a single ownership. I believe that substantial and effective support has already been generated for reasonable amendments to the acreage limitation provisions of Reclamation Law. However, this problem will probably not face us until implementation of it is undertaken. I merely mention this because it might someday pose a difficult problem for us.

With kindest regards,

Sincerely,

JOHN CONNALLY,
Governor of Texas.

Mr. ROGERS of Texas. Is that all you have?

Mr. UDALL. No; I have a couple more observations, Mr. Chairman.

This is a rather sensitive matter which I direct to the chairman of the subcommittee. I thought that one of the best comments on the Governor's letter, one of the most knowledgeable comments, was a letter, a reply, that Mr. Rogers sent to the Governor. I do not want to put this in the record if the chairman of the subcommittee feels that I should not, but if he has no objection, I will ask that it be made a part of the record.

Mr. ROGERS of Texas. The Chair will take care of his own at the proper time.

Mr. UDALL. I thought that there might be a question about it and I did not want to offer it unless you desired it.

Mr. ROGERS of Texas. It will be in the record.

Mr. UDALL. All I want to say is that I see some major differences between your situation and the Colorado Basin situation. We have, first of all, a long history in this area. We have a compact dividing the water. We have had years of extended negotiations. We have achieved a rather delicate balance between the upper and the lower basins. We

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brought in a bill that we think does the job for that area. We have a definite plan underway by which we will undertake some immediate projects, and then undertake studies to see about augmenting the supply, whereas it seems to me that west Texas is in the early stages of beginning to look around to see what should be done. We have one primary source for our area. We have some very definite alternatives that we could look to for import, whereas you could go north and east as well as to the west.

You are largely, in substantial part, a pumping area, whereas most of our agriculture is not in such an area.

Mr. ASPINALL. We will not finish these hearings this month if we keep putting in all of our observations.

If this were a matter of writing up a bill, the observations might be in order.

I would like to take exception to my friend's observations.

I think that we had better get to work.

Mr. UDALL. I agree with what the gentleman from Chicago has said. I have pledged myself to expedite these hearings. And in the light of the chairman's observations, I will make my position known on this at a subsequent time. I have concluded, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Burton of Utah?

Mr. BURTON of Utah. I want to tell the distinguished chairman of the Appropriations Committee who is now appearing before us that all of us in Utah feel sorry for those poor devils in Texas drilling for water and striking nothing but oil. [Laughter.]

I accompanied the chairman of the subcommittee on a trip several months ago down into the chairman's district. And while we were at Lubbock, it rained all day long.

Mr. MAHON. And we want you back there because of that. [Laughter.]

Mr. BURTON of Utah. Thank you.

That is all.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. Mr. Chairman, do you know, sir, if there have been studies conducted by the State of Texas on your need for water?

Mr. MAHON. Yes, sir; there have been rather extensive studies over a period of years—various types of studies. The latest is by the Texas Water Development Board. It is quite an ambitious study. I do not think it has been made wholly public, but references are made to it in prepared statements which you will be presented on Thursday.

Mr. FOLEY. Would it be correct, Mr. Chairman, to say that in the studies that have been conducted by the State of Texas as to its need, and possible sources of meeting the need for water, that a number of sources of water have been considered?

Mr. MAHON. They have; yes, sir. Many of the rivers of Texas, of course, flow into the gulf. There is a proposal, a basin study, which this committee is very familiar with, and which the Appropriations Committee is very familiar with. We have been having a study made in which we explore the possibility of trying to tie the rivers together near the gulf and possibly transporting the water to the needy areas. But we have not been offered any encouragement as to getting any water in the northwestern section of the State to which I make reference.

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Mr. FOLEY. The possible sources have been examined in the Missouri Basin as well as others?

Mr. MAHON. Congress has not undertaken this. In my opinion, Congress should. And Congress will examine this possibility, not only for supplying surface water to Texas but to the State of Kansas and to other areas of the country. I think we are at the threshhold of a real examination of how to meet our water needs. Otherwise, many areas will wither on the vine. And the people are going to be living almost exclusively in the coastal areas.

Mr. FOLEY. In view of your remarks, would you favor the placing of the responsibility for a study of the water needs for Texas and similiar areas in a national water commission rather than in a very narrow western study that is proposed in this bill before us?

Mr. MAHON. I think that is a very good question but I am not qualified to authoritatively answer your question. It very well may be that you will want another forum to make a comprehensive study of the Nation's needs, but we cannot study it too long. We have got to begin to move or else we are going to be caught short.

Mr. FOLEY. Assuming that the study were as prompt and expeditious as any other study, would this, in your judgment, be the proper course to follow, to look at it from a national standpoint, so that west Texas and Kansas and other areas could be studied and other sources outside of the Colorado could be studied, such as the Missouri River?

Mr. MAHON. In the 17 Western States, the Reclamation Service moves, of course, very largely—it has done an outstanding job. And I am not prepared to say that this proposed study should be lifted out of the jurisdiction of the Bureau of Reclamation. I have not thought that much about it. But I am sure that it is one of the things that this committee will consider.

Mr. FOLEY. You believe that question should be considered.

Mr. MAHON. I do, yes.

Mr. FOLEY. Thank you.

That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. I would like to join in welcoming the distinguished chairman of the Appropriations Committee here this morning. And to mention that since Oregon in 1964 received approximately one-tenth of 1 percent of the defense dollar, and knowing of the Texas situation in this regard, I find it a little difficult to agree with the distinguished chairman about Texas being anyone's stepchild.

Mr. MAHON. I did not mean to say that it was anyone's stepchild. I was speaking of certain areas of Texas as being left out of the Texas water plan. This is the point that I undertook to make.

Mr. WYATT. I would like to comment on this, that I was interested in your observations as to the desirability of seriously considering a national water study if it can be done expeditiously, and to include the areas that we are discussing here this week.

I have no other questions.

Mr. ROGERS of Texas. Mr. White of Texas.

Mr. WHITE of Texas. Mr. Chairman, I, certainly, wish to say that I feel that Texas should be included in this. I want to ask the chairman if he has studied a map or has seen a map in which one leg of this

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proposed study comes within 100 miles of Texas, on, approximately, the same elevation as a point called Deming, which is 100 miles from El Paso?

Mr. MAHON. I have not seen the map, but I do know generally of it. And, of course, I know about Deming. We are strong for the inclusion in this study.

Mr. WHITE of Texas. So far as that region is concerned, it is a similar agricultural area. Those farmers, who farm in Deming, farm in the Rio Grande Valley and in that area.

Mr. MAHON. The gentleman is correct.

Mr. WHITE of Texas. As to the study that was mentioned, so far as the northeast and the eastern part is concerned, is not one of the obstacles that there might be too great a lift problem into the western part of Texas? This would not be present in the bringing of the water from the West to Texas.

Mr. MAHON. The gentleman is correct. You are going to have this water at a relatively high elevation from time to time if you bring it from the Columbia River area into the Colorado River Basin.

Mr. WHITE of Texas. So, actually, there is less problem posed in bringing the water from there than there would be otherwise?

Mr. MAHON. I believe that is correct.

Mr. WHITE of Texas. And if we do not get water within 20 years, there will be virtually nothing much left in surface waters in the western part of Texas?

Mr. MAHON. That is a major problem. We want to maintain our economy and grow. And we have got to look to the future to do it. We will have problems, but we are not going to fade away.

Mr. WHITE of Texas. I am speaking of surface water.

Mr. MAHON. There is very little, very little surface water—not enough.

Mr. WHITE of Texas. Not the ground water.

That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Hansen?

Mr. HANSEN of Idaho. It is good to see you here, Mr. Chairman.

In fact I am especially glad to see you here because your presence means that we have arrived at the point where we can consider the Great Lakes and the Mississippi, for water importation sources as well as the Pacific Northwest. I feel that we should consider more than just regional aspects, and I appreciate your comments about a broad water study because I think it is very important to the Nation as a whole.

Thank you.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. One of the most difficult parts of this legislation is the fact that we are being asked to authorize a project which will, in turn, obligate the Congress to spend, perhaps, 3 or 4—perhaps 10 times as much in addition to this project within the next 10, 15, 20 years. I am interested in knowing what the attitude of the Appropriations Committee might be toward authorizing this specifically, which will require the importation of water by the year 2000 and that that importation will cost somewhere in the neighborhood of between $5 and $10 billion, even though the whole bill here is on the order of $1.6 billion.

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And that we, in turn, are obligating future Congresses for this tremendous obligation, in my opinion.

I am interested in knowing what the general attitude of the Appropriations Committee as to what it would be toward obligating future Congresses for future expenditures.

Mr. MAHON. Well, I think that this study will help this committee and all other committees, and the people generally, to form a judgment on where we should go. Water is worth what you have to pay for it, really, of course, because, without water, there can be no progress.

I do not think that we can commit future Congresses by our actions, but in view of the fact that the water problem concerns every area of the Nation, I cannot foresee that there will be a lack of support and funds to carry out sound water projects. If only certain areas of the Nation had a water problem, it would be different.

I think we can work together in a national effort to meet this. Of course, it will cost a lot of money over a long period of time.

Mr. REINECKE. One portion of this legislation presents a problem to me, roughly, about $800 million worth, which will become inoperative if we do not import the water. At least, it will cut down the efficiency of the project. So by authorizing and appropriating for this project at this time, the study will show these people that it is mandatory that we do import water, if we are to continue the project in its full operation.

I am sure that it must be carried out, but I am concerned about the cost of the importation as compared to the cost of the project itself, and the fact that we are obligating the Congress to do it in the future.

Mr. MAHON. We are all concerned about it, but we realize that this is a problem that has to be licked and we have got to find a way to do it.

And this study ought to be one of the tools which will enable us to accomplish that.

Mr. REINECKE. The project will be well under construction before the study is ever completed, so authorizing the study at the same time the work takes place takes the decision out of our hands. We are making a decision to authorize this program to import water—period. And the question now is: How economical can that be done? But it does represent to me a very big step to obligate future committees in what we do here.

Mr. MAHON. This is one of the things that the committee will have to wrestle with. I do not have the answer.

Mr. REINECKE. Thank you.

No further questions.

Mr. ROGERS of Texas. Thank you, Mr. Mahon.

I just want to make one further observation as to the cost of the importation of the water. We are not talking about carrying surface water across some place to put it someplace else solely; this includes, of course, the tremendous program of desalination that is going on, and we hope and look forward to successes in that field that may make it possible to desalt water in certain areas at lesser cost than it would be to transport the water over long distances, over widespread areas. And matters of this kind all have to be studied, and that is what the studies are for.

Mr. MAHON. Your committee has been most generous, and I appreciate the opportunity of appearing before you.

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Thank you.

Mr. ROGERS of Texas. Thank you, Mr. Mahon.

Our next witness is the Honorable Al Ullman of the State of Oregon.

Mr. Ullman, if you will come to the witness chair, the Chair will recognize you.

STATEMENT OF HON. AL ULLMAN, A REPRESENTATIVE IN CONGRESS FROM THE SECOND CONGRESSIONAL DISTRICT OF THE STATE OF OREGON

Mr. ULLMAN. Mr. Chairman and members of the committee, it is always a pleasure to come before this committee. I have great respect for the men who sit on this committee, because I know how dedicated they are in trying to solve resource problems, particularly of water development for the West.

Mr. ROGERS of Texas. With that statement, you are always welcome to come back home any time—let the Chair state.

Mr. ULLMAN. Mr. Chairman, I appreciate the opportunity to appear today and express my views on H.R. 4671, to authorize the Lower Colorado River Basin project. As you and the members of the committee know, my primary interest and concern is with the provisions of title II of the bill, the provisions authorizing the Secretary of the Interior to undertake studies for the purpose of importing water into the Colorado River Basin from other river basins.

I want to begin by expressing my pleasure that, at this point in history, the Congress and the American people are fortunate enough to have the services of the distinguished chairman of the full committee, my good friend, Wayne Aspinall of Colorado. For during his service as chairman, he has established and maintained a set of principles and guidelines that will stand for many years. He has given new strength to the laws and traditions that have governed the development of western water resources and he has demonstrated a firmness and integrity in their application. He has not deviated from that system of equities so vital to the maintenance of stability in water resource management.

In August of last year, Mr. Chairman—a little over 8 months ago—this committee held hearings on H.R. 4671 as introduced by my good friend and colleague from the Second District of Arizona. Title II of that bill forecast the prospect of diverting 2.5 million acre-feet of water into the Colorado Basin from sources outside the basin. It was made clear by Department witnesses, by witnesses from the Southwestern areas of the United States, and by sponsors, that the Columbia River was the most likely source for this diversion. I want to say here that Congressman Udall came to my office last July and laid the facts on the line. He has not tried to hide or gloss over the reality, nor has he failed to recognize the problem that such a proposal poses for the people of the Pacific Northwest.

But today, 8 months after those original hearings, the 2.5 million acre-feet diversion has grown to 8.5 million. The infant proposal of last year has become a bouncing baby of major proportions. In fact, the people in my part of the country wonder if there might not be a glandular problem involved here.

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I want to say, after listening to the previous witness, my distinguished friend from Texas, Mr. Mahon, and knowing the size of Texas I am further concerned.

In other words, Mr. Chairman, the latent fears expressed by constituents to me in my travels through my district last fall have already been partially realized. The proponents of this bill are no longer talking about making the Colorado River whole to meet allocations allowed in the 1922 compact, they are now talking about major augmentation of the water supplies of the system—far beyond what was foreseen in the compact or was made possible by nature.

The area I have represented in Congress these past 10 years comprises about 68,000 square miles, or two-thirds of the area of the State of Oregon. I think this committee knows that I am a country boy representing one of the great rural areas of the Nation. It is sparsely populated. We, in our part of the country, do not represent a population bloc in Congress, and I think that most of the members of the committee can appreciate that position.

It might surprise the people of Arizona and southern California to learn that most of my area receives an average rainfall approximating their own, 8 to 11 inches annually. The people of my district are planning and pleading for water development programs of their own. Prior to completion of the Dalles reclamation project last year, which delivers a modest 14,300 acre-feet of water annually, not one major acreage of Oregon soil was irrigated directly from the Columbia River. There is not another single irrigation district in my entire State that receives its supply of water from that river—although there are yet hundreds of thousands of acres of irrigable lands bordering the river. We have dreams that someday such projects will be feasible. The Dalles project pumps water part way up the slopes of the Columbia Gorge for distribution on orchard land within sight of the river. Landowners are paying up to $32.50 per acre-foot for water less than 1 mile from the Columbia River. I hope this fact will erase any notion that the Columbia River provides a bounty of free and easy water for the people of Oregon. Prior to completion of the project, orchardists in the area relied on ground water pumping. By the time project water was delivered, farmers had lowered wells as deep as 300 feet. I cite these facts to demonstrate that the problems experienced in Arizona are not unique. They exist throughout the inland areas of the Columbia Basin and even on the very banks of the Columbia River.

It should be no surprise, then, to the members of this committee to learn of the fears, the apprehensions, and the bewilderment of some of the people of my region when they learn the water may be transported from the Columbia River, 1,500 miles to another river basin. These people are thirsty for wet water, too. They have been told for years, some as long as 40 years or more, that they must comply with a system of strict feasibility and cost requirements, none of which would permit the diversion of the water from the main stem of the Columbia. Now, they see the claim of Arizona and California as possibly being superior to their own hopes for water from the river.

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The people of the water-short regions of the Southwest should keep these things in mind before imagining an eastern Oregon farmer with his shotgun guarding a headgate of sparkling water from someone dying of thirst. In my mind, I see him in a much different light, anxious and even desperate for enough water to make a living, or sometimes even enough for his household and his livestock.

A number of years ago, when I was a freshman Member of Congress and a member of this distinguished committee, we had before us a proposal to store 3 million acre-feet of water at the Hells Canyon site on the Snake River. One of the arguments used to defeat that proposal—and there were not many specious arguments—was that we would never be able to fill the reservoir. Isn't it ironic that now, only 10 years later, the rivers of the Pacific Northwest have apparently gained the capability to fill reservoirs, rivers, canals, aqueducts, and water mains throughout the western United States and northern Mexico. Let me state at this point, however, that the chairman of the full committee, Mr. Aspinall, the chairman of the subcommittee, Mr. Rogers, and other members of this committee—and such distinguished ex-members as the brother of our colleague from the Second District of Arizona—have stood shoulder to shoulder with the people of the Pacific Northwest in our efforts to achieve higher levels of use for waters of the Columbia River and its tributaries. We are grateful for that support, and it is not my intention to repay it with unreasonable opposition to a proposal for studies of Columbia River diversion.

However, we cannot recognize—nor can this committee approve—the concept that an area 1,500 miles away has any natural claim on the waters of the Columbia Basin. We will never, under any circumstances, agree to substitute the promise of abundance for a share of scarcity. It has been stated time and time again in prior hearings on this proposal that the abundance of the Columbia River was of such magnitude that the basin could not conceivably be denied its own potential development by the export of 2.5 million acre-feet, or 8.5 million, or even far larger amounts. If there is such a certainty about the accuracy of those statements, then there should be no objection to States of the region making that determination for themselves. I assure you that if those assumptions are true, the people of my State would neither insist upon nor condone a perpetual waste of water that is sorely needed elsewhere.

But we must have the major role in that determination.

During last year's hearings, Chairman Aspinall did a masterful job of assuring that the long-range interests of the Upper Colorado Basin were protected to the maximum. The record he made in those hearings is unmistakably precise and complete in every detail. I am sure that he understands, and I hope all the members of the committee will also recognize, the similar concern that we in the Northwest feel about this proposal. We must be permitted to voice our own aspirations for the future of Columbia River waters. We must insist on the prerogatives that each of you would demand for your own States—and indeed, have demanded repeatedly throughout the many years of controversy in the Colorado Basin.

We must be assured that our rights to our own water are paramount over any others—for all time and for all purposes. To do less would

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be to create unprecedented havoc with the basic water laws and customs of this Nation. To do less would make the citizens of the Northwest stepchildren of their own heritage.

I know it is not the intention of the author of the bill or of the committee to run roughshod over the future of one region to satisfy the needs of another. Let us then resolve to do those things that are essential in any such dealings between good neighbors.

Five years ago, Mr. Chairman, no one in a position of responsibility was advocating the diversion of water from the Columbia River. In fact, the actual bombshell hit only a little over a year ago. And yet, some witnesses before this committee last August objected to allowing the State of Oregon time to complete its own inventory of future water needs before studies are initiated into the engineering feasibility of diversion works. Oregon's study is now underway and it is scheduled to be completed in 1970, but there is objection to allowing my State and others in the Columbia Basin 5 years in which to prepare for a decision that will affect their future for all time. If congressional authorization for a diversion study had been anticipated for many years, our request might conceivably be construed as a delaying tactic. But, Mr. Chairman, I repeat: The hard cold proposal came only last year.

To expect our region to settle for a decision based upon engineering and feasibility studies that are incidental to the construction of a project 1,500 miles away is incomprehensible to me. Coming from men who themselves have been engaged for many years in the highly sensitive, emotional, and volatile issues of water conflicts, opposition to our active and decisive participation in this decision can only serve to arouse apprehension and outright suspicion among northwesterners as to the motives for such tactics.

The people of the Northwest have a right to expect that the existing and potential quality of life made possible by the water resources of the region will not be adversely affected by diversion. We are not concerned solely with consumptive uses, as they are in the Colorado Basin. If the disposition of Columbia River waters should ever be made on that basis, then terrible damage will have been done to the character of the Pacific Northwest's greatest natural endowment. Its impact could be compared only with something as drastic as cutting off Arizona's sunshine from October through April.

A report by the U.S. Geological Survey indicates that by the year 1990 the entire streamflow of the Columbia River will be required to produce electrical energy at installed capacity. This is the same year the crisis is scheduled to hit the central Arizona project, if authorized and constructed. Furthermore, this Geological Survey report indicates that significant volumes of water are required below the Bonneville Dam for the navigation requirements of one of the major seaports on the west coast and for fish and wildlife and other purposes. The Secretary of Interior has testified before this committee that Columbia River diversion studies should be limited to withdrawals below Bonneville Dam, and I concur in that judgment.

I do not cite these facts as evidence that surpluses will not exist in the year 2000 and after, but only to inject an element of reason and to counter reckless and misleading statements that have been made

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before this committee to the effect that 180 million acre-feet of Columbia River water is being wasted into the Pacific Ocean.

Mr. Chairman, studies by the Bureau of Reclamation and the testimony of witnesses before this committee all support the fact that the central Arizona project is feasible on its own, that it can repay all reimbursable costs without the assistance of imported water. If this is true, it is not only bad reclamation policy, but the worst kind of legislative practice to incorporate the untried and far-reaching program of water diversion in this particular authorization.

The important feature of the bill as it is now drafted is not the authorization of dams and canals to transport Colorado River water to the central Arizona project and to projects in the upper basin. Rather, it is the authorization of an unprecedented study for interbasin and interstate transfers. From the point of view of its historical significance, this bill should rightfully be entitled, "A bill to authorize a study for diversions and transfers of water throughout the Western United States and Northern Mexico."

If this bill gets to the floor of Congress, the debate will not center around the reclamation features of the project, but on the authorization for water diversion. It is not proper that Congress be asked to consider such a major step in the context of an authorization for development of a specific project or projects.

A study of water diversion as envisioned in this legislation must be considered by Congress completely separated from the proposed authorization of the central Arizona project and other component projects of the Colorado Basin.

I would interject here that it is unthinkable that this study should be paid for by the Colorado Basin funds. It should be paid for by the people of the United States, because the people of the United States will be affected vitally for years and centuries to come by the outcome by such a study.

Because of the many references to water diversion and importation in the various titles of this bill, how can anyone really know what the implication of these references may be? For example, we are allocating 2 million acre-feet of water for reclamation purposes between the diversion point and Lee's Ferry. How can projects be constructed to utilize that water under reclamation law without valid water rights to back them up? How can an allocation of firm and valid water rights for such purposes be reconciled with the so-called priority of right for the area of origin offered by the bill?

What would this bill do to the basic western concept of water rights? Nobody knows for sure.

As I said before, I do not question the motives of any member of this committee.

Mr. Chairman, I am not opposed to the authorization of the central Arizona project and to the full and equitable utilization of all the resources of the Colorado River.

I am not opposed to a separate and independent study of available water supplies and possible diversion by the proper agency—with the full cooperation of the affected States.

But I am emphatically, irrevocably, and conclusively opposed to that kind of study in a bill designed to authorize specific reclamation projects.

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It is proper for this authorization to consider all water sources that are legitimately within the realm of reclamation practice and precedent as laid down by this committee through the years. It is my considered judgment that the central Arizona authorization, considered in the context of those practices and precedents, should stand on its own merits. This would be the course of sound legislative procedure.

But we should delete from H.R. 4671 all references to a water importation study and should draft a bill that will do the total job for studies of potential diversions in the Western States. I am not advocating any particular form of study, but it should be done with thoroughness and objectivity. It must be conducted by the best brains in America in the field, including those outside the Department of the Interior. It should provide full participation by the States involved, particularly by the State of water origin. Above all, the study should not be made in relation to any single set of proposals for reclamation development elsewhere in the Nation. It must be completely independent to be valid. How can the Secretary of the Interior and his agencies produce a completely unbiased report, fully protecting the rights of citizens everywhere, when the basic premise upon which his study is based is the feasibility of a reclamation proposal dependent upon importation for its long-range usefulness?

Gentlemen, if we ever reach the point where we divide up our Nation's water by counting the number of votes each region has in Congress, then we have seen the end of everything this committee has stood for in sound reclamation development. It grieves me to say so, but in this bill are the first faint signs of such a concept.

What good is the language in the bill, inadequate as it is, that protects priority uses in the basin of origin if a future Congress can take it away? Who in the future should determine priorities between domestic use of Columbia River water in Phoenix, or agricultural use in southern Nevada, against Pacific Northwest needs for industrial water, navigation, reclamation development, recreation, or fish and wildlife?

True, this legislation call for only a study of diversion, but even if one endorsed the legislative procedure, it is readily apparent that it provides a vacuum in its set of directives and assumptions. What an evasion of the consequences of disrupting intricate water laws and the existing complicated priorities.

What would be the guideline for people within a river basin to determine water use and priorities?

How can we make a study for diversion, as requested by this bill, without at least making an initial determination of basic assumptions that must go into such studies?

Mr. Chairman, considering the enormous and far-reaching consequences inherent in such a study, and considering that it is the most significant departure from established reclamation concepts ever considered by this committee, I urge that the matter of diversions from one basin to another—involving interstate transfers of water—be considered separately by the committee and by Congress.

I thank the chairman and members of this committee for hearing my views and my appeal.

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Mr. ROGERS of Texas. Thank you, Mr. Ullman, for your statement and for its contribution to the record.

The Chair recognizes the gentlemen from Colorado, Mr. Aspinall.

Mr. ASPINALL. I am always glad to have our colleague who served well on this committee and now serves on the Committee on Ways and Means.

I do not believe I have ever heard him make such an impassioned plea at any time while he was before this committee on any particular matter.

I would ask my colleague this: Does not my colleague believe that the studies that might show surpluses in some areas and scarcities in other areas should be made?

Mr. ULLMAN. Mr. Chairman, these studies should be made. I have repeated time and again in my testimony that I favor such studies.

Mr. ASPINALL. If the studies are made in this part of the Nation, where else could there be any possible diversion of the water for the national good and for the area which is considered here, even including the fringe areas south and east of the Rocky Mountains.

Mr. ULLMAN. Well, of course, the gentleman from Texas has indicated that he is going to put Texas into this study.

Mr. ASPINALL. I included Texas there. I will say this: More than likely such importation is not even possible let alone probable.

Mr. ULLMAN. Mr. Chairman, I do not think we will know. This is the reason that we need a study. I think it is the worst kind of posture to have a shortage area to pay the piper for making a study to incorporate in any set of reclamation proposals a study that will vitally affect the future of another area. This should be done by the people of the United States of America, because they are the ones that are going to live with it during the years and the centuries to come.

Mr. ASPINALL. My colleague is simply postponing it. That is all that he is doing. Maybe this is the only way that we can do it.

Mr. ULLMAN. Mr. Chairman, I am not. I do not want to postpone it. The study that would be made, if it is going to be an adequate study, would take the same length of time, whether the Bureau of Reclamation did it, or whether you had a commission do it.

Mr. ASPINALL. Let me ask to have my colleague remember something. We have already passed legislation authorizing the preparation of river basin plans. Now, it is important—and this is the order of the day—that this kind of a study that is proposed in this legislation bring about and expedite a constructive river basin study of the Columbia River Basin, and if it did, would not my colleague be in favor of that?

Mr. ULLMAN. As I have indicated in my testimony, I am not advocating any particular plan or study. I am not saying that it should be a commission. I am saying what you should do is to take out of this bill all of the elements of the study—broaden it. It would have to be broadened. You simply cannot do an adequate job by having the Secretary of the Interior do it. You must include the States, and you have to include the best brains in the Nation. But put this together into a new proposal, put the same timetable on it that you have in this bill, and I will support it. But it simply cannot be incorporated in this bill.

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Mr. ASPINALL. Well, of course, if my colleague would read this thoroughly, as to the responsibility of the members who are involved in supporting this legislation, he would find that every one of them is desirous of having a survey made of all of the possible potential needs of the States involved, the exporting areas, and everything else. No one desires to handicap any of these States in their future development. If the study should show that there is no water available, then that is all there would be to it. It seems to me, knowing my colleague as I do, knowing his philosophy of life, that if there is a study that can be made, he would be for it. Keep in mind that there is nothing sacrosanct about a river basin in the United States. The national welfare is what we are thinking about. If there should be found to be surplus water not required for the future potential needs of the Columbia Basin or any other basin, would not my colleague be in favor of sharing it with the rest of the Nation; that is, to share this resource?

Mr. ULLMAN. Mr. Chairman, I have already repeated time and time again that I would. I am not taking "a dog in the manger" attitude, but I want to call the attention of the gentleman from Colorado to a situation that might very well develop. There is no problem as long as we have surpluses of water. And if we could confine our diversion to the areas of surpluses and at the time while the surpluses exist there would be no issue between us, but the problem is going to come, and the crisis is going to come when we get into an era of scarcity. I have already pointed out that even within another 25 years, we are going to be needing all of our water for power purposes. We need to have a comprehensive study outside of the realm of any one project in the Bureau of Reclamation, so we know what is going to happen and where the priorities exist.

I would just like to call the attention of my colleagues that I am from a State with four Members of Congress. We all recognize that in the areas represented by this bill there are a lot more Members of Congress and that we may very well be the minority that is ridden over in legislation of this kind.

Mr. ASPINALL. I yield my share of the time.

Mr. ULLMAN. But let me point out, Mr. Chairman, this one thing that could happen: When the period of scarcity arises—and it will, just as surely as we are in this room today—and we have an irrigation project, for instance, of 200,000 acre-feet that has not been developed, that becomes feasible—and it surely will in another 25 years—and that matter comes before the Congress for consideration and the water that will have to be utilized by that project will be water that also is needed in California and Arizona, highly populated areas, would my colleague think that the people who represent those areas could vote for a reclamation project in my district that would utilize water that they need? No Representative could be reelected and do that. That is what we are doing in this legislation today. We are getting away from the basic concept of reclamation law and throwing it into the area of interregional priorities.

Mr. ASPINALL. The gentleman is not answering my question, so far as that is concerned, in painting these pictures of the future. We have not gone into that. I know how the gentleman feels. I respect him for trying to represent his district today, tomorrow, and forever.

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And I will go along with him forever, so long as the welfare of his people are involved. Outside of that, I have nothing further to say. I come from a State—and I may say a district—where we have shared our water more than any other place in the United States. We take no offense to our sharing of this water, and we do not try to stop the development in other areas.

I yield back my time.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. Will the gentleman explain the origin of the expression that Oregonians sometimes apply to themselves, to wit: "webfoot?"

Mr. ULLMAN. We have two areas in Oregon which are different. We have a coastal area in Oregon, and the gentleman from California, I am sure, knows this, because he has been in the State of Oregon, where we have abundant water, but, as I said in my testimony, I represent an area of 66,000 square miles—larger than any State east of the Mississippi River—that is a semiarid country.

Mr. HOSMER. Like California, in some places it is wet and in some places it is dry. I presume that the webfoot refers to the wet areas.

Mr. ULLMAN. The gentleman is correct.

Mr. HOSMER. That they have so much water that they are like ducks.

Mr. ULLMAN. That is correct.

Mr. HOSMER. You set forth the proposition that the region involved should make the decision itself relative to any excess water, and, also, that Oregon is going to have its study completed by 1970. I presume that there are other States in the basin, at least Washington and Idaho——

Mr. ULLMAN. The Columbia River Basin you are referring to?

Mr. HOSMER. Yes.

Mr. ULLMAN. Yes, certainly there are about seven States.

Mr. HOSMER. What?

Mr. ULLMAN. Seven States, I believe.

Mr. HOSMER. Seven States?

Mr. ULLMAN. Yes.

Mr. HOSMER. Do you know what, if anything, any of these other States are doing about such a study?

Mr. ULLMAN. Well, the States lying wholly in the basin are Washington, Oregon, and Idaho, and to my knowledge, they are all three making such studies now. I understand that they are going to testify here this afternoon. I am sure that they will tell you about that.

Mr. HOSMER. Do you know what kind of time schedule Washington is on in its study?

Mr. ULLMAN. I do not.

Mr. HOSMER. Do you know what kind of a time schedule Idaho is on in its study?

Mr. ULLMAN. I am sure that everyone would be willing to set the time schedule that we have set in Oregon.

Mr. HOSMER. Do you know what kind of time schedule the others are on in this study?

Mr. ULLMAN. I do not.

Mr. HOSMER. Do you know of any movement underway to coordinate any of the studies of these seven States?

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Mr. ULLMAN. No. Let me tell the gentleman from California this, that if we had separate legislation calling for an overall study, with the full cooperation of the various States involved, I am sure you would not have any difficulty with the States in the Pacific Northwest, since there are very few people who are taking an adamant position. If we really, in fact, do have surplus water, and if we really, in fact, can determine a way whereby that water is protected for future use in our basin, there are very few people who are going to stand in opposition to such diversion.

Mr. HOSMER. Let me say to you that it took something like a hundred years for the seven States of the Colorado River Basin to come to any definitive conclusions about their water, as to how much it was and how much it was short, and I think that the experience of other basins has been that this job simply cannot be done within a basin solely, and I gather challenge the practicality of the gentleman's thesis that the determination should be made by the basin involved—solely by them.

Mr. ULLMAN. The answer, however, does not lie in allowing a study centered in another water-short basin to determine for the Columbia River Basin what the Columbia River Basin needs are. It is for the people of the area of the Columbia River Basin to determine what the guidelines are and what the future needs are going to be, and I think that, if anyone on this committee takes the position in opposition to that—and I am sure they are not—then they are violating a very basic principle of justice in America.

Mr. HOSMER. Well, now, let us look at precedents to this kind of thing—in another resource—electricity that comes out of the great hydro projects of the Pacific Northwest in the Columbia River Basin System. I believe that the gentleman was quite active in the recent past in getting a law passed relative to establishing the regional priority on that power for the Pacific Northwest, was he not?

Mr. ULLMAN. I certainly was, and I will do the same thing for the water diversion.

Mr. HOSMER. Will you answer my question?

I will give you a brief period to make a speech.

Now, the gentleman has satisfied, I assume, because of his strong advocacy of this measure on power that the Congress was a good place to protect the priority with respect to electricity of the Pacific Northwest, was he not?

Mr. ULLMAN. I certainly was. It was a good one.

Mr. HOSMER. That electricity is an export product then of the Pacific Northwest. Nobody had any particular difficulty in defining it as a "surplus"? And apparently, the Pacific Northwest is fully aware that the congressional legislation will protect its right.

Mr. ULLMAN. Will the gentleman give me an opportunity to comment?

I think we are talking about two totally different problems. We are not talking about a study that was proposed in some other power-hungry center of the area that came in and offered the proposal to study our power needs. What we had was a proposal that originated in the Pacific Northwest in favor of power grids throughout America, and we will see the day when we have that, but when you are talking about water, we are talking about another problem.

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Mr. HOSMER. We are talking about something that the gentleman mentioned. He would have to be against exporting water, in order to be reelected. I understand that.

Mr. ULLMAN. The record is clear here. I am not against exporting water, whether I get reelected or not, but I am drastically against the kind of study you propose here which cannot conceivably come up with the ultimate answers and does not take into consideration the viewpoint of the people of the Pacific Northwest.

Mr. HOSMER. As a matter of fact, you said that this sort of thing that these people, including myself, have introduced bills about, tends to arouse apprehension and outright suspicion among the northwesterners as to the motives for such actions. What is the "suspicion" and what are the "motives" that you refer to?

Mr. ULLMAN. The gentleman could ease that suspicion by agreeing——

Mr. HOSMER. To gut the bill?

Mr. ULLMAN. Not to gut the bill at all. If your project will not stand on its own merits—and I think it will—then it should not be passed. The kind that I have recommended here is the only kind of study that can come up with the answers that we are looking for.

Mr. HOSMER. Who do you think we will have to have to do this study, the United Nations, or somebody else?

Mr. ULLMAN. The United States of America has traditionally made these studies and the United States could do it. It could not be done by any water hungry basin that is, obviously, going to approach the whole problem from its own point of view.

Mr. HOSMER. Have you read the bill?

Mr. ULLMAN. I have read the bill.

Mr. HOSMER. It provides for the study to be made, and it provides——

Mr. ULLMAN. Paid for by the Colorado Basin funds, is that not right?

Mr. HOSMER. Paid for? By the Colorado River Basin funds?

Mr. ULLMAN. Right.

Mr. HOSMER. That question was indicated by Mr. Mahon; whereas, as a matter of fact, the staff advises that it is to be paid for by the general obligations of the Treasury, since it is a study to be established by a group created by law, by the Congress. How can you say that it is not an act of the Congress?

Mr. ULLMAN. My position is clear. I am in favor of a study, a comprehensive study, an independent study.

Mr. HOSMER. But you do not think that if this is established by Congress that will give you that; is that correct?

Mr. ULLMAN. This is a study by the Secretary of the Interior who is advocating the project.

Mr. HOSMER. In the Pacific Northwest——

Mr. ULLMAN. He is a very wise government official. He is a personal friend. I have great admiration for him. Even though he comes from the State of Arizona, I am sure that he would do everything possible to make it an unbiased study.

Mr. HOSMER. Well, you said, in part of your testimony today, that we should inject an element of reasoning, to counteract misleading

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statements made before this Committee to the effect that 180 million acre-feet of Columbia River water is being wasted into the Pacific Ocean. How much water is being wasted into the ocean?

Mr. ULLMAN. This is why we need an unbiased study. We need to know. Nobody knows. We do not have any set of guidelines to determine how you are going to make that study.

Mr. HOSMER. The gentleman is forgetting the fact that competent hydrologists and river scientists and engineers put this at about 90 million acre-feet on an annual average. If I am giving you some new information, and you want to revise your testimony on that basis, I hope that you will feel free to do so.

I guess that is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Haley.

Mr. HALEY. Thank you, Mr. Chairman.

We are getting down now to what I have asked for, for a long time, as to who wants to steal from whom.

Now, then your State is in the slot, so to speak.

I was quite intrigued by the testimony of Anthony Wayne Smith, president and general counsel, National Parks Association, in the hearings that were held last year. I do not recall who, but some member of the committee raised the question about Mr. Smith's qualifications as an expert witness, and he furnished the committee with a résumé of his qualifications, you might say, consisting of about 2½ pages, and he testified as to those. Let me hand to you, Mr. Ullman, this testimony of that gentleman. Turning to page 743, I asked a question as to where this water would have to come from, and Mr. Smith testified—and I will read it.

Mr. SMITH. Eventually, you are going to take it out of the Pacific Ocean by the nuclear fusion process. You are going to get it at rates much less than you can bring it down from Northern California or the Pacific Northwest.

And further he states that it has been indicated that the fission process will make it feasible in the next 10 or 15 years and that this water will be available at much lesser cost than to build a diversion canal, and so forth.

Do you have any comment on that?

Mr. ULLMAN. I say to my good friend from Florida that I am glad that he is here today.

Mr. HALEY. You need some friends on this. [Laughter.]

Mr. ULLMAN. And I take it from the tenor of his remarks that Florida does not need any water from the Columbia River Basin. I am glad that my friend has brought out this point, because this is why we need an independent high level study that incorporates not just the best brains of the Department of the Interior, but the best brains of the Nation, because there are alternatives that should be considered.

When we come to the point where we have an organization studying this problem that the people of my State have confidence in and can rely upon and if they should determine that all of the other alternatives have been looked into, and then if they should propose a set of guidelines that would give us adequate protection, then I am sure that there would not be the problem that we have today. But there is a very real posibility that it would be much cheaper and more efficient to choose a method of converting saline water than to spend

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some $8½ billion—and in this we are talking about a lot of money—to divert water out of the Columbia River Basin. This, certainly, needs analysis by the best experts we have. And we, in this Congress, should be, in my judgment, examining the possibility of accelerating our saline program to try to speed the day when this can be done.

Mr. HALEY. I have served on this committee with the gentleman. I think that the Congress should—and I think it is the duty of this committee, to make a thorough study. If this project is feasible and you can take this water from southern California and other parts of the country out there from the Pacific Ocean, then you are not put in the embarrassing situation of robbing some of your neighbors, and that is exactly what is proposed in this bill. I know that you have got a tremendous momentum built up here to go ahead and authorize these projects.

I think that this committee and the Congress in the future, in the United States, as in the past, has been and will be very generous with the people of the Western States in their reclamation projects and many other projects. I realize the importance out there, but, again, I say let us study all of these various projects. We are spending a lot of money here to see if these systems or precedures are feasible and possible. I think that we should go a little slower.

As I say, Mr. Smith was taken to task by one of the members of the subcommittee. He furnished a statement as to his qualifications as an expert in this matter.

I think that the gentleman from Oregon has a very valid position in this matter. Let us study it. If it is not feasible then we will know it. I do not know whether this process of purifying water is going to be possible in 10 or 15 years, maybe never, but I think that we are entitled to know just where we are going before we rob you people up in your part of the country of your rights to water. In the future, you may need that water very badly. Your people need some water up there.

I would like to suggest that some of them move up into that part of the country. I do not know why the rest of the country is under any obligation to provide water for southern California, Arizona, or New Mexico, or even to the great State of Texas. I think we ought to have all of the facts before us.

I want to commend the gentleman and to thank him for his testimony here this morning. Certainly, it is something that this committee ought to take into consideration and to consider very seriously.

Mr. ULLMAN. I thank you.

Mr. HALEY. I came here, because I knew that you would need a friend.

Mr. ULLMAN. I thank you again. [Laughter.]

Mr. ROGERS of Texas. Mr. Johnson?

Mr. JOHNSON. Thanks, Mr Chairman.

I want to say to you that you certainly spelled out your position on this particular piece of legislation. There is only one question that I would like to ask of you and have your comments on. In title II, is there not some way that we can provide and work out language that will establish priorities to avoid the fears that you have? As I understand it, you share what is provided for in the

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bill in title II at the present time. If title II were amended to take care of some of your fears, would you still object to this piece of legislation?

Mr. ULLMAN. I will say to my good friend from California that he comes from about the same type of area that I come from. He has a large area in California that he represents. He knows some of the problems we have.

I would say that I am emphatically convinced that it is wrong legislative procedure to incorporate a comprehensive water study—to include Texas and all of the Western States—in a bill to authorize a specific reclamation project. I favor such a study. It needs to be rewritten. You should pull the study out of this bill and run it separately through this committee. I will be glad to support it, if it takes fully into consideration the position and the findings of the various States and utilizes the best brains in America, in addition to the Bureau of Reclamation. I will do anything that I can to help the gentleman, but it simply does not belong in this bill.

Mr. JOHNSON. I presume that the States involved here have had some of the best brains in the water field in the United States study this.

Mr. ULLMAN. We are in the process.

Mr. JOHNSON. I think that they have been working on this for some time. I can only say that much of the legislation that has passed this committee in the past with arguments about certain things have not always succeeded. For years, we held up the Frying Pan-Arkansas project, which is a project for diverting water into another water basin—into another drainage area—yet it is clear that the Congress, after this committee acted favorably upon it, the Congress did so, too, after many years of arguments.

We have a shortage of water in California. After many years of argument, it has been worked out—and after study.

My only concern is that if we are going to have a movement of water development in the West, we have to somehow compromise our differences, and I think that the best brains in the West, at least in this particular field, have worked on this.

I know that your people in the Northwest have worked on it, because you have developed the Columbia River Basin. Certainly, the States of Oregon and Washington have looked out for their welfare when they dealt with the Columbia River Basin project.

We talked about this yesterday being a national water matter. It is international, because, in the treaties that we have with Canada, we are bringing down a sizable amount of water for our own power purposes and on out to the ocean.

I certainly have no objection to your making your statement, coming from the area that you do, but I do think that if we could amend title II in this particular bill, I think that it would protect everyone, because it says you can write it in any way that you would want; it would only relate to surplus. And I think that when it comes right down to all of the arguments, it will be that we will only deal with surplus water, if they are going to make any diversion of it.

Mr. ULLMAN. I would be happy to join the gentleman from California in working for a study of total water diversion, the kind

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that we are talking about. It is time that we had such a study underway. I do not know why the sponsors of this bill are adamant against an independent water study. This is the right way to do it. You simply do not make such a study this way. This is the most important thing in this bill, and we have it as an appendage. This is major departure from water policy in the West. This is an issue we should decide on its own merits, and every Member of Congress ought to have the right to decide the details of a specific bill on a water diversion study, and this should be the business of the day. We should consider this problem separate from the Colorado River project, and, as I said before, I am not opposed to either. I would be in favor of both if they were handled intelligently and separately.

Mr. JOHNSON. I think you fully realize, and you know, that we could write a section 2 that would be independent. Time is of the essence here. They are asking for authorization of the project on the Colorado River and for a study to be made within a stipulated time, and for that study to come in here within that stipulated period of time. We could write in title II that it be an independent study and you can bring in the best brains in the country to do the study, but someone has to head that study up, and I think we all have confidence in the Secretary of the Interior whoever he may be. God knows that it might be Stewart Udall when the study is finally made and reported, but we have to direct this by someone. You can stipulate in these just how you want the study made, but I think that the study should be made. We are only talking about surplus.

I had to yield when I was in the legislature to a statewide study, even in our own State, and the diversion there.

Mr. ULLMAN. The gentleman and I have not any argument. We both agree that we should have a major water diversion study in the West. It should include Texas and it should include every other Western State. But we violently disagree as to the reasons that it should be in the bill. The Colorado River project can stand on its own feet. This committee could report out expeditiously a bill for a water diversion study on an independent basis and run it through ahead of the Colorado River project, if they would. There is no reason why it could not be done, and done immediately—and the study could be conducted just as rapidly on an independent basis as if it were included in this legislation.

The gentleman and I can agree on that, but we certainly are never going to agree that you put a major interbasin water diversion study in as the tail end of a bill authorizing a specific reclamation project. This is wrong legislative procedure, and I think the gentleman from California knows it. I think I know why he takes the position he does, but it does not make it any more right from a legislative point of view.

Mr. JOHNSON. The study that would be asked for, for any project that could be conceived of, would have to have new authorizing legislation to come through the Congress. If you disagreed with that, you could certainly take that out. But to stop a study and stop a project just because you do not want them written in the same bill, but to provide for a separate study, I think, is taking an unrealistic view on the matter.

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Mr. ULLMAN. I would like to say that this committee has never done this before. How in the world can you assume what the results of a study are going to produce? The study may show that there is no surplus water in the Columbia River Basin.

Mr. JOHNSON. That is fine. Then, there will be no further project in the way of a diversion, either. And the study would prove that.

Mr. ULLMAN. But you have already authorized your project, and if that project is contingent, that is, if the long range feasibility of that project is contingent upon the diversion, then you do not have a project. That is why the two should absolutely be divorced.

Mr. JOHNSON. I think it was made crystal clear yesterday that the development on the Colorado River would stand on its own.

Mr. ULLMAN. In my testimony I have said that I think that it does, and that I am not opposed to the package of the Colorado River project on its own, but I am violently opposed to tying an interbasin water diversion study to a bill that should stand on its own and, in my opinion, can stand on its own. Nobody has ever given me a reason, a valid reason, why the two must be tied together. It is wrong legislative procedure any way you look at it.

Mr. JOHNSON. Thank you.

Mr. ROGERS of Texas. Mr. Burton of Utah.

Mr. BURTON of Utah. I would like to compliment our colleague in presenting a most convincing case and in presenting his point of view very lucidly. I do not agree with it, but he has done an excellent job. I want to take exception to the remarks of my colleague from Florida about this being a steal or a case of robbing our neighbors, and I wish that my colleague was here, but he has left. I do not think that that is the case.

I am in somewhat of an analogous position, as my friend from Oregon, because our friends and colleagues here from Arizona and California come along and tell us that we are not in a position to use this water, our projects have not been developed yet, and, in effect, it is surplus so that they want to use it for a while.

Now, as to "surplus" water, surplus water in my mind is synonymous with water "waste". In a highly developed and complex society and economy that we have, it is pretty hard to be in a position of justifying waste, and if the study shows that there is a surplus, that there is a tremendous waste in the Columbia River Basin, I believe that our colleague would be hard pressed in defending that when there are other areas that are desperately in need of water. This bill is not any insurance policy, that they are going to drain off your water. It is an insurance policy that there will be a study made of possible uses of 90 million acre-feet. I live in a river basin where we are talking about, eventually, utilizing among three or four Upper Basin States, 7½ million acre-feet, and that is not an awful lot of water. I do not want to be in the position of robbing my neighbor, but I think we have to look at the bill in its proper perspective and not purport it to do things that it really does not do.

I take issue with you, Mr. Ullman, on the fact that this is improper legislation. In my opinion, there is nothing wrong in authorizing a series of reclamation projects, and at the same time authorizing studies.

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Mr. ULLMAN. The gentleman has not told me why he is opposed to separate legislation, because he and I do not agree at all on utilization of waste water. I could not agree more. If there is waste, it should be used.

But the gentleman has not told me why——

Mr. BURTON of Utah. I will tell you why.

Mr. ULLMAN (continuing). He is opposed to an independent study.

Mr. BURTON of Utah. I will tell you why. Now, wait. Let us talk about that term "independent," an independent study. What makes the gentleman think that this would not be independent?

Mr. ULLMAN. The Secretary of the Interior is coming before this Congress asking for the authorization of one of the largest reclamation projects ever conceived in the West, and he is an advocate of that project. At the same time, incorporated in the same legislation, he is saying "I want the authority to sudy the water diversion from other river basins." There is a clear implication, a very clear implication that as an advocate of this project and recognizing the fact that the long-range usefulness of the project is contingent upon diversion, that he is also an advocate of diversion. I am not questioning, in fact, the motives of the Secretary of the Interior. I am saying that this study should be much broader than that, and above all, it should be independent. It should not be the tail end of any reclamation bill.

Mr. BURTON of Utah. I have confidence in the Bureau of Reclamation.

Mr. ULLMAN. The Bureau of Reclamation——

Mr. BURTON of Utah. And the Secretary of the Interior would rise to the occasion as he has on other occasions. I have confidence that he would.

Mr. ULLMAN. I have great faith in Secretary Udall, but I would not want to put this burden on any Secretary. Secretary Udall might very well do a much more unbiased job than another Secretary from another State, but he would still be an advocate of this project, and he would still be looking for water from somewhere else to make the project feasible.

Mr. BURTON of Utah. The gentleman knows that we have had this project and this possibility-of-importation study before us for a year. We held hearings for the better part of 2 weeks on it last year.

You asked me why I am opposed to independent legislation. The answer to that is that if we separate or divorce this importation study from this bill, this would mean more hearings, more delays, and it would still be before us next year. The time to do this, I think, is now. You cannot get a glass of water in New York City unless you ask for it. And I think that this is a natural problem that has to be viewed in that light.

Mr. ULLMAN. I suggest to the gentleman that we get to the business of the water study. That comes first. That should be the first priority of business of this committee, an independent study, and then let us talk about reclamation projects after that. Let us decide how much water we have and where it is available before we talk about using the water and committing ourselves to the use of the water.

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Mr. BURTON of Utah. In my judgment that is a mere stalling tactic. We have got to face up to this. These people in your area, they have to face up to it just as the people in Utah have to face up to it. The day of reckoning is here. It cannot be protracted any longer.

Mr. ULLMAN. I would just like to comment that I think that if the Secretary of the Interior came from another basin and had the responsibility of determining, regardless of what the opinion of the people of your district was, whether they would take away some of your water, I think that you would be a very great advocate of the kind of position that I am advocating today.

Mr. BURTON of Utah. We are in that position now.

Mr. ULLMAN. You are attempting to determine the future of your own water, but whatever arrangement that has been made upstream or downstream has been made on the basis of dividing up somebody ele's water. Unfortunately, this is the situation we are in today.

Mr. BURTON of Utah. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. If we do not concede that, we are going to be here for a long time. We should confine our questions and our answers. Mr. Udall?

Mr. UDALL. I will take 2 minutes.

I want to say to my colleague that he is constructive. He is a builder; I have enjoyed working with him.

I will pose two very quick questions.

I was going to discuss the legislative procedure, but I will set that aside for the moment and talk about the merits.

Suppose that the President had on his deck either two separate bills or one bill with a title which happened to be entitled "Studies." Suppose each of these alternatives included the same language. You said that you want thorough studies, objective studies, fair studies.

I compliment you on your presentation, because I think it has been a constructive one.

Suppose that it is one bill or it be two separate bills, containing any kind of study that you wanted to include, including the Secretary of the Interior who has the project for desalinization of water, as well as the Reclamation Bureau under his control, that it provides that such independent group be a specific one, such as a National Water Commission, and it provides the kind of study that you want to make, and also it provides the current authorizations, either in a separate bill or in the title of the bill, that either of these alternatives was before him, would you be in favor of the President signing that one bill or those two bills? What is the difference?

Mr. ULLMAN. I have already made it very clear that the first consideration is that it be a separate bill. I think that any connotation that one is a part of the other just simply has to be erased. But I think that the gentleman and I could probably agree on an independent bill for a water study. It would have to be much more comprehensive. It would have to contain much more in the way of guidelines, because there are absolutely no guidelines for the Secretary of the Interior to follow in this bill.

If we could agree on a bill for a study—and I think that we could because the gentleman is a reasonable man—and it were on his desk as an independent study without any cross-references or connections between the two, then, I certainly would advocate his signing the

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independent water study bill. If this committee determines that the Colorado Basin Project is feasible on its own merits—this committee would have to make that determination—then, certainly, I would not oppose that bill. I would probably favor it, as I have always favored worthy reclamation projects.

Mr. UDALL. Would the gentleman agree that if we provide for an independent water commission, be it a Pacific regional water commission or a national water commission, to make a study of all of this, that that study group should have as its first priority the study of the Colorado River Basin, the needs for the Southwest, and the like?

Mr. ULLMAN. Well, I certainly think that this would be a first order of business, but I would not want the study itself to go to a particular area. It should study the whole water problem in the West. I would certainly think that this is one of the most urgent problems. And anybody making the study would make it the first order of business.

Mr. UDALL. I have one other question.

On page 1 of your statement you seem to be unhappy with the fact that it has gone from 2.5 million importation to 8.5 million importation.

Does the gentleman understand that my purpose in rewriting that was to attempt to meet some of the fears that you had expressed and that the people in your area had expressed, that we had floor last summer but no ceiling. So, we rewrote it, because we wanted to give you a range within which we were studying the quantites of potential importation.

Mr. ULLMAN. I wonder if the addition of the Texas situation would change that?

Mr. UDALL. It might well change that.

I thank the chairman, and I thank my colleague.

Mr. ROGERS of Texas. My Wyatt.

Mr. WYATT. I would like the privilege of editorializing for only 2 minutes.

However, I would like to welcome my colleague and to commend Congressman Ullman upon his able and very excellent and well prepared statement.

In addition, I would like to say, Mr. Chairman, that I subscribe wholeheartedly to Congressman Ullman's endorsement of a completely independent study.

I might also say that it is a courageous act to go against some of the people in our home State of Oregon who are against export of water regardless of surplus, and I join Congressman Ullman in presenting that viewpoint.

Mr. ROGERS of Texas. Mr. White of Idaho?

Mr. WHITE of Idaho. Thank you, Mr. Chairman.

From what has been said here so far I am afraid I am going to be painted with the same brush that my colleague from Oregon has had liberally applied to him up to this point. We are talking about the national interest here to a great degree. I have watched the advocates of this bill. I know a little of the history of my colleague from Oregon, since he has been here. I know that we have had reclamation projects all over the West. We have had legislation affecting every part of the United States. I think, if you will examine the

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gentleman's record, you will find that he has supported such legislation in every area.

And, again, in trying to impung him as being parochial in his approach, I think is a serious mistake.

I think some of the people who have attempted to do this are as guilty or more guilty than this gentleman who sits at the witness table at this time. I specifically refer to my good friend from California. I have sat on this committee for 3½ years, and I have seen the gentleman attend only when he has been interested in problems dealing with California and with power projects rather than some of the things like the Garrison project or some other project that we have had before this committee.

Now, I think if you will take my record and the gentleman from Oregon's record, we have supported every reclamation project in the entire country. I think it is the needs of the entire country that counts. And, certainly, we are going to represent the thinking of the people who elected us and brought us to the Congress.

I see people sitting in this room who were not here at the time other projects were being considered by this committee, but I have been here for almost every one of them, and I have taken positive action on them.

Mr. HOSMER. A point of order.

Request is made that the members confine themselves to questioning.

Mr. ROGERS of Texas. What is the point of order.

Mr. WHITE of Idaho. I will ask the chairman to rule.

Mr. ROGERS of Texas. What was the gentleman's question?

Mr. WHITE of Idaho. I will be glad to ask a question.

Mr. ROGERS of Texas. He is taking the position that you are laying a predicate for a question. That is what the Chair takes to be the position.

Mr. WHITE of Idaho. With the permission of the gentleman from California, I will state the question.

Mr. JOHNSON. Will you yield there?

Mr. ROGERS of Texas. Your time has expired. You said that they would be short questions.

Mr. WHITE of Idaho. All I wanted to say is that I think that the gentleman has done an excellent job in preparing his testimony. I think he has placed precise, succinct, eloquent testimony together; he has documented it well, and his arguments with the members of the committee who interrogated him have been well presented.

Mr. ROGERS of Texas. You are asking how he stands on the bill?

Mr. WHITE of Idaho. I will yield to the gentleman from California.

Mr. JOHNSON. I want to take this opportunity to say to my good friend, Congressman Ullman, that I took no exception to your statement other than asking questions as they related to title II, and I certainly have sat on this committee, too, for some time, and I think that I have voted for every reclamation project in the West, too, and in many other States other than my own, and I certainly took no offense to you, nor did I try to paint with any paintbrush or anything else. I merely asked a question about title II here, as to whether it would resolve our differences if it were rewritten, if you would agree to rewrite the language so that we could go ahead with the bill.

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Mr. ROGERS of Texas. Are you through?

Mr. WHITE of Idaho. Do you feel then that we should provide a separate study that would do the job, if possible, and a continuation of the legislation study?

Mr. ULLMAN. There is no question in the world but what this committee could write language that I would agree to. I have great faith in this committee, that it could provide for an independent study that would go to the real problem and provide the wherewithal to come up with the answers we are all seeking.

Mr. WHITE of Idaho. I yield the balance of my time.

Mr. ROGERS of Texas. Mr. Hansen of Idaho?

Mr. HANSEN of Idaho. Thank you, Mr. Chairman.

It has been a pleasure having you here, Mr. Ullman, and I certainly sympathize with the position you have taken. You made some very fine points and your presentation was excellent.

Do you feel that tying these two pieces of legislation together, project authorization requests for dams and possible water importation studies, makes it appear that study is only a formality that precedes actual importation?

Mr. ULLMAN. Regardless of the motive—and I do not question the motive—the very fact that this is tied to a bill authorizing a specific reclamation project prejudices the outcome.

Mr. HANSEN of Idaho. You then feel that the way to end this prejudice would be to separate the legislation so that the project or the projects in Arizona would stand on their own and the water study itself would stand on its own; is this correct?

Mr. ULLMAN. I do not see how this Congress can constructively do it any other way.

Mr. HANSEN of Idaho. It was mentioned a few moments ago that this is a national problem. Do you feel that it is being treated in a national way when it is tied to a regional situation?

Mr. ULLMAN. I certainly do not. This is a problem that is of vital interest to every American, because water holds the key to the future of almost every State in the Union. And I should think that it would be the first order of business of this committee to get underway as rapidly as possible a comprehensive, overall water study that would improve the possibilities of diversion.

Mr. HANSEN of Idaho. Do you feel that an overall water study as you mentioned should be solely in the hands of the Secretary of the Interior, or do you feel that it should be broadened by bringing in representatives of the various State agencies, and other important bodies concerned with water problems so as to have a broad and comprehensive study by all water agencies combined across the United States?

Mr. ULLMAN. I think it is wholly wrong to do as this bill provides, to put the study only under the Secretary of the Interior who is an advocate of the project. It should be a broad study, including the Secretary of the Interior and including the best water brains in America, including the States who are vitally affected.

Mr. HANSEN of Idaho. Do you feel then that the advocacy of the Secretary of the Interior for this project prejudices any study that he might make toward the diversion of the water?

Mr. ULLMAN. I am not questioning his motives whatsoever.

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Mr. HANSEN of Idaho. I am not questioning his motives either.

Mr. ULLMAN. This Secretary or any other Secretary, I think, as an advocate, is not in a position to make the kind of study we are talking about.

Mr. HANSEN of Idaho. Do you feel that the $8½ billion mentioned as the cost of water diversion might be used to great advantage to perfect the means to convert saline water?

Mr. ULLMAN. He would not have to spend $8½ billion, but if he spent $1 billion I feel we would find a way of doing it—we could provide the water for a lot less than $8½ billion.

Mr. HANSEN of Idaho. Do you feel that the pressing drive now by certain regions of the country for water could preclude the fact, that on a long-term basis, other areas, as you have mentioned, might eventually have uses for the water now in question, and that maybe we are only getting part of the picture by talking in terms of one area which is now sorely pressed?

Mr. ULLMAN. Absolutely, I think that the fact that the gentleman from Texas has said that Texas will now be included—is symptomatic of what will happen. There will be other areas that will realize that they should be in this study, too. That is why it should include the whole Western United States.

Mr. HANSEN of Idaho. Do you feel then that, as has been stated, it would gut the bill if the diversion study section were to be taken out of this piece of legislation?

Mr. ULLMAN. Absolutely not. The last thing I want to do is to gut any piece of legislation, but, in my judgment, it is totally unsound legislative procedure to do it the way that this bill is proposing to do it. The only constructive way to do it is to launch an all-out independent study. Then we will be in the position to know whether we have the water to build these irrigation projects.

Mr. HANSEN of Idaho. And if we did take this section out of the bill, should the bill then be passed?

Mr. ULLMAN. If the study remains in the bill, I am very much opposed to the bill, and I will do everything that I can to see that it is not enacted. But I would hope very much that the committee, in its wisdom, will separate the two, because I think that this is the responsible and sound way of proceeding.

Mr. HANSEN of Idaho. I wish to thank the gentleman for a fine clarification of the statement he had presented this morning.

Mr. ULLMAN. Thank you.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. Thank you, Mr. Chairman.

I would like to say to the gentleman that he has given, both in his statement and in his responses, what I consider to be a most eloquent and informative and comprehensive statement, not only of the position of the State of Oregon but of the entire Pacific Northwest regarding this problem of water diversion.

I would like to ask the gentleman if it is not true that the attitude in the Pacific Northwest is that a study directed by the Secretary of the Interior and the Bureau of Reclamation in itself is considered by us to beg the question as to various means for improving the water supplies of the Colorado River?

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Mr. ULLMAN. I think that the gentleman is absolutely correct. I stated it a number of times, that such a study would be highly suspect by anybody from our area.

Mr. FOLEY. Is it not true that in terms of the directions of the bill itself, while the Secretary called last year for a variety of Government agencies, market modifications, and weather modifications, and the like, it would be in the feasibility report on the importation together with that?

Mr. ULLMAN. Right.

Mr. FOLEY. Whatever the Secretary's attitude might be, it would direct him in advance as to the means of augmenting the water supply, which facts and research do not now justify?

Mr. ULLMAN. Absolutely correct; we are calling, in essence, for a prejudiced report.

Mr. FOLEY. Is it not also true that there is no ceiling on diversion because the bill last year called for a minimum of 2½ million acre-feet, and the gentleman from Arizona, the sponsor of this legislation, said yesterday that the new draft also contains no ceiling?

I mentioned the figure of 100 million acre-feet, and he corrected me to 400 million acre-feet, which would be possible within the scope of the study here.

Mr. ULLMAN. I am very happy that the gentleman has brought that out, because this is something that has aroused great fears, as the gentleman knows, in our part of the country.

Mr. UDALL. Will you yield?

Mr. FOLEY. Yes.

Mr. UDALL. I added about 10 qualifications to that, if the gentleman will recall. We aren't talking about any such quantities.

Mr. FOLEY. Is it not also true that any river basin, such as the Columbia River Basin, utilizes water for a variety of means, navigation, port facilities, industrial uses, fisheries, and wildlife, and water pollution control, as well as reclamation and power?

Mr. ULLMAN. Absolutely and there are no guidelines in this bill to guide the Secretary as to what considerations he would follow in determining all of the various and multiple uses. And, certainly, the uses for water in the Pacific Northwest are very vital. This is our gold and this is our oil. This is the greatest thing we have in the way of a natural resource, water. And we have more uses for it and more need for it than anybody else.

Mr. FOLEY. Will the gentleman state whether or not it is correct, when it has been admitted in this hearing room, that the seven States of the lower and upper basins have consulted for months and months—is it not true that except for individual contacts by members that you mentioned of the Pacific Northwest, it has never been included in these conversations?

Mr. ULLMAN. The Pacific Northwest has been left completely out of the negotiations, that is right.

Mr. FOLEY. Is it not true that the sections of this bill which are offered as proof that we will be protected in the Pacific Northwest in our water uses have been rejected out of hand by witnesses, such as the Governor of Colorado yesterday when I suggested that such might satisfy the State of Colorado as to its water uses vis-a-vis the lower basin?

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Mr. ULLMAN. The gentleman is absolutely right. I know of no one in the Pacific Northwest who places any long-range reliance upon this kind of guarantee.

Mr. FOLEY. Is not this the source of our concern, Mr. Ullman, when every State and every basin, other than the Pacific Northwest, comes in to this committee and asks for absolute protection in the future, then we, alone, are segregated out to be called lacking in statesmanship and selfish and parochial and narrow?

Mr. ULLMAN. We are expected in this legislation to allow somebody else with a prejudicial interest to determine our future needs, and this is why we absolutely cannot accept the incorporation of this kind of a study on that basis.

Mr. ROGERS of Texas. Mr. Reinecke.

Mr. REINECKE. No questions.

Mr. ROGERS of Texas. Mr. White of Texas.

Mr. WHITE of Texas. I do not have a question.

Mr. ROGERS of Texas. It has been nice having you before the subcommittee, and if there is any insinuation that you were parochial, other than trying to protect the people of your State here, why, of course, I think you will know that.

Mr. ULLMAN. The gentlemen of the committee have been very courteous, and I certainly appreciate the time they have given me.

Mr. ROGERS of Texas. Thank you very much.

The House will soon be in session.

The Chair at this time will recognize Mr. Pat Head representing the Honorable Grant Sawyer, Governor of the State of Nevada, for the insertion into the record of a statement. It is the Chair's understanding that Mr. Head has to return to Nevada.

Mr. HEAD. Do you want me to come to the witness table?

Mr. ROGERS of Texas. If you would, please.

I am sorry that the time has gotten away from us, but it is not unusual in these hearings.

STATEMENT OF HON. GRANT SAWYER, GOVERNOR, STATE OF NEVADA; PRESENTED BY PAT HEAD, ADMINISTRATOR, COLORADO RIVER COMMISSION OF NEVADA

Mr. HEAD. Mr. Chairman and members, it is a pleasure to be back before you again. I have a statement from Governor Grant Sawyer. He wished me to present it to you. It is a very short statement, and I can read it in about 5 minutes.

Mr. ROGERS of Texas. I would suggest, Mr. Head, that you ask that it be inserted into the record.

Mr. HEAD. Mr. Chairman, I so ask.

Mr. ROGERS of Texas. And without objection it will be inserted in the record at this point the same as if read in full, that is, the statement by the Honorable Grant Sawyer, the Governor of the State of Nevada, which has been presented by Mr. Pat Head of the Colorado River Commission of Nevada.

Are there any questions of Mr. Head?

(The prepared statement of the Honorable Grant Sawyer reads in full as follows:)

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STATEMENT OF THE HONORABLE GRANT SAWYER, GOVERNOR OF NEVADA, PRESENTED BY MR. PAT HEAD, ADMINISTRATOR, COLORADO RIVER COMMISSION OF NEVADA

Mr. Chairman, and members of the committee, it is a pleasure for me to present a statement in support of revised legislation now before you to authorize the Colorado River Basin project.

In August of 1965, I presented a statement to your committee in support of H.R. 4671 in which I outlined our views in Nevada concerning the great need for this legislation. In my statement I pointed out the necessity for a clear understanding regarding the fair sharing of water shortages when there is insufficient water in the Colorado River to satisfy the 7½ million acre-feet entitlement to Arizona, California, and Nevada. The revised legislation before you today satisfies our State in this regard. Specifically, a sentence has been added to section 304(a) which states:

Water users in the State of Nevada shall ont be required to bear shortages in any proportion greater than would have been imposed in the absence of this section 304(a).

Under this legislation after the Bounder Canyon project is repaid in 1987 revenues will still accrue and will be paid into the Lower Colorado River Basin Development Fund to help pay the cost of facilities for irrigation. Under the Boulder Canyon Project Adjustment Act of 1940, Nevada and Arizona each receive $300,000 from the Boulder Canyon project as payment in lieu of taxes until 1987, which is the final year of amortization of the Boulder Canyon project. Section 403(c)(2) of the legislation before you today would continue power rates from the Boulder Canyon projects sufficient to create surplus revenues which would be paid into a Lower Colorado River Basin Development Fund after 1987. The $300,000 in-lieu-of-tax payments now received by Nevada annually from the Boulder Canyon project under the Boulder Canyon Adjustment Act would cease and this $300,000 would go into the Lower Colorado River Basin Development Fund.

The history of the Boulder Canyon Project Act reveals in detail the justification for the payment of moneys to the States of Arizona and Nevada from excess profits of the project. The Project Act provides that each of the two States is to receive 18¾ percent of the revenues received by the Secretary which are in excess of the amount necessary to meet the periodical payments to the United States as provided in contracts executed under the act. The act also contains provisions (section 5) by which the Secretary can adjust rates in power contracts so that there will be excess profits for the States of Arizona and Nevada.

The testimony before Congress during hearings on the Boulder Canyon project contained a great deal of background as to why these fixed percentages were put in the act. Briefly, the background is this:

The location and building of Hoover Dam on the Colorado River meant that the banks, bed, and water of a navigable stream were being taken for use by the United States. The utilization by the United States of the banks and bed of the river and the adjacent area to be flooded by the reservoir, effectively denied for all time to the

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States of Arizona and Nevada, the utilization of this portion of their natural resources and, also, the possibility of any private development. The legislative history shows that there were private interests who wanted to immediately construct power generation facilities on the site of the dam and reservoir.

Congress recognized that, where for purposes of conservation, the United States took control of natural resources in the individual States, the States were being deprived of a tax base. This recognition took form by the passage of the act of May 23, 1908 (35 Stat. L. 260) which provided that 25 percent of the revenues received by the United States from each forest reserve must be paid to the State in which the reserve is situated. An additional 10 percent of such revenues is to be used for construction of roads and highways in each such State. Congress gave further recognition when it passed the act of March 11, 1920 (41 Stat. 450) wherein the Secretary of the Treasury is to pay 37½ percent of the revenues received from oil leases to the States in which the deposits are located. Again, on June 10, 1920, Congress passed an act (41 Stat. 1070) wherein 37½ percent of the charges arising from licenses collected by the Federal Power Commission for occupancy of public land is to be paid to the State in which the lands are located.

At a conference of Governors and commissioners of the Colorado Basin States held in Denver in August 1927, a resolution was adopted which embodied a statement of the right of States to receive compensation for the use of their lands and waters.

The regulations of the Federal Power Commission require that any applicant for a license must submit satisfactory evidence of having complied with State laws with respect to bed and banks and to the appropriation, diversion, and use of water for power purposes and for transmission and distribution of electric energy. Fees and taxes then levied by the States become a source of revenue when their resources are used for private development, but which is denied the States if federally developed.

Enactment of the Boulder Canyon Project Adjustment Act in 1940, changed the basis for determining power rates at Hoover Dam. Under this act power rates were placed on an amortization basis instead of on a fluctuating competitive basis thereby eliminating surplus revenues. Some commutation provision was then necessary to carry out the intent of the original Boulder Canyon Project Act. The fixed sum of $300,000 per year included in the Adjustment Act to be paid to each of the States of Arizona and Nevada to the amortization year 1987 was arrived at by negotiations between representatives of the contractors and the two States. In a spirit of cooperation the States in accepting such a fixed sum recognized a probable reduction in anticipated payments to them, and a lower rate for power at Hoover Dam.

All of the foregoing is to say that Congress has recognized an obligation to compensate Nevada for tax revenues lost as a result of Federal construction of Hoover Dam. I see nothing which should justify Nevada's loss of this revenue in 1987 any more than one should expect to cease paying taxes on a piece of real estate just because it is paid for.

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This is especially true when revenues to aid irrigation are to be continued for many years after the Boulder Canyon project is paid for.

We, therefore, recommend that section 403(c)(2) be changed by adding after the last sentence:

Provided that, however, the Secretary is authorized and directed to continue the in-lieu-of-taxes payments to the States of Arizona and Nevada provided for in Section 2(c) of the Boulder Canyon Project Adjustment Act so long as revenues accrue from the operation of the Boulder Canyon Project.

Mr. Chairman, it has been a pleasure to present to you Nevada's views on this most vital piece of leigslation. We urge early favorable consideration of legislation to authorize the Colorado River Basin project.

Mr. ROGERS of Texas. There being no questions of Mr. Head, the subcommittee will stand in recess until 2 o'clock this afternoon.

(Whereupon, at 12 noon, a recess was taken until 2 p.m. of this same day.)

AFTERNOON SESSION

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation will come to order for further consideration of pending business.

Scheduled to appear this afternoon, first, is Mr. George L. Crookham, Jr., chairman of the Idaho Water Resources Board, State of Idaho.

. Mr. Crookham, it is nice to have you.

STATEMENT OF GEORGE L. CROOKHAM, JR., CHAIRMAN, IDAHO WATER RESOURCES BOARD, STATE OF IDAHO, ACCOMPANIED BY WILLIAM HOLDEN

Mr. ROGERS of Texas. You may proceed.

Mr. CROOKHAM. Mr. Chairman, accompanying me will be Mr. William Holden.

Mr. Chairman, it is a pleasure to be before you again and to make a short statement, even shorter, I will be brief through it.

Mr. ROGERS of Texas. It seems to be very short. If you care to read it—sometimes when they brief them, it takes longer than to read them. [Laughter].

Mr. CROOKHAM. I haven't been in politics that long.

Idaho is sympathetic to those States urging the authorization of the central Arizona project, for we have experienced a delay similarly. We have one project in Idaho that has been 50 years in coming, and this is the forerunner of a development that will contemplate the full usage of the Snake River within Idaho's boundaries.

Mr. ROGERS of Texas. Mr. Crookham, without objection, your entire statement will be included the same as if it had been read.

Mr. CROOKHAM. Thank you very much.

The first point we want to make comes down at the bottom of the page. The bill permits feasibility project studies to be made without limitation of areas.

In view of that, we have the first suggestion coming in, in a constructive amendment where section 404 would contain this language, in a new paragraph (a).

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Repairment contracts for the use of imported water for irrigation, water supply, power, quality control, groundwater recharge, recreation, fish and wild life and any other use shall contain a provision setting out in substance the provisions of Section 202(b) of this Act.

Then, we thought it would be most propitious to include in the general language of the act itself a restatement of principles as appearing in the Water Resources Planning Act adopted by the Congress last year. That language appears in quotes in the middle of the page.

We think that is good and necessary language and definitive, to the satisfaction of the Idaho position.

Moving on to the last point we make, it concerns the creation of the Colorado Pacific Regional Water Commission. Now, it is our contention that this commission does supersede the Water Resources Planning Act, that we had better stay with accepted law and move in this direction in the matter of first things first, following the congressional desire in that regard.

So Idaho, accordingly, is cooperating with the other Columbia River States to initiate the request for the Pacific Northwest Rivers Basin Commission, and it will be the duty of this Commission to proceed with the studies of the Columbia River area.

We feel, then, in a closing paragraph, that the River Basin Commission of the Pacific Northwest, operating under the authority of the Water Resources Planning Act of 1965, be permitted to complete its coordinated studies of ultimate needs in that area before the Secretary is authorized to undertake feasibility investigations involving export from the Columbia River system.

That is a summary of the remarks.

Mr. ROGERS of Texas. Thank you very much, Mr. Crookham.

Now, I notice you have a statement attached to your statement here. Do you want that included as a part of it?

Mr. CROOKHAM. No, sir. That just merely is for the committee's reference. It is our previous language.

Mr. ROGERS of Texas. I see.

Mr. Aspinall?

Mr. ASPINALL. I am trying to get in mind just how your amendment that you propose of page 2—you ask for a section to be designated (a), to 404. Now, 404 has a present section (a).

Mr. CROOKHAM. Mr. Aspinall, we would just merely move that (a) and it would become (b) and (b) would become (c).

Mr. ASPINALL. The objective of section 404 is to provide for irrigation repayment contracts.

Mr. CROOKHAM. Mr. Aspinall——

Mr. ASPINALL. Section 202(b) is a priority of state of origin. So what you would have, if I understand you correctly, is in the irrigation repayment contracts that have reference to the basin fund, you have priorities set up on the same basis as section 202 of the Planning Act, is that right?

Mr. CROOKHAM. That is correct. A reiteration. Would you care to have Mr. Holden explain that in detail?

Mr. ASPINALL. Yes.

Mr. HOLDEN. The thought is, Mr. Aspinall and members of the committee, that there has been an endeavor here by the authors of the bill to include in the bill some comforting language to the areas of

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origin, and the endeavor is to show that the areas of origin would have a priority of right in perpetuity to any of the uses that might be made of imported water in the Colorado.

Now, of course, if the act were passed with that language, it is helpful, even though some people are fearful as to whether or not it would insure the areas of origin the protection which they feel that they ought to have, but it is our thinking that in the repayment contracts or in the contracts that are issued to any user of imported water from the Colorado system, that if the substance of this paragraph 202(b) is inserted into those contracts and made a part and parcel of it, that anyone then using imported water will have notice and knowledge and will be using it subject to the express language of this section, and with full knowledge, so that 25 years hence he might say, well, we didn't know, or this or that, when you run into the problems, if the areas of origin ever wanted the water back.

Mr. ASPINALL. Well, the chairman of the full committee wants to commend you gentleman for coming here with something constructive rather than just a block. It has been suggested that the amendment placed where you think it should will be helpful and I agree with you. We are very appreciative of your contribution to the committee.

Mr. HOLDEN. Might I just make one further comment along that line? Idaho was greatly impressed, I think, and made some contribution by way of amendments, to 8980 when it was before the Congress, trying to look to a constructive approach to this overall problem. And after that law was passed, we have had a number of informal conferences with the Northwest in an endeavor to launch a river basin commission under that law.

We have just recently reached an accord following these conferences, and conferences with Mr. Coulfield that have continued on since the meeting in Denver, I think, which Congressman Aspinall can remember back last November, and a number of those problems have been resolved and our States now are in accord in the creation of a river basin commission, and we feel that since that machinery has been set up and provides a vehicle for carrying out river basin planning programs, that it is somewhat shocking to us to—that is, with language in the present bill, in that it might interfere with the endeavor that we hope to follow in good faith under 8980 through our own river basin commission.

And that is the reason for our conclusion as set out in our statement in connection with that question.

Mr. ASPINALL. Again, I thank you.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. No questions.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. No questions.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. I would just like to commend the gentleman upon his statement and the contribution. I think this is very constructive, and I think it would go a long way toward preventing litigation that might otherwise grow out of this legislation.

Thank you.

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Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. Mr. Crookham, how do you see section 202(b) as being implemented? Either witness.

Mr. HOLDEN. How do we see what?

Mr. FOLEY. How do you see section 202(b) as being implemented? How is the priority of right to be exercised, in your judgment?

Mr. HOLDEN. Well, as I indicated before, of course, it isn't spelled out. It is general language and there is a general intent to try to write some protective language. It could be delineated in greater detail. Of course, we would look at it in its broader form and broader interpretation, to wit, that the priority of right that is afforded to the areas of origin under that section would apply to any right within the area of origin that might conceivably—it would have to be a beneficial right of some nature, it couldn't be a wasteful right—to which the water might be put at a future date and because of which we may then need the water that had been exported.

Mr. FOLEY. Well, my question is: What agency or organization or institution is going to say for the areas of origin that the water is needed in those areas? How would you implement that?

Mr. HOLDEN. The States, themselves. It doesn't spell it out but it would have to be, and I think it is broad enough to mean that it would be the State, itself, or some entity.

Mr. FOLEY. Do you foresee that there would be a—for example, the Idaho Water Resource Board, which is the agency in Idaho, would issue a statement or a letter to, let us say, the Bureau of Reclamation, indicating that they should cease delivering water from the Columbia River into an aqueduct at a certain time because the water is needed in Idaho?

Mr. HOLDEN. I think any duly constituted State agency authorized to speak for the State with respect to water matters could.

Mr. FOLEY. Well, let me put it another way. Maybe the Bureau of Reclamation isn't going to pay any attention to them.

Mr. HOLDEN. Well, of course, as I say, we don't get all the comfort out of the language that we would like, but it would be a part and parcel of the law, to protect us in perpetuity, to give us a prior right ahead of anyone using it in Colorado. To give us greater assurance of that protection, we are asking that the act be amended to provide that the essence of this paragraph 202(b) be incorporated in any user's contract of exported water that comes from the Colorado system so they will be using that water with full knowledge of the priority of right in perpetuity of the State of origin.

Mr. FOLEY. Now, who would you foresee would be contracting with the individual recipient or the district or irrigation unit in Southwest? The Bureau of Reclamation?

Mr. HOLDEN. Yes. Well, the only—well, the Secretary of the Interior on all reclamation contracts, the only contract I have seen on reclamation projects are contracts between the Secretary and the water user.

Mr. FOLEY. That is all I have seen, too.

Mr. HOLDEN. Yes.

Mr. FOLEY. And I assume, then, by your answer, that the Secretary would have to make the finding that the water was needed in the area of origin.

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Mr. HOLDEN. That would help.

Mr. FOLEY. And he would have to implement the restriction of diversion. Is that your understanding?

Mr. HOLDEN. Well, that could be so. We may—if he would make such a finding and we had a legitimate case, I think that the language and the fact it is in the contracts and in the law would afford us an opportunity to go into court to seek redress then, if he failed to act.

Mr. FOLEY. Would it be fair to characterize your amendment as being one establishing a right, not necessarily a remedy?

Mr. HOLDEN. Well, I think that it helps to fortify our position with respect to establishing a right. A property interest in the water.

Mr. CROOKHAM. In keeping with the context of the bill, Congressman.

Mr. FOLEY. Does the State of Idaho favor the sections in this bill that call upon the Secretary to conduct a feasibility study for diversion of water from the Northwest?

Mr. CROOKHAM. Our position is——

Mr. FOLEY. From some point outside the Colorado Basin?

Mr. CROOKHAM. Our position as given was the vehicle had been established by Congress for the study of the Pacific Northwest water supplies, this being the river basin commission. We have engaged in this initial study. This, we think, is the proper place to begin.

I might say on this point, also, that the way the bill is now constituted, it calls for a representative of the State of Idaho to participate. I can assure you, gentlemen, that the Governor would have difficulty in finding a pigeon in Idaho to devote himself exclusively to the importation of water features of the Southwest. We think it is a two-way street. We would like to develop this more fully on a live-and-let-live basis.

Mr. FOLEY. But you recognize, though, do you not, that this bill calls for a feasibility report from the Secretary of the Interior on a plan to import waters from outside the Colorado River Basin?

Mr. CROOKHAM. This is in our testimony, our second point; yes.

Mr. ROGERS of Texas. Is that all you had, Mr. Foley?

Mr. FOLEY. Yes.

Mr. ROGERS of Texas. Mr. Hansen?

Mr. HANSEN. Mr. Chairman, I am very proud of the gentlemen we have representing the State of Idaho here today. I am well acquainted with both of them, and certainly appreciate the excellent testimony they have submitted, and the constructive points they have made, as the chairman of the full committee has pointed out.

Certainly, we don't want to adopt a dog-in-the-manger attitude and I think this is well demonstrated by the efforts of these men to present points of a realistic nature about safeguards for our rights in the Northwest and in Idaho, in particular. I feel that these suggestions that one member be appointed by the Governor of each State on any such commission that may be established, and that the river basin of the Pacific Northwest be allowed to complete studies prior to the inception of any feasibility study on water diversion which the Secretary might be instructed to take on, are vitally important. I do again

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commend you gentlemen for this very constructive approach and appreciate having you here to represent our good State.

Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Burton of California.

Mr. BURTON of California. No questions.

Mr. ROGERS of Texas. Mr. Reinecke.

Mr. REINECKE. No questions.

Mr. ROGERS of Texas. Mr. Hosmer.

Mr. HOSMER. No questions.

Mr. ROGERS of Texas. Mr. White.

Mr. WHITE of Idaho. Thank you very much, Mr. Chairman.

I, too, would like to compliment my fellow citizens from the great State of Idaho, and the position they have taken with respect to this particular piece of legislation. I think that it is evident that the people of Idaho have tried to take a constructive approach toward this particular problem and we have had the fears, of course, that normally go with any diversion of water. This has been traditional in Idaho for many, many years.

Mr. Holden, do you feel that if there could be assurances given to the people in the State of Idaho that now depend on the Snake River for their sustenance, for their complete existence in southern Idaho, that their needs and the future needs for orderly development of the State, that they would want to take part in this study for diversion of water into some other portion of the United States?

Mr. HOLDEN. I am sure that that would be the conclusion, even though everyone abhors the thought of losing any water, but our discussions in Idaho, I think, have been conducted from a high level point of view; to wit, that all—if all our future needs are provided, if we are given an opportunity to plan and study for future needs to take care of our future growth and development, and if it were then found that we had waters that we couldn't use through any conceivable means by today's standards, and with protective language such as has been added and inserted in the bill, that our people would face up to the problem.

Mr. WHITE of Idaho. Mr. Crookhan, don't you think, then, that that is the real issue here, is what is the amount of water that will be needed out of the present reaches, either by an implied water right downstream or by actual needs of water to be diverted to any place from the upper reaches to the ultimate Pacific Ocean?

Is this not the big problem that we are faced with, as to what water will be needed in the State of Idaho, and, then, what water will be needed for exportation, and this is a very difficult thing to discern, isn't it.

Mr. CROOKHAN. Mr. White, this is the essence of the entire hearings, that we have talked around the horn on many things, but it gets down to the priority of use.

Now, if there is water being needed for drinking and municipal purposes, this must be recognized. We are members of these United States. When it comes to the matter of production of food, these studies will bring out the cost of developing this food in the Northwest as compared with the cost of transporting the water for agricultural purposes to the Southwest.

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I can't say what they will be. But I would venture to say that we would see an enormous development, that the tenor of this committee 10 years from now would be, send us food, rather than send us water, when you look at the full economic potential of the actual production.

This is the crux, I think, of our confusion. We think about quantities of water without definition of the ultimate uses in both areas.

Mr. WHITE of Idaho. Well, I think that is very important, what beneficial uses water would be ultimately placed to after it had been diverted out of the Columbia Basin.

Now, I would like to ask one other question. In the State of Idaho, particularly, it is my understanding that we have almost a million acres of arable land that is not now presently irrigated; it that true?

Mr. CROOKHAM. That is a minimum estimate; yes.

Mr. WHITE of Idaho. And of that million arable acres, how much of it would be irrigable?

Mr. CROOKHAM. Well, I think we could take that figure and go on higher. You see, we have been limited by such economics as lifting 200 or 300 feet and transporting, maybe, 30 miles from the point of origin.

Now, in this plan conceived by the present bill, we are talking about lifting 3,000 and 4,000 feet and transporting 1,500 miles.

Mr. WHITE of Idaho. And it would be logical to assume that the entire million acres of arable land could be irrigated if we wanted to extend it to the same means and methods and costs of irrigating land that we are talking about here with respect to the Colorado; isn't that true?

Mr. CROOKHAM. And we have the soil type to support it.

Mr. WHITE of Idaho. I thought I would go into that next. What type of land is it? What is the productive type?

Mr. CROOKHAM. Largely, class 1 and 2, and I think, my home county is one among six counties of the best agricultural counties in the Nation. We are quite diversified and quite versatile in what we can do. This, of course, brings me up to my own field, that I know this, as a man who has worked in seed for more than 40 years. We have not touched the agricultural potential of the north temperate zones in these unclassified and undeveloped and unsurveyed lands. This is part of our study, too.

Mr. WHITE of Idaho. Well, would you state, briefly, what the experience has been with some of the pump irrigation along Snake River, with respect to the acreages and productivity and how long it took to get into production, and the amount of money that is being involved in the type of activity at the present time?

Mr. CROOKHAM. Well, it is, roughly, at a million acres that have come in, in the last 7 or 8 years, of highly productive soil.

Mr. WHITE of Idaho. Well,——

Mr. CROOKHAM. Private development.

Mr. WHITE of Idaho. Last fall I was on a farm of 5,000 acres of land that was producing 350 sacks of potatoes to the acre and they contracted at $2 a sack. That figures out about $700 an acre for the first year's production after being nothing but sagebrush that year, and the one ingredient that was needed to be added was water, and that was the result of a little imaginative use of capital.

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Mr. CROOKHAM. What the Congressman points out is this, that food will play a more important role in the coming decades than in the past.

Mr. WHITE of Idaho. The thing we should be considering here is, where should that food be produced? What are the economic factors, and when you figure in reclamation, transportation of water, this is what we should ultimately determine here, and I agree with the gentleman, that should we have a need for municipal and industrial water in certain areas of the United States, we would take a very close look, but, to transport water from one agricultural area to another agricultural area to grow food rather belabors the question, doesn't it?

Mr. CROOKHAM. I think, in the broad analysis, that is a fair statement and I think this is the intent of the committee, that we should develop this to our fullest extent in Idaho. I believe that we can move forward with the reclamation of the West.

Mr. WHITE of Idaho. I want to thank you, Mr. Crookham and Mr. Holden, for your testimony today and for the colloquy we have just had.

Mr. HOLDEN. Thank you, Congressman.

Mr. ROGERS of Texas. Thank you, gentlemen.

(The statement of Mr. Crookham follows:)

STATEMENT BY MR. G. L. CROOKHAM, JR., CHAIRMAN, IDAHO WATER RESOURCE BOARD

Mr. Chairman, my name is G. L. Crookham, Jr., from Caldwell, Idaho. I am appearing in behalf of the Honorable Robert E. Smylie, Governor of the State of Idaho, and the constitutionally created Idaho Water Resource Board. I was honored to appear before the sub-committee on the same proposed legislation last year, and I appreciate your granting our state the opportunity to again appear and present our views on H.R. 4671 as amended.

In line with the Committee's request my statement will be confined principally to the amendments that have been added to the bill since the last hearing. For the convenience, however, of the members of the Committee, I have attached to my statement filed with the clerk a copy of the statement I made last August to the bill then being considered by the Committee.

Idaho is sympathetic to those states urging the authorization of the Central Arizona Project for we are aware of the long years of delay they have experienced. We have had similar experience with proposed reclamation projects in our state, one of which is the Southwestern Idaho Project which is now pending before this Committee. This project has been in the mill for more than 50 years and is the forerunner of development that contemplates full usage of all waters of the Snake River within Idaho boundaries.

It is not about the authorization of the projects proposed in H.R. 4671 that we are concerned, but it is about the broad, unrestricted authority vested in the Secretary of the Interior to make feasibility studies anywhere of projects designed for the importation of water into the Colorado System of which we are concerned. The bill permits these feasibility project studies to be made without limitation of areas outside the Colorado System, whose own future needs of water have not yet been fully determined.

It is our desire to be constructive in our comments on the bill and we have several suggested amendments to propose.

We urge that Section 404 of the bill be amended by adding a new section to be designated (a), which reads as follows:

"Repayment contracts for the use of imported water for irrigation, water supply, power, quality control, groundwater recharge, recreation, fish and wild life and any other use shall contain a provision setting out in substance the provisions of Section 202(b) of this Act."

Section (a) of the bill as printed will be changed to read Section (b), and the old (b) will become (c).

With regard to Title VI "General Provisions: Definitions: Conditions," we request that the following amendment, as Section 604(d) be added to the bill:

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"Nothing in this Act shall be construed to expand or diminish either Federal or State Jurisdiction, responsibility, or rights in the field of water resources planning, development, or control; nor to displace, supersede, limit or modify any interstate compact or the jurisdiction or responsibility of any legally established joint or common agency of two or more states, or of two or more States and the Federal Government; nor to limit the authority of Congress to authorize and fund projects."

The above language is identical to Section 3 of the Water Resources Planning Act of 1965—Public Law 89-80, and we feel strongly that it should be included in this bill.

Title VII provides for the creation of "The Colorado-Pacific Regional Water Commission" and we note that an amendment has been added, as follows: "PROVIDED, That if, pursuant to Section 201, the Secretary undertakes an investigation involving export of water from the Columbia River Basin, one member shall be appointed by the Governor of each State in that basin; * * *."

Idaho is cooperating with the Columbia River Basin States of Oregon, Washington, and Montana, to initiate a request to the Council for the formation of a Pacific Northwest River Basin Commission, under the provisions of Title II of the Water Resources Planning Act of 1965. This Commission, as you know, will serve as the agency for the coordination of Federal, State, interstate, local and non-governmental plans for the development of the water and related land resources of Idaho and the other member states. We hope that such a commission will, in cooperation with the affected states, determine the ultimate long range needs for water for the entire Columbia-Snake river region, and thus help to establish whether or not there is any water available for export from the Columbia or the Snake into another river basin.

We urge that the River Basin Commission of the Pacific Northwest, operating under authority of the Water Resources Planning Act of 1965 be permitted to complete its coordinated studies of ultimate needs in that area before the Secretary is authorized to undertake feasibility investigation involving export from the Columbia-Snake river system. We respectfully urge that this bill be amended accordingly.

Mr. ROGERS of Texas. The bells have rung. A quorum call is on.

The subcommittee will stand in recess until 2:45.

(Whereupon, there was a short recess. The subcommittee reconvened at 2:45 p.m., the same day, and the following proceedings transpired:)

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation will come to order for further consideration of pending business.

Our next witness is Mr. H. M. Ahlquist, director of the Washington State Department of Conservation, representing the State of Washington.

Mr. Ahlquist, come forward, and the Chair will recognize you.

STATEMENT OF H. MAURICE AHLQUIST, DIRECTOR, WASHINGTON STATE DEPARTMENT OF CONSERVATION, STATE OF WASHINGTON

Mr. ROGERS of Texas. You may proceed.

Mr. Ahlquist. Thank you, Mr. Chairman.

Mr. Chairman, members of the committee, my name is H. Maurice Ahlquist of Olympia, Wash. It is my pleasure to appear before you to present testimony on behalf of the Honorable Daniel J. Evans, Governor of the State of Washington, and for the Department of Conservation, of which I am the director.

The legislation under consideration is the amended version of H.R. 4671. It was my pleasure to appear before you last August 26 and present testimony on behalf of the State of Washington. I shall make every effort to not repeat that testimony.

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The title II provisions of the bill are of extreme importance to the State of Washington. In section 201(a)(2), the Secretary is directed to investigate "importations from sources outside the natural drainage basin of the Colorado River system." There are no directives, no criteria to guide this investigation.

Are the many uses for which water will be needed in the future in the Columiba Basin for its economic and population growth to be considered? We are making studies now of our potential resources and projected needs. These, through a State-financed program at the Washington State University Water Research Center, and others, in conjunction with the Federal Government under the direction of the Columbia Basin Inter-Agency Committee.

Just recently, CBIAC has initiated a Columbia North Pacific type I comprehensive study to determine water needs into the year 2020. This study, at a cost of approximately $5 million, will be done by the Federal agencies in cooperation with the States of the Columbia Basin.

In the interest of furthering our investigations, the Governors of the Columbia River Basin States are taking action to request the formation of a Pacific Northwest Basin Commission, under the provision of that most forward-looking Public Law 89–80, the Water Resources Planning Act of 1965. This Commission, a joint Federal-State organization, will bring together all of the agencies of the Federal Government having an interest in Columbia Basin waters and the States, as well as local entities, to develop a complete analysis of the water resources and needs of the basin. Certainly, it would appear that such a cooperative study should be allowed to be completed before programs of diversion are to be considered.

The question of criteria to be used when making these studies is most important. I would merely like to draw to your attention that the Governors of the 11 Western States have formed a Western States Water Council to establish such criteria and to offer a vehicle through which the States can cooperate among themselves in the formulation of plans for the integrated development of our water resources.

The above remarks are to try to bring forth the thought that the States of the Northwest are in cooperation with each other and with the Federal Government and are making every effort to ascertain their total potential water resources, the needs projected into the future to the year 2020, and programs for the most economical and beneficial uses for this water. These studies will have to consider the optimum use and reuse of this water and its value as an asset to the area and as a national asset.

I have not pointed out the ambiguities of section 202. I can only state that the so-called protective features for the States of origin leave much to be determined in the future.

I think that was brought out by the testimony of Idaho.

I could not consider them other than an expression of good will.

This testimony is all pointed at one conclusion. The State of Washington respectfully requests that the provisions authorizing studies for the importation of water from sources outside the natural drainage basin of the Colorado River be deleted.

Mr. ROGERS of Texas. Thank you, Mr. Ahlquist.

Mr. Aspinall?

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Mr. ASPINALL. Mr. Ahlquist, you spend a good deal of your statement talking about your position that there are no criteria provided in the legislation, and then you state in your last part of your statement that the study provisions ought to be deleted in their entirety. Did you ask for the study to be deleted because the criteria are not there or because—do you ask for it to be deleted whether there are criteria or there are not criteria?

Mr. AHLQUIST. At the present time, Congressman Aspinall, it would be the consideration of the State of Washington that we be allowed, through the agencies that I have enumerated and such other studies as we can make, to have an opportunity to develop a specific criteria through the Western States Water Council, in which we will be working with the Southwestern States in an effort to establish this criteria. And, then, we will be in a position to, in a definitive manner, give an answer to your question.

At the present time, I am not prepared, unless we would take the series of criteria that I noticed in studying Senate bill 3107 for the National Federal Water Commission. The criteria there is quite excellent and very explicit.

Mr. ASPINALL. You have been working now for several months and are pretty well organized. You know what you have in mind. How long do you think that it will take to get the criteria that you suggest?

Mr. AHLQUIST. I think we should have a reasonably close approximation, in the course, probably—probably, around 1970. This does not mean that that is a leading answer to agree to anything, but you asked me a definite question and I am trying to give you a definite answer. About 1970.

Mr. ASPINALL. Do you mean to say that it will take you until 1970 just to work up your criteria?

Mr. AHLQUIST. Oh, no. To work up the criteria and arrive at some answers as the result of the use of the criteria.

Mr. ASPINALL. I didn't ask for your answers. I asked you how long it is going to take you to prepare this criteria.

Mr. AHLQUIST. I would say, probably, as fast as we can work together with the Southwestern States. It might take us several meetings, a year. That is just a guess. I don't know.

Mr. ASPINALL. How long have you been in your position?

Mr. AHLQUIST. How——

Mr. ASPINALL. How long have you been in your present position?

Mr. AHLQUIST. June 1, last year.

Mr. ASPINALL. What was your work before you became the Director of Conservation?

Mr. AHLQUIST. I was a legislator in the State of Washington for five sessions, starting in 1957, a farmer on irrigated ground, officer in our National Reclamation Association, and State Reclamation Association.

Mr. ASPINALL. What is your thinking as to the minimum amount of water that is surplus to the needs in the Columbia River Basin?

Mr. AHLQUIST. I have read the figures that I think practically everybody else has, or around——

Mr. ASPINALL. I have read the figures. I just wonder what you have. You have a pretty good background. I know that you have

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been a water surplus State throughout all these years and I can understand how you have been perhaps a little bit loath to even study your problems, as long as you have plenty of water. Many States have been loath to study theirs, even when they had a scarcity of water, and even with the passage of 25 years of time.

Perhaps, there is not an agreement in many areas, but surely you have some idea yourself, in the position you hold, and having worked in the legislative body and been a farmer and interested in irrigation, and worked with National Reclamation Association, surely you have some idea of the minimum amount of water which is surplus to Columbia River Basin needs.

Mr. AHLQUIST. You use the word "minimum." I saw the figures the other day to the effect that there were times when the Columbia River, on the downstream measuring points from The Dalles, has been in drought years below the amount of water required for the operation of the port of Portland. Down around 55. Whether that was an exact figure or not, sir, I could not tell you.

Mr. ASPINALL. Well, you see, the United States——

Mr. AHLQUIST. That is the figure I saw.

Mr. ASPINALL. The United States of America, working on a national program as well as an international program, has not been derelict in its contribution to the State of Washington in preparing, authorizing, and permitting the construction of reservoirs to hold your water in times of surpluses so that you could use them in times of need. I think you can still give me an annual minimum if you are of a mind to.

Mr. AHLQUIST. No. I can only give you the figures of around 170 to 180 that have been prepared by the Corps of Army Engineers.

Mr. ASPINALL. 170 to 180 million acre-feet of water.

Mr. AHLQUIST. Yes, going into the ocean on a per annum basis. Those are figures I have read as being presented by the Corps of Army Engineers.

Mr. ASPINALL. That is not a minimum, of course.

Mr. AHLQUIST. No.

Mr. ASPINALL. If that figure could be agreed upon, of course, there wouldn't be any way in the world that you folks in that area could prove that you were ever going to use that amount of water before A.D. 2500. But that is an awful lot of water.

No, I am not going to argue with you as to your ambitions and your future desires. I am for you. I want you to use every drop of water in the Columbia River Basin that can be used in the Columbia River Basin. My difficulty is to try to find out why it is that you want to put off now this question of the study which some of us think is timely, at least. I can understand why you want criteria. Don't misunderstand me. I just am not sure in my mind that the basin and especially the State of Washington is desirous of ever sharing if there is any surplus. If there aren't any surpluses, it would be almost criminal to try to take the water away from you. I believe so much in the region of origin in the use of water, but it seems to me about every time we have ever made any suggestions to the people of Washington, they just throw a block and say, we don't want any study, we don't want a study, and yet, I know you are working in this Committee of the Western States. I have been present when you were working, and I know that you have made contributions.

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I just don't want it to go too far in the future, so that some of the rest of us might not be able to see whether or not there is any chance at all of receiving any contribution.

Mr. AHLQUIST. Congressman, in trying to answer, giving a certain bit of realistic information, to be able to factually answer those figures, in the first place, we will see one figure and a few days later we will see another figure that will be quite contradictory, depending upon what agency or what exact periods they are referring to.

Mr. ASPINALL. You will never get out of that situation. We have had the Colorado River program now for pretty near 50 years and we still have to dispute each other's positions on it but we do agree on minimums.

Mr. AHLQUIST. Well, we think we should, and I think those are figures that we should be having available to us in the very near future. I know that our Washington State Water Research Center is working on figures for us similar to that right now. And, then, I think another thing we have to discuss and know is the social-economic effect of the diversion.

If we have, as you say, an amount of water projected into the future that we couldn't possibly use, the position of our State would certainly have to give credence to that. However, until such time as we do know, we have to request, respectfully, delays so that we can know our position so that we can arbitrate with you.

Mr. ASPINALL. I have no quarrel with that position, providing you are——

Mr. AHLQUIST. Diligent, and get to work.

Mr. ASPINALL. Yes. Provided you are diligent in your efforts, not only to solve your own problems, but to work with your neighbors.

That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. You understand, do you not, that this bill provides for no exportation of water from the Columbia River Basin.

Mr. AHLQUIST. Do I understand that?

Mr. HOSMER. Yes.

Mr. AHLQUIST. I understand that there is a section 202, and through the bill, in many different places that provides for the planning and the ascertainment of the requirements of the Southwest for waters which can only be satisfied as a result of importation from the Columbia. The study is a justification study.

Mr. HOSMER. The bill provides for studies. It provides for planning. It does not provide for any exportation from the Columbia River Basin, does it?

Mr. AHLQUIST. To the best of my knowledge, there is no appropriation for construction.

Mr. HOSMER. There is no authorization for any construction work, either, is there?

Mr. AHLQUIST. Not that I know of, as authorized.

Mr. HOSMER. No. wouldn't it be, then, that the earliest any consideration would be given to such a thing as exporting water would be after all these studies are in, after your studies are in, for comparison and evaluation, each with the other, and then somebody might introduce a bill in the Congress at some future time that would provide for

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authorization of some kind of a plant for water export from some place, or for some other means of getting water? Isn't that what might happen after all these studies are done?

Mr. AHLQUIST. It is to be assumed, on the basis of the wording of the bill, which would provide for a study, that the steps that you have outlined subsequently would of necessity become true. However, our position is this, that we would prefer that a study be done under certain specified criteria rather than a study being authorized for the purpose of proving an already accepted objective.

Mr. HOSMER. Well, now, that is assuming a fact not in evidence and expressing an opinion that is contrary to what the words and phrases of the bill are. This matter that was mentioned by Mr. Ullman this morning of "fears, apprehension and bewilderment" in the Pacific Northwest, "fears and apprehension and bewilderment" over paper studies. Now, that doesn't sound to me like a very reasonable attitude because, you, yourself, are making paper studies—which you should be doing—and I see no reason why other entities interested in the United States of America, in its parts and pieces, should be denied the opportunity to make comparable studies, so that the total of them can be used to come up with something sensible for the country.

Do you see any reason why not?

Mr. AHLQUIST. If the study were being made with a complete nonoriented agency, I think it would be far more proper, and while we might or might not agree to that study, prior to the time when we had the facts and figures whereby we could then cooperate with that agency in coming up to those conclusions, instead of having separate studies, I think you would find a different attitude on the part of the Northwest.

Mr. HOSMER. Then, you are calling up the issue of impropriety with respect to every single study the Department of Interior has ever made about any project, any movement of water from one place to another, other than that channel through which it naturally flows, is that right?

Mr. AHLQUIST. No.

Mr. HOSMER. You have no question of impropriety relative to the Federal Government's——

Mr. AHLQUIST. I had the pleasure of working with the Bureau of Reclamation——

Mr. HOSMER (continuing). Actions with respect to the Bonneville project and all of the other nice expensive installations that the taxpayers of the United States are financing for the Pacific Northwest?

Mr. AHLQUIST. If the Bureau of Reclamation has not been called on in the Pacific Northwest to delve into matters of interbasin transfers——

Mr. HOSMER. Yes; but you didn't even go to studies to find out whether or not the projects that the Federal Government wanted to build, and did build, in there interfered with any allocation of resources within your State or within your basin. As long as it is for the Pacific Northwest, you don't care about studies. Now, you want studies because somebody else is involved.

I see no rationale for that other than the obvious, do you?

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Mr. AHLQUIST. I can only reiterate the statement that I have already made, Congressman Hosmer, and that is to the effect that it is an entirely different matter to make a study, to make plans for an interbasin diversion of water, which plans might affect the entire economic-social life of that area, in the future, without having given credence to such philosophical, sociological, economic thinking. All of the plans——

Mr. HOSMER. The very same things that have been taken into consideration with respect to every project that has been built by the Federal Government.

Mr. AHLQUIST. Therein is where we differ.

Mr. HOSMER. Now it is all called to question.

Mr. AHLQUIST. No. We don't think along the same lines, Congressman, and I am sorry.

Mr. HOSMER. I regret it sincerely because you are quite an able man and I wish we could enlist you in the cause of righteousness. [Laughter.]

Mr. ROGERS of Texas. Mr. Johnson?

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. Ahlquist, I just want to ask a question or two. Seemingly, your main objection is to section 2. Do I understand that if section 2 remains in the bill, regardless of what it asks for, you are opposed to the legislation? Title II, I mean.

Mr. AHLQUIST. I have tried to make it clear that section 2 is not palatable.

Mr. JOHNSON. Not what?

Mr. AHLQUIST. Not palatable.

Mr. JOHNSON. For what reason?

Mr. AHLQUIST. Well, for the reasons that it is a directive and there is no criteria.

Mr. JOHNSON. What if we put some criteria into it?

Mr. AHLQUIST. Well, then, we have to go through this all again until we have had time to study and come up with some reasonable criteria.

Mr. JOHNSON. Let's get to that point, then. This could be set for a given period of time and, as you say, you are getting along with your basin study now. And, then, there is also a separate study being carried on in the State of Washington. I presume both of those will be concluded prior to the consideration here.

Say, we set 1970 in section 2, completion of the study; 1970. What objection will you have then?

Mr. AHLQUIST. Congressman, I appreciate the point that you are working toward, to put a date on this thing, that we are going to be through at a certain date, and so are you.

Mr. JOHNSON. I want to put a priority on the study. I am afraid that if——

Mr. AHLQUIST. All right.

Mr. JOHNSON (continuing). If we go into a national study that you talk about, then the priorities might be set back, and we are concerned with a definite consideration that has to take place now.

Now, in your national study, the legislation is pending in the upper body, they are going to create a national commmission. I don't know what the priorities are going to be. I don't see why you would have

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objections to clarifying section 2, or title II, of the bill here, to set criteria and to set a time.

Mr. AHLQUIST. We are asking for time in which to establish the criteria and, on the basis of those criteria, to make a study of our assets throughout the Pacific Northwest. I was asked a question by Congressman Aspinall as to when I anticipated that might be approaching an answer. I made a guess at 1970.

Now, at that time we would be in a position, with knowledge of our facts and figures, to cooperate in making a study, but while we are trying to make a study, we are not in a position to cooperate with others.

You asked me another question here. Under section 2—under section 201, title II, it says:

Investigate sources and means of supplying water to meet the current and anticipated water requirements of the Upper and Lower Colorado River Basin—

That is a distinct order, as written—

including reductions in losses, however, importations from sources outside the natural drainage basin of the Colorado River.

Another order.

Now, those are things that we object to, sir.

Mr. JOHNSON. That is the type of study we want to have made.

Now, we are trying to write it into the bill under title II. You can write in there the criteria and the timing and all of that, and it can be put in there as to how you want to make the study, and if the committee agrees, it will be in there.

Now, I take it the opposition here, a little bit to the bill, is that you possibly don't want any study made of the Pacific Northwest as far as it relates to a diversion of water into the Colorado River Basin.

Mr. AHLQUIST. Would——

Mr. JOHNSON. The reason I say that is this, because, if you are opposed to any criteria under title II being written into this bill and if we can give you the time, so that your studies can actually be underway and completed, I should think that, at the same time you were studying, your studies would be much cheaper because engineering data is pretty much transferred from one group to another. It has been my observation in our State, at least, where the State and Federal agencies and local government are concerned, much of the engineering data is passed between study groups and they come up with this.

I would just like to ask that question and get an answer. Are you opposed to a study of the Pacific Northwest for the purpose of making a diversion of water into the Pacific Southwest?

Mr. AHLQUIST. If the purpose of the study is to prove that, under a basis of a distinct, positive program, that water can be diverted, without the establishment of the criteria which would cover a wide variety of aspects, I think that the State of Washington would have to stand that we are opposed to such a study. If, at some time in the future, when we have ample information and criteria has been established wherein a study can be made, not to prove a point, but as to whether water is in surplus according to those criteria which then could be used in the Southwest, I am very certain that you would find our attitude would be cooperative.

Mr. JOHNSON. That is all we are asking for, is surplus water, based on a study.

Mr. AHLQUIST. But it can't be made, Your Honor, without criteria, *which is uniformly* used by all studying groups.

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Mr. JOHNSON. Well, I think that criteria can be very well written into title II of this bill.

Mr. AHLQUIST. It isn't, now.

Mr. JOHNSON. Well, we are not through with the bill, either. We are only holding hearings, and I was trying to see if you would agree that if title II were amended or the sections in title II, to spell out just what we are going to do, and put a time limit on it, would you then support the legislation, because we are only talking about surplus water.

Mr. AHLQUIST. We would have to have sufficient time in order for us to work with—work through the Western States Water Council, the States of the Southwest, which include the States that are interested in this importation of water, as to an acceptable criteria.

Mr. HOSMER. Would the gentleman yield?

Mr. JOHNSON. Yes.

Mr. HOSMER. I wondered if criteria of something of this nature would be satisfactory. The criterion would state that all requirements, present and future, for water within any State lying wholly or in part within the drainage area of any river basin from which water is exported shall have priority of right in perpetuity to use the waters of that river basin for all purposes as against the water delivered by means of exportation.

Mr. AHLQUIST. Are you asking me if I would accept that?

Mr. HOSMER. Yes. Don't you think that is a pretty broad criterion?

Mr. AHLQUIST. Yes. But it doesn't mean anything because there is no agency set up with which we are guaranteed that those rights that you referred to in your statement would be protected. And, furthermore, there is no definition as to who would be the beneficiary of payments, if made. Would it go to the States? Would it go to individuals? To whom?

There is a deep consideration that has to be done.

Mr. HOSMER. All I want to mention is the fact that there is an organization set up for that very purpose. And it has been in existence for over 150 years. It is provided for by the terms of a very basic and fundamental document called the Constitution of the United States, and it is the judicial branch of the U.S. Government, the protector of the rights of States and the people, alike. So, you do have recourse.

Thank you, Mr. Johnson.

Mr. ROGERS of Texas. Are you through, Mr. Johnson?

Mr. JOHNSON. Yes.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. No questions, Mr. Chairman.

Mr. ROGERS of Texas. Mr. White of Idaho?

Mr. WHITE of Idaho. Thank you, Mr. Chairman.

Mr. Ahlquist, from your testimony and from the previous testimony given by the people from your area, I gather that you feel that what we are doing here is a pragmatic thing of accelerating a study to do

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one specific thing, make whole the Colorado Basin and look toward the only logical source of water, the Columbia Basin, and not take into account the total impact on every area of the entire western region of the United States. Is that correct?

Mr. AHLQUIST. I think you have come awfully close to analyzing it; yes, sir.

Mr. WHITE of Idaho. And that you feel that we have councils and commissions and the commission now that would be the logical vehicle to take a look at the water requirements of all of the areas, and ultimately ascertain as rapidly as possible, what the excesses and what the needs are in various portions of that part of the United States.

Mr. AHLQUIST. Correct.

Mr. WHITE of Idaho. Working with the States and their own agencies, and coordinating all of the information ultimately to come up with answers to the problem.

Mr. AHLQUIST. That would be a desirable way of doing it; yes, sir.

Mr. WHITE of Idaho. Do you feel that this could be done in sufficient time to—I think we are getting into the same question the chairman of the full committee asked—sufficient time with respect to the needs of the arid areas of the Pacific Southwest? In other words, I don't want you to be guilty of saying here that you would want to delay any such determination, and I don't think you do, but I want you to express yourself.

Mr. AHLQUIST. Through the formation of the Western States Water Council and through the formation which we are attempting to set up, these basin commissions, under 8980, we are attempting, and it will be our desire to accumulate information as fast as is possible and the establishing of criteria under which we can accumulate the information so that we can most intelligently participate in proper negotiations. There is no deterring action that I know of in the Northwest.

Mr. WHITE of Idaho. Well, do you feel that if we would follow the course that we are following here in enacting the legislation as it is presently written, that we might very easily overlook some of the needs of certain of the areas and some of the future needs of the areas of origin, that we might some day feel that we had incorrectly approached the problem if we pass this legislation to do the immediate thing, make the Colorado whole for the benefit of the central Arizona project as it is now proposed?

Mr. AHLQUIST. There is that strong possibility, and I am certain that, given a reasonable period of time, reasonable answers will be reached. There is—we are not anti, as such, but we are very interested in the things I tried to outline without repeating myself.

Mr. WHITE of Idaho. I think that point was made very well by my colleague from Washington here, that everyone else feels that righteousness, as the word was used here a moment ago, that as long as we are on your side, we are righteous. If we have any doubts at all, then we are no longer righteous. It seems like we have that problem in the United States in so many areas, even as to the religious impact itself, as to what is righteous and what is not.

I would comment that your particular testimony is very enlightening and I want to compliment you on your presentation.

Mr. AHLQUIST. Thank you, sir.

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Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. I appreciate your being here, Mr. Ahlguist, and I believe I understand your position. I thank you for your presentation.

Mr. AHLQUIST. Thank you.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. Mr. Chairman, off the record for a minute.

(Discussion off the record.)

Mr. FOLEY. Back on the record.

I would like to ask a question or two.

We have heard a great deal about studies. You were present at the hearings last August and September, were you not?

Mr. AHLQUIST. Yes, sir.

Mr. FOLEY. And you have, I assume, examined the record of those hearings before testifying today. Is it not true that the Secretary of the Interior at that time suggested there were a variety of means by which the Colorado Basin could increase its water flow?

Mr. AHLQUIST. That was my understanding.

Mr. FOLEY. Did these include such things as salvage and conservation, desalinization, weather modification, and importations from other areas?

Mr. AHLQUIST. Correct.

Mr. FOLEY. Is it fair to say that one of our objections to the bill as written is that it directs the Secretary to prepare and submit to the Congress and to the affected States the plan for the importation of water from outside the Colorado River Basin, which is only one of the several means enunciated by the Secretary last year as a possible means of augmenting water?

Mr. AHLQUIST. That is one of our strong objections, and as I read the portion of the section 401, I believe it was, that would so indicate.

Mr. FOLEY. And this direction of begging the question as to means of augmenting the water is underlined by the fact that the study would be done by the Secretary and undoubtedly by the Bureau of Reclamation, an agency logically associated with the building of great diversion works, isn't that correct? This is one of our objections.

Mr. AHLQUIST. I think that I could properly agree with you that the Bureau of Reclamation, which is one of our finest construction agencies, and with all of the great work they have done in our area, that we are aware of it is still a construction-minded agency. So, to truthfully answer your question, I would say I think that we would be oriented toward a positive statement to prove feasibility for construction.

Mr. FOLEY. Would we not feel much better in the Northwest if the studies associated with this legislation were made by an independent body open to other means of increasing the water in the Colorado Basin, not just a question of the importation of water from outside the region?

Mr. AHLQUIST. Yes.

Mr. FOLEY. We do not want to foreclose those options, do we?

Mr. AHLQUIST. No.

Mr. FOLEY. And isn't it true that the Commissioner of Reclamation himself testified last year that he has no way of knowing whether diversion of water would be less expensive than desalinization?

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Mr. AHLQUIST. I think that is a correct statement that I remember reading.

Mr. FOLEY. So in addition to criteria isn't it our position in the Northwest and the State of Washington that we should open up such studies for helping our friends in the Southwest through a variety of different technological and hydrological means and not a decision in advance that it must be diversion, and directing the Secretary to prepare an actual authorization plan to submit to this Congress to divert water?

Mr. AHLQUIST. The inference of the statement is they should look into every and all avenues for water for their needs. If I understood you correctly, that should be a part of any study.

Mr. FOLEY. But that is not the case at this time in this bill.

Mr. AHLQUIST. Not in this bill.

Mr. FOLEY. Thank you.

Mr. ROGERS of Texas. Is that all you had, Mr. Foley?

Mr. FOLEY. That is all.

Mr. ROGERS of Texas. Thank you very much, Mr. Ahlquist, for your testimony.

Our next witness is Mr. Donel J. Lane, executive secretary of the Oregon Water Resources Board.

Come forward, Mr. Lane.

STATEMENT OF DONEL J. LANE, EXECUTIVE SECRETARY, STATE WATER RESOURCES BOARD, STATE OF OREGON

Mr. LANE. Mr. Chairman and members of the committee, I appreciate the opportunity to appear before you today on this very important legislation.

My name is Donel J. Lane of Salem, Oreg. I appear before you today to present testimony pertaining to committee print No. 19, a revision of H.R. 4671. My testimony is presented on behalf of Hon. Mark O. Hatfield, Governor of Oregon, and the State Water Resources Board of Oregon, which I serve as executive secretary.

At your August 25 hearing testimony was presented on behalf of the State of Oregon by Mr. LaSalle E. Coles, a member of the State water resources board. In accordance with the chairman's directive, I shall not repeat that statement.

Our comments today are directed primarily to the provisions of title II of the revised bill.

We believe the authorization of feasibility reports to augment the waters of the Colorado River from sources outside the Colorado Basin is premature if the source of such water is the Columbia River or its tributaries.

Before such feasibility studies are initiated, it is essential that studies currently underway to determine future water requirements of the Columbia Basin be completed. Only then will information be available to determine how much, if any, of the waters of the Columbia River system are surplus to the requirements of the area it now serves.

As the committee is aware, individual State studies to determine future water requirements for all purposes are well underway. The State of Oregon has appropriated $332,000 to be utilized during the

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current biennium for this purpose. Requests will be submitted to the January 1, 1967, session of the Oregon Legislature for a substantial additional amount to complete Oregon's projections.

A Columbia-North Pacific type I comprehensive investigation to be undertaken by Federal agencies at an estimated cost of $5 million is just being initiated. The Federal study is scheduled for completion in 1970. It is expected to determine water requirements for all authorized purposes to the year 2020. A technical staff has been employed, composed of representatives of the Departments of Army, Agriculture, Interior, and Health, Education, and Welfare. Activities are coordinated under the auspices of the Columbia Basin interagency committee.

To achieve full coordination of water planning involving local, State, and Federal interests, the Governors of the Pacific Northwest States have agreed to submit a request for the formation of a Pacific Northwest Basin Commission as authorized by Public Law 89–90, the Water Resources Planning Act of 1965. This highly significant action, we believe, strongly supports our contention that a full, factual determination of our region's requirements must be developed before authorization of diversion feasibility studies is approved.

The River Basin Commission will provide the vehicle to develop and coordinate a comprehensive plan through the joint efforts of private, local government, State and Federal interests. This commission must, of course, have time to get this highly important assignment completed before consideration is given to exportation of waters from the Columbia system to other regions.

In addition to the determination of water requirements for our region, we believe development of criteria for planning to meet western water requirements is essential before feasibility studies are authorized.

To meet this very important need the Governors of 11 Western States, namely, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming have formed the Western States Water Council to accomplish effective cooperation among Western States in planning for programs leading to integrated development by State, Federal, and other agencies of their water resources. The first function of the council, as listed in its rules of organization, is to "prepare criteria in the formulation of plans for regional development of water resources to protect and further State and local interests."

This concept has been agreed to by all 11 of the Western States. It should be adhered to. We request that the Western States Water Council be given sufficient time to develop agreed-upon criteria that can be used as what I term as "ground rules" for project feasibility studies.

The type of water planning envisioned in H.R. 4671 is substantially different from project or river basin planning undertaken by Federal agencies heretofore. The possibility of serious economic and social loss to the States which are the source of water to be diverted is real and should not be discounted.

We believe the authors of title II of revised H.R. 4671 were sincere in their efforts to protect States and areas of origin but we question

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whether the language incorporated in the bill would adequately provide such protection or, to the contrary, result in bitter controversy and protracted litigation.

For example, how does the Secretary make provision for adequate and eqitable protection of the interests of the States and areas of origin? Who determines what is fair and what is equitable? Are the criteria in section 202(a) applicable to construction and operation of physical works or are they limited to planning?

Does the priority of right included in section 202(b) refer to use for any purpose at any future period of time or does it refer to a legally acquired water right with a definite priority date? Who is authorized to claim the priority if one exists? What provision is made for the protection of waters that do not conform to the accepted definition of a water right, that is, nondiversion uses of water such as flows required for recreation, fisheries, navigation, et cetera?

We request that authorization of studies to import water into the Colorado system be deferred until conclusions have been reached as to the future water requirements of the State of Oregon and our neighboring States in the Pacific Northwest. Furthermore, at such time, if it has been determined that there is surplus water in the Pacific Northwest, we request that specific and precise language insuring full physical, economic, and legal protection to the States of origin be developed and incorporated in the proposed legislation so that it may be readily and effectively administered.

Thank you.

Mr. ROGERS of Texas. Thank you, Mr. Lane.

Mr. Aspinall?

Mr. ASPINALL. Mr. Lane, did you hear Mr. Ahlquist say that it would take, perhaps, a year to prepare the criteria? How long do you folks in Oregon think that it would take?

Mr. LANE. Well, Congressman, the Western States Water Council is working diligently on this. It is my understanding that their staff will submit to the council at its July meeting at least a start of the type of criteria, and I would venture that the determination of time will be dependent in part upon the general areas of agreement or disagreement that are developed at the July meeting. I would think a year should be a reasonable period of time; yes, sir.

Mr. ASPINALL. You folks have spent quite a good bit of time studying this legislation and getting yourselves in position to give the committee your fears.

Have you spent any time trying to draft a section to take the place of title II with language with which you could live?

Mr. LANE. We have consulted with attorneys in our State, Mr. Chairman, in an endeavor to come forth with some type of language that would meet our requirements. So far we have not developed that language, and also the mechanism by which the language would be implemented.

Mr. ASPINALL. The representatives from the State of Idaho who would contribute, I suppose, more water to the Northwest, perhaps, than even your wonderful State, they have come up with some suggestions that they would like to see in the legislation. If you could give us some suggestions so that the committee when it writes up the bill could have not only the benefit of your thinking but the benefit of your draftsmanship, I think it would be very helpful to us. If

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you can do that, why, please let us know. That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. I have no questions.

Mr. ROGERS of Texas. Mr. Johnson of California?

Mr. JOHNSON. Thank you, Mr. Chairman. I have one matter, Mr. Lane. The same question I asked the gentleman from Washington here. If we were to amend title II to include several things that you object to, would you then be in favor of the legislation?

Mr. LANE. The main concern, as we tried to indicate in our statement, Congressman, is the authorization of a feasibility study at this time when the facts that would be an important segment of a feasibility study have not as yet been developed.

Mr. JOHNSON. We realize your State is making a separate study, that there is going to be a basin study made, and this bill would provide for a study to determine if there was surplus with a time certain in the bill. To me it would seem that that would be fairly reasonable. I do not know why you would object to the bill if that was in the particular bill. That is what you are asking for.

Mr. LANE. Yes, sir. Well, for example, one of the types of information we are trying to develop, and we are actually with the U.S. Department of Agriculture, to do a part of this, is an identification of the irrigable land in the State that could be irrigated from the standpoint of soils, climate, and so on. This information is not available. We are working as rapidly as we can to get it developed.

Mr. JOHNSON. But that study could be going on right along with this other study, and the study that would be authorized in this bill would be a study to determine if there was surplus water. All of these things naturally would be taken into consideration.

Are you in favor of the bill before the other body now calling for a national commission?

Mr. LANE. Yes. We think that it has advantages.

Mr. JOHNSON. Would the same language that is in that bill there pertaining to this very subject matter be acceptable to you if we were to put it in this bill?

Mr. LANE. To authorize the studies but not feasibility studies.

Mr. JOHNSON. To spell out the criteria. Would you agree if we just take the language out of that bill and put it in this in title II, would you then agree to this bill?

Mr. LANE. If you would delete the language pertaining to feasibility studies, feasibility project studies.

Mr. JOHNSON. Well, the studies that we were asking for in here were to determine if there was a surplus. We first have to establish that. If there is a surplus, then we have to come back to the Congress and get authorization for the specific works, and then we have to get the appropriations to carry it out.

What we are concerned with here, I think, for what it is worth, is the timing on this and the priorities. We are asking here in a piece of legislation that this start take place now if passed by the Congress. We could have all of this protection written into title II that you want, but yet the study would start taking place.

Now, if we get into a national commission, maybe the priorities might set us back awhile.

Mr. LANE. Well, we, as I mentioned, the Federal agencies are now spending $5 million to try to develop the needs to the year 2020. We are endeavoring to cooperate as closely as we can with them in our

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study. We are providing physical data to them without which they could not develop these needs, and their schedule, their time schedule, is 1970.

Mr. JOHNSON. I think any cooperative study would have to be an exchange of information.

Mr. LANE. Oh, yes, sir.

Mr. JOHNSON. Now, I should think if we should set a definite time these could all be taking place.

Mr. LANE. Well, 1970 is their date. We hope to be just slightly ahead of them.

Mr. JOHNSON. Fine. That is all.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. I would like to ask Mr. Lane if you have any idea of what percentage of the Columbia River Basin each of the States contributes. Just as a matter of interest I would like to know.

Mr. LANE. I do not have the numbers in mind. I could furnish them to you, sir, but I do not have them in mind.

Mr. BURTON of Utah. Why don't you do that?

Mr. LANE. Yes, sir.

Mr. BURTON of Utah. Thank you, Mr. Chairman.

(The information furnished by Mr. Lane follows:)

DEPARTMENT OF THE INTERIOR,
GEOLOGICAL SURVEY,
Portland, Oreg., May 19, 1966.

MR. DONEL LANE,
Executive Secretary, Oregon State Water Resources Board, Salem, Oreg.

DEAR DON: We enclose two copies of "Determination of Contributions by Various States and Canada to the Flow of the Columbia River at the Mouth."

We wish to emphasize that these computations are not precise and that values shown must be considered approximate. However, we feel the computations are reasonably good, not only because of the checks we described but also because of other checks which were made but which are so complex that we have not attempted to describe them for fear that the issue would be confused. Hope the enclosed will satisfy your needs.

Sincerely yours,

A. M. MOORE, *Staff Engineer.*

DETERMINATION OF CONTRIBUTIONS BY VARIOUS STATES AND CANADA TO THE FLOW OF THE COLUMBIA RIVER AT MOUTH

In response to your telephoned request we have computed the approximate contributions of the various States and Canada to the flow of Columbia River at the mouth. We have assumed that this is what you want rather than a computation of streamflow in the basin generated within the several States and Canada. The latter computation would give larger results because some of the water is used consumptively and also the computations would be more complex. To compute contributions to Columbia River at the mouth as accurately as possible would require at least several man-weeks of work if not a few man-months because:

1. Even if we had gaging stations on all streams at every State line and at the international boundary the stations would miss some tributaries that should be included and pick up some that should be excluded. For example a station just over the line in Canada on a stream that is flowing south from Canada may be below a tributary most of which is in the U.S. Similarly a tributary that is mostly in Canada may enter below the gaging station. To make as accurate determinations as possible would involve measuring all such drainage areas and determining accurate figures of average runoff per square mile to assign to these areas.

2. All figures should be converted to the same time base and one that is representative of long-term average conditions.

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3. All consumptive uses of water should be subtracted from the contributions of the State in which such use was made, if the computation of contributions did not already take this into account.

4. Change in reservoir storage should be taken into account to the extent that storage at the end of the time period used differed from that at the beginning.

To compute the contributions by the various States in a reasonably short period we have necessarily taken several shortcuts and made certain assumptions. This means that the computed results are therefore approximate but nevertheless should be correct within a few percent.

The methods used were as follows:

Averages for the standard period 1943–57 were generally used, for several reasons. First, they were already available for many of the gaging station records used in the computations. Second, based on the record for Columbia River at The Dalles, the period is closely representative of long-term runoff conditions. Third, the period is quite representative of present conditions with respect to irrigation developments and consequent consumptive use of water. In some instances records were not available for this period and records which were available were used with no attempt to correct those particular averages to the averages for 1943–57. No serious error was believed to be introduced by this procedure.

At State or national borders no attempt was made to carefully evaluate drainage areas and unit runoff of tributaries that crossed and perhaps recrossed the boundaries. In some places relatively small drainage areas of this type were ignored, but where somewhat larger ungaged tributaries were involved an attempt was made to balance such areas visually and thereby identify fairly accurately the real source of these contributions. Because these areas were relatively small compared to the large flows that could be accurately identified (through gaging stations) as to source, no serious error was believed introduced by these methods.

In computing the contribution of Nevada, Idaho, and Oregon to a few upper Snake River tributaries (Goose Creek, Salmon Falls Creek, Bruneau River and Owyhee River) a 1949 report of the Hydrology Subcommittee of CBIAC was used. That report took into account consumptive use of water for irrigation.

Contributions of some areas were computed by the method of differences. That is the flow recorded at an upstream station on a mainstem was subtracted from the flow at a station downstream on the same mainstem to obtain the contributions of many or several tributaries. This method, which could be used only where all tributaries were in the same State, automatically accounts for depletions by consumptive use in the intervening area.

In considering a reach of river where tributaries drained more than one State direct computation of inflow for each gaged tributary and an allowance for yield from ungaged areas was used. Because some tributaries were not gaged near the mouth this method of computation may result in ignoring some consumptive use occurring between the gaging station and the mouth of the tributary. However, her too, errors are believed to be small with respect to total contributions.

No attempt was made to take into account water in storage in 1957 as compared to that in storage in 1943 as the effect would be very small.

Results obtained using the above described methods are as follows:

Political subdivision	Drainage area		Average contribution to Columbia River Basin during 1943–57.	
	Square miles	Percent of total	Cubic feet per second	Percent of total
British Columbia	39,508	15.3	72,580	27.0
Montana	25,148	9.7	26,720	10.0
Idaho	79,823	30.8	51,560	19.0
Wyoming	5,110	2.0	7,220	2.7
Utah	360	.1	[1]	
Nevada	5,590	2.2	800	.3
Washington	45,841	17.7	47,560	18.0
Oregon	57,620	22.2	60,280	23.0
Total	[2] 259,000	100.0	266,720	100.0

[1] Negligible.

[2] Drainage areas shown here are from H. Doc. 531, p. 437. Geological Survey drainage area for the mouth is 258,000 but is not broken down by States. Therefore Corps of Engineer figures from H. Doc. 531 are used here.

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There are several rough checks of these computations. First, the average flow of Columbia River at the mouth as computed above from various components adds to 266,720 cfs. This checks closely the figure of 271,300 cfs which had been accurately computed several years ago as the average flow at the mouth for the standard period 1943–57.

In a June 1958 report of Corps of Engineers, North Pacific Division titled "Water Resources Development, Columbia River Basin" the contribution of the Canadian portion of the basin for the period 1929–48 was shown (page 6 of that report) as 28% of that at the mouth for the 20-year period 1929 through 1948. This checks closely the figure of 27% shown in the foregoing table. The 1929-48 period represents conditions which are lower than the long-term average and the contribution shown for Canada in the Corps of Engineers report amounts to 69,300 cfs as compared to the 72,580 computed for 1943–57.

Prepared by,

H. H. OREM.
A. M. MOORE.

Mr. ROGERS of Texas. Mr. Udall?

Mr. Wyatt?

Mr. WYATT. I would like to welcome Mr. Lane here and ask for the record when the Oregon study underway was authorized?

Mr. LANE. It was approved by the last session of the 1965 session of the legislature. Funds were available July 1 of 1965.

Mr. WYATT. When was this Federal study authorized for the basin or when did the work start on it, let me ask you that?

Mr. LANE. Well, the work started on that during the current fiscal year. The staff is now, what I call, preparing a plan for planning, Congressman.

Mr. WYATT. They are really just getting into the swing of it.

Mr. LANE. Yes, sir.

Mr. WYATT. Do you feel, Mr. Lane, that the position of the Water Resources Board in the State of Oregon that we should have in Oregon complete and accurate information on our water inventory and our water requirements as projected over the next 100 years as a basis, as one of the bases, for any feasibility study that is conducted by any other agency?

Mr. LANE. I would think this most essential because you have to, if we are going to talk about feasibility studies to divert surplus water, we have to identify what is surplus water.

Mr. WYATT. As a matter of fact, we in Oregon, in spite of this figure of 170 million acre-feet per annum, or 180, 190, we, in fact, do not know today whether we do have surplus water, is that not correct?

Mr. LANE. No one in Oregon or anywhere else could answer that question, sir.

Mr. WYATT. That is all I have. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. Mr. Lane, would you have any statement as to whether the State of Oregon would support the central Arizona project in title II of this bill?

Mr. LANE. The best answer that I can give you to that, Mr. Congressman, if you will refer back to Mr. Cole's testimony in August of 1965 he stated that we did not. The State of Oregon was not commenting on the project portions of the proposed bill.

Mr. FOLEY. Would you feel, Mr. Lane, that any study of the benefit of augmenting water into the Colorado River Basin should include

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an examination of the possibility of the desalinization techniques and weather modification, conservation, and salvage as part of that study?

Mr. LANE. I believe that also is reflected in Mr. Cole's testimony, which I attempted not to repeat, but he commented favorably on that aspect, on these provisions, of exploring the various alternates of meeting the needs.

Mr. FOLEY. Is the failure of this bill to incorporate such requirements in the study to be conducted by the Secretary and a report to be submitted by him, part of your objection to its provisions?

Mr. LANE. I am a great believer in always looking at alternates, sir, before you arrive at a final decision.

Mr. FOLEY. Does the construction of this bill provide for the Secretary to submit plans for alternate means of augmenting water?

Mr. LANE. I believe this bill directs the Secretary to prepare a feasibility report, and later sections of this bill refer to events that happened, that take place, after the importation of water under the Colorado system, and this is a portion that bothers us.

For example, on page 36, line 23, there is reference to "the limitation stated in paragraph (a) shall cease whenever the President shall proclaim that works have been completed and are in operation, capable in his judgment of delivering annually not less than 2,500,000 acre-feet of water into the main stream of the Colorado River below Lees Ferry from sources outside the natural drainage area of the Colorado River system;" and so on.

This assumes an accomplished fact, in my opinion.

Mr. FOLEY. Will you read such things as section 203(a) on page 32, line 7?

When you read the words "importation plan," what, in your judgment, does such a plan refer to?

Mr. LANE. In my judgment, it refers to the feasibility report on the projects that would be recommended therein in title II.

Mr. FOLEY. And as to what means or possible means of augmenting water to the Colorado does that refer to, in your judgment?

Mr. LANE. Physical structures.

Mr. FOLEY. Diversion of surface waters.

Mr. LANE. Yes, sir.

Mr. FOLEY. We have some confusion on that this morning. This does not, in your judgment, then include desalinization, weather modification, and these other means of salvage and conservation?

Mr. LANE. The specific language of feasibility studies, as I interpret it, does not include these alternates; no, sir.

Mr. FOLEY. Thank you.

Mr. ROGERS of Texas. Thank you very much, Mr. Lane, for your presentation.

Mr. LANE. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. That concludes the witnesses for this afternoon, and the subcommittee will stand adjourned until 9:45 in the morning.

Thank you.

(Whereupon, at 3:45 p.m., the subcommittee was in recess, to reconvene at 9:45 a.m., Wednesday, May 11, 1966.)

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LOWER COLORADO RIVER BASIN PROJECT

WEDNESDAY, MAY 11, 1966

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 9:50 a.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS of Texas (presiding). The Subcommittee on Irrigation and Reclamation will come to order for further consideration of the pending bills.

Let the Chair make this observation: We have had some difficulty in moving along with the witnesses, and I think that we will invoke the 5-minute rule on questioning. There are a number of members here, and we will invoke the rule, so that the members can have an opportunity to be heard, and if further questionings are desired we will go for a second round or a third round, but I think we must do this to move these hearings along in order to finish this week.

Our first witness this morning is Mr. Northcutt Ely, representing the State of California, who is accompanied by Mr. Wesley E. Steiner, Deputy Director, California Water Resources Department, and Mr. Dallas Cole, chief engineer, Colorado River Board of California.

Mr. Ely, it is nice to see you before the subcommittee again. You may proceed.

STATEMENT OF NORTHCUTT ELY, SPECIAL COUNSEL TO THE COLORADO RIVER BOARD OF CALIFORNIA AND SPECIAL ASSISTANT ATTORNEY GENERAL, STATE OF CALIFORNIA; WESLEY E. STEINER, DEPUTY DIRECTOR, DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA; AND DALLAS E. COLE, CHIEF ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA; ACCOMPANIED BY RAYMOND RUMMONDS, CHAIRMAN, COLORADO RIVER BOARD OF CALIFORNIA; DON MAUGHAN, CHIEF, WESTERN STATES WATER PLANNING, DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA; AND MYRON HOLBURT, PRINCIPAL HYDRAULIC ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA

Mr. ELY. Mr. Chairman and members of the committee.

Mr. Steiner, whom you know, is to my right, and Mr. Cole, whom you also know, is to my left. Accompanying us is Mr. Raymond Rum-

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monds, chairman of the Colorado River Board of California. Next to him is Mr. Myron Hulburt, principal hydraulic engineer of the Colorado River Board, and to his right is Mr. Don Maughan, chief, Western States Water Planning, Department of Water Resources, State of California.

Mr. Maughan testified before you in August.

This is a joint statement on behalf of the State of California submitted by myself as special counsel to the Colorado River Board of California and special assistant attorney general; Mr. Wesley E. Steiner, deputy director of the Department of Water Resources of the State of California, and Dallas E. Cole, chief engineer of the Colorado River Board of California.

Each of us will endeavor to answer the questions within the fields in which we are acquainted.

California joins her sister States of the Colorado River Basin in support of the revisions of H.R. 4671 embodied in Committee Print No. 19 of that bill, to be renamed "A bill to authorize the construction, operation, and maintenance of the Colorado River Basin Project," now before this committee.

These revisions of H.R. 4671 are the result of interstate conferences which have taken place since the conclusion of the House committee hearings on the bill last August. The charges are primarily in titles II, III, V, and VI, but there are some others. Our discussion is restricted generally to substantive changes.

Title I: Title I remains a declaration of purposes, generally balancing the water budget, with the goal enlarged from the previous version to include the entire Colorado River Basin. At page 28, line 13, the objective of "filling and refilling of reservoirs to optimum operating levels" has been added. When we reach title VI we shall see how this is to be done.

Title II: Title II directs the Secretary, in section 201, page 28, line 16, to prepare estimates of water supply and requirements to at least the year 2030 for both basins. At page 28, line 24, he is directed to investigate sources and means of supplying these requirements, in both basins, including—

reductions in losses, importations from sources outside the natural drainage basin of the Colorado River System, desalination, weather modifications, and other means.

At page 29, line 17, this instruction is expanded—

to investigate current and anticipated water requirements of areas outside the natural drainage area of the Colorado River system which feasibly can be served from importation facilities en route to the Colorado River system.

This instruction is to be read in connection with the important new language in section 201(b) and (c), which begins at page 29, line 22.

The Secretary, in section 201(b), is directed to prepare planning and feasibility reports of a staged plan for projects adequate, in his judgment, to meet the requirements reported under section 201(a).

This staged plan is to be based upon comprehensive analysis of water resources and requirements, not only in the entire Colorado River Basin, but also in the potential areas of origin of water to be imported into that basin.

Importations for use in the lower basin—The first 2.5 million: Section 201(c), beginning at page 30, line 3, tells the Secretary that—

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the plan for the first stage of works to import water into the Colorado River system from outside the natural drainage area of that system shall include facilities to provide two million five hundred thousand acre-feet annually for use from the main stream of the Colorado River below Lee Ferry, including satisfaction of the obligations of the Mexican Water Treaty and losses of water associated with the performance of that Treaty.

The plan for the first stage may include, in addition to this mandatory minimum component, three discretionary increments of capacity. But before discussing them, the quantity of 2.5 million deserves explanation, as it occurs several times in the bill.

Two million five hundred thousand acre-feet annually is the quantity which must be added to the main stream to make possible the use in the lower basin on a permanent basis of the 7.5 million acre-feet apportioned by the Supreme Court, when the flow at Lee Ferry is reduced to the compact minimum by upper basin depletions and the upper basin is released from the treaty burden. The derivation of the 2.5 million acre-feet figure was explained in detail in the August hearings at page 289.

Discretionary increments of capacity: The three discretionary increments in capacity of the first stage of importation works begin at page 30, line 13.

First, in section 201(c)(1) the Secretary may include facilities to divert into the Colorado River up to 2 million acre-feet annually of additional water for use in the Lower Colorado River Basin, bringing the lower basin total up to a maximum of 4.5 million acre-feet of imports. This recognizes that the water requirements of Arizona, California, and Nevada are much greater than the 7.5 million acre-feet which would be "firmed up" by the importation of 2.5 million. For example, 7,500,000 acre-feet, under the terms of the decree, and of this bill, would provide only 2.8 million acre-feet for Arizona, 4.4 million for California, and 300,000 for Nevada. Arizona's stated requirements are at least 3.8 million acre-feet. California's existing projects were constructed to use 5.4 million, not 4.4 million acre-feet. Nevada, in the Supreme Court suit, offered proof of requirements greatly in excess of the 300,000 acre-feet which the decree would give her out of the first 7.5 million.

The second discretionary increment in the capacity of the importation works appears in section 201(c)(2) at page 30, line 16. It authorizes inclusion of up to 2 million acre-feet for use in the Upper Colorado River Basin. If this were brought in below Lee Ferry, the 2 million acre-feet so imported would, in fact, be used in the lower basin, and the obligation of the upper division under article III(d) of the compact would be reduced from 75 to 55 million acre-feet in each period of 10 consecutive years. Thus, the first stage of the Secretary's plan may provide a maximum importation into the Colorado River system of up to 6.5 million acre-feet annually.

The third discretionary increment of capacity (sec. 201(c)(3), p. 30, line 19) in the importation works is up to 2 million acre-feet annually for use in the areas which can be served by these importation facilities en route from the areas of origin to the Colorado River system. Thus, if the import aqueduct brings water from the rivers of north California to the Colorado, it may be feasible to deliver water from it, en route, to areas in northern and central California, and Nevada. If

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the aqueduct brings water from the Columbia, similar opportunities for service may be found in northern California, Oregon, Idaho, and Nevada.

Mexican Treaty burden: Section 201(d), at page 30, line 24 deals with the Mexican Treaty burden. This paragraph makes three points. First, the treaty constitutes a national obligation. Second, and in consequence of the first point, the upper division and the lower division are both to be relieved of the obligation imposed by article III(c) of the compact to curtail their uses to supply water for Mexico, but only if and when the third point is met. This states that the obligation shall end when the President issues the proclamation specified in section 304(b) (p. 36, line 23). The President must be able to proclaim that works have been completed and are in operation, capable, in his judgment, of delivering annually not less than 2.5 million acre-feet into the main stream below Lee Ferry from outside the natural drainage area of the Colorado River system, and that such sources are adequate, in the President's judgment, to supply such quantities without adverse effect upon the foreseeable water requirements of any State from which such water is imported. The 2.5 million here referred to is identical with the 2.5 million capacity which section 201(c) directs the Secretary to provide as the mandatory element in the first stage of his importation plan. This proclamation has other important effects, which we will come to later.

Protection of States and areas of origin:

Section 202 contains important new provisions for the protection of areas and States of origin. This subject is of concern to California as a potential area of origin, just as it is to the Columbia Basin States for the same reason.

Section 202(a), at page 31, line 12, gives the Secretary a general mandate to make provision for adequate and equitable protection of the interests of the States and areas of origin, including assistance from the development fund established by title IV of the bill, so that water supplies will be available for use in those States and areas at prices to the users of water which are not adversely affected by the exportation of water to the Colorado River system. This means, in California's case, that if the cheapest potential projects for development of our northern rivers are first used as sources from which to export water to the Colorado, with the result that potential uses of water in California must instead look to more expensive sources, then the development fund is to pay that increment of cost.

Section 202(b), at page 31, line 22, provides a priority for the States and areas of origin in about as sweeping terms as could be devised. It says, in so many words—

> all requirements, present or future, for water within any State lying wholly or in part within the drainage area of any river basin from which water is exported by works planned pursuant to this act shall have a priority of right in perpetuity to the use of the waters of that river basin, for all purposes, as against the uses of the water delivered by means of such exportation works, unless otherwise provided by interstate agreement.

Thus, if the exported waters are diverted from any point in the Columbia River Basin, any State which has any portion of its area in that basin has a perpetual priority, to be initiated at any time in the

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future, to the use of Columbia system water for all purposes as against any user of water exported from the Columbia River system by any project which may result from the planning proposed by this bill. This is so even though the water so exported is being devoted to consumptive use in the Colorado River basin by projects whose initiation is prior in time to the future projects in the Columbia Basin on whose behalf the priority is asserted. It is so even though the use thus protected in the Columbia Basin is not a consumptive use, but is use for power or navigation or fish preservation or disposal of pollution to the ocean. No Columbia Basin State may be deprived of this protection except by its own consent, given in an interstate compact. By the same token, if California rivers, instead of the Columbia, are the source of the exported waters, California receives the same protection.

If California is the area of origin for even as much as 2.5 million acre-feet, California will contribute a quantity of water from our northern rivers to the Colorado which is several times the quantity that this bill would give us out of the Colorado. We have accordingly exercised great care in writing this language and other safeguards for areas of origin which this bill contains, and are satisfied with it. We hope that our sister States in the Columbia Basin are similarly reassured.

Timing: Section 203(b), at page 32, line 11, directs the Secretary to submit his proposed report and findings on the importation plan to the affected States and Federal agencies, as required by existing law, and to do so by December 31, 1970. This date, which is later than some of us would prefer, is adopted in deference to the 5-year period of investigation adopted for current water planning studies by certain of the Columbia Basin States in 1965.

Section 203(c), page 32, line 15, requires that within 1 year after the affected States and Federal agencies have submitted their findings, the Secretary must submit his plan and report to the President and to the Congress, accompanied by the comments of these States and agencies.

No authorization for construction of importation works: This bill does not authorize construction of any importation works. Such authorization must await another act of Congress, after it has reviewed the Secretary's plan and the comments of all affected States and interested Federal agencies.

Title III.—Authorized units—Protection of existing uses: Title III, as in the original bill, authorizes construction of Bridge and Marble Canyon Dams and the central Arizona unit, subject to certain provisions for the protection of other projects. It contains some important additions.

Capacity of the central Arizona aqueduct: In section 303(a) at page 34, line 3, appears a direction that the central Arizona unit shall consist of works "of such sufficiency as to provide for not to exceed an average annual diversion of 1,200,000 acre-feet of Colorado River system water from the main stream." The original bill did not specify the capacity of the aqueduct, but the Reclamation Bureau's testimony in August, on cost and payout, was related to an aqueduct with a capacity of 1,800 cubic feet per second. This would transport a

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maximum, not an average, of 1.2 million acre-feet annually. Arizona wants a larger aqueduct than this, and California supports her, up to a point. We believe that the authorized capacity should be written into the bill in cubic feet per second, to avoid misunderstanding.

Other capacities considered include these:

1. A capacity of 2,500 cubic feet per second would permit an annual diversion of about 1,650,000 acre-feet, taking into account normal downtime. California's studies indicate that this is the maximum size that can be supported by the hydrology of the Colorado River. A probability analysis, based upon the joint statement on water supply presented by the three lower basin States to the committee in August, shows an even chance that the river, until about the year 1990, would furnish a supply to a central Arizona aqueduct of about 2,500 cubic feet per second, and the full requirements of Arizona's existing projects, while maintaining a supply of at least 4.4 million acre-feet per annum to California, and a full supply to Nevada. The river would continue to furnish at least 1.2 million acre-feet per year to central Arizona until about the year 2000, gradually diminishing thereafter unless imports arrive. In the absence of imports, the average diversions for central Arizona through a 2,500 cubic feet per second aqueduct over the period 1975 to 2025 would be about 1.2 million acre-feet, taking into account the larger diversions in the early years of this period.

2. A capacity in excess of 2,500 cubic feet per second requires for its hydrologic justification one or both of the following assumptions:

(*a*) First, that even without imports, there will be a mainstream water supply in excess of 7.5 million acre-feet available for consumptive use in the lower basin; hence, a supply for Arizona in excess of 2.8 million acre-feet, and a supply for the central Arizona unit in excess of 1.65 million, for a period long enough to justify the added investment. California's hydrologists cannot justify an assumption of a Colorado River supply greatly in excess of 7.5 million acre-feet for any substantial period of time.

(*b*) Second, that imported water will be available to justify the capacity in excess of 2,500 cubic feet per second.

Accordingly, California has told Arizona that we will agree to an amendment which will have the following elements:

1. The central Arizona aqueduct is not to be restricted to a capacity of 1,800 cubic feet per second.

2. California will support a capacity of 2,500 cubic feet per second. The cost of the aqueduct at this capacity would be a part of the basic project, with repayment in accordance with the provisions of title IV.

3. A capacity in excess of 2,500 cubic feet per second can be justified, in our view, only on the basis of future value for importations, and must be financially supported from sources other than the development fund created under title IV, and the cost of that additional capacity shall not be borne by the water or power users in California or Nevada.

We wish to make it clear that the sizing of the central Arizona aqueduct is not related to any assumed limitation of Arizona's uses to a total of 2.8 million acre-feet annually, or to any other quantity. We do not imply this. We recognize the decreed right of Arizona not only to the use of 2.8 million acre-feet of the first 7.5 million acre-

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'eet of mainstream water, but also to one-half of the excess above '.5 million, if available, just as California has a decreed right not only o 4.4 million acre-feet of the first 7.5 million, but to one-half of the xcess above 7.5 million, if available.

Sections 303(a), page 34, line 3, and 303(c), page 35, line 12, con- ain some new language designed to prevent overexpansion in central Arizona and to provide for exchange of Colorado River water with isers of local supplies in Arizona. These seem sensible.

Shortages—Protection of existing projects: Section 304, page 35, ine 25, is of major concern to California. It relates to shortages, and s the second half of a shortage formula, the first half of which was vritten in section 4(a) of the Boulder Canyon Project Act in 1928. That section required California's legislature to agree, which it did, that California's uses would be restricted to 4.4 million acre-feet of the 7.5 million apportioned to the lower basin by paragraph (a) of article III of the Colorado River Compact, plus one-half of the excess or surplus waters not apportioned by the compact. The Supreme Court, in article II(B) (1) and (2) of its decree in *Arizona* v. *California*, construed this limitation to mean 4.4 million acre-feet of the first 7.5 million acre-feet of consumptive use supplied in each year from the main stream below Lees Ferry, plus one-half of any additional consumptive use supplied from the main stream. The effect of the limitation, so construed, is to require California to bear the first impact of any shortage which reduces the supply to 7.5 million acre-feet. Inasmuch as California's three existing projects were built to use 5.4 million acre-feet, a million of it in the category of excess or surplus, and we have used 5.1 million, this segment of the shortage formula requires California to sacrifice 700,000 acre-feet of existing uses when the supply shrinks to 7.5 million.

The second segment of the shortage formula is contained in section 304(a), page 35, line 25, now before you. It says, in substance, that if the supply drops below 7.5 million, the next impact of the shortage shall be borne by the central Arizona unit. Its diversions shall be reduced to the extent necessary to assure the availability of water for use in Arizona, California, and Nevada by existing projects, or, more precisely, by the holders of present perfected rights, other users served under existing contracts with the United States by diversion works heretofore constructed, and by existing Federal reservations. The protection to California is limited, however, to 4.4 million acre-feet, the quantity referred to in the 1928 limitation as well as in the decree. This paragraph does not affect relative priorities, as among themselves, of water users in Arizona and California, which are senior to the central Arizona unit, or amend any provisions of the decree. We would include Nevada in this disclaimer if she so desires.

The technique adopted in section 304(a) is the implementation, by directions to the Secretary, of article II(B)(3) of the decree, which deals with shortage in the 7.5 million acre-feet apportioned by articles II(B)(1). Article II(B)(3) directs the Secretary to first satisfy present perfected rights, then to allocate the remaining available water in accordance with applicable law. This section writes the applicable law.

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We have added new language, at page 36, line 16, saying that water users in Nevada shall not be required to bear shortages in any propor-

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tion greater than would have been imposed in the absence of this section 304(a).

Section 304(b), at page 36, line 23, provides that the limitation on the central Arizona unit diversions, stated in section 304(a), shall cease whenever the President makes the proclamation to which we have previously referred as triggering the release of both basins from the Mexican Treaty burden. In view of questions asked at the August hearings, it should be reemphasized that the event which ends the limitation on the central Arizona unit, and releases both basins from the Mexican burden, is the importation of water into the main stream in a quantity not less than 2.5 million acre-feet annually from sources outside the Colorado River Basin. It is not the production of desalted water on the coast of California or in Mexico, or the increase of rainfall on the Gila watershed or on the Rockies through weather modification, or the salvage of main stream water, or water savings through the lining of canals, or any other scheme. They are worthwhile measures and we strongly support them, but they do not trigger the release of the limitation which protects our priorities. That event is the proclamation referred to in section 304(a), which relates solely to importations into the main stream.

Cost of imported water: The cost of imported water is dealt with in sections 304 (c), (d), (e), and (f), at pages 37–39, as follows:

The cost of importing the first 2.5 million acre-feet is to be met, so far as possible, from tow sources. The first is by nonreimbursable payments from the Treasury in amounts fairly allocable to the performance of the Mexican Water Treaty. This treaty burden includes associated losses as well as the guaranteed delivery of 1.5 million acre-feet at the boundary. The second source is revenues accruing to the development fund from power operations at Bridge and Marble Canyon Dams and from Hoover-Davis, and Parker Dam power after those projects have paid out. (See sec. 403(e)(3), p. 46, line 10.)

The first water imported into the Colorado must be used to satisfy the treaty burden—1.5 million at the boundary plus associated losses in transit. To the extent that the imported water is so supplied to satisfy the treaty burden, that same quantity of Colorado River water is released from that obligation and becomes available for consumptive use.

It is probable that funds from these two sources will meet the cost of importing all water necessary to offset deficiencies in the 7.5 million acre-feet apportioned among Arizona, California, and Nevada by article II(B)(1) of the Supreme Court decree. The bill provides, therefore, in section 304(c), page 37, line 11, that imported water to the extent necessary to accomplish that result shall be made available at Colorado River prices, taking into account the funding from the two sources just mentioned. If funds from these two sources are not adequate, the resulting deficit will require the extension of the amortization period of the importation works. This period is not fixed in this bill, but will be stated in the legislation which authorizes the importation facilities.

The importation of 2.5 million acre-feet of water may make more than 7.5 million acre-feet available temporarily, until such time as the gradually increasing upper basin depletions reduce the flow at Lees Ferry to the compact minimum of 75 million acre-feet in each 10-year

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period. If so, the water imported to satisfy the Mexican Treaty burden will permit temporary use in the lower basin of more than the 7.5 million acre-feet of native Colorado River water.

At some point in time, however, the upper basin depletions will reduce the flow at Lees Ferry to the compact minimum, with the result that if the lower basin is to use more than 7.5 million acre-feet annually thereafter, more than 2.5 million must be imported. This brings into consideration the next increment of 2 million acre-feet, referred to in section 201(c)(1), at page 30, line 13. The available assistance from the development fund may have been fully committed, in reducing the cost of the imported water required to firm up the first 7.5 million acre-feet at Colorado River prices, but if any additional assistance is available from the development fund, it is earmarked for the reduction in cost of this 2 million acre-foot increment. This is provided for in section 304(d), page 38, line 6.

Section 304(d) also directs that if importations make available more than 7.5 million acre-feet of consumptive use from the mainstream in the lower basin, the excess shall be made available in the same proportions, as among the three States, as article II(B)(2) of the decree provides with respect to like surpluses of Colorado River water. These decreed proportions are one-half to California, one-half to Arizona, with provisions for Nevada's taking 4 of the 50 percentage points of surplus apportioned to Arizona, if the Secretary so contracts with Nevada. Within each State, the imported water is to be first offered to those now using water, and offered in quantities equal to the deficiencies that each user would bear in the absence of importations. What this means is that in California, for instance, imported water in excess of that required to supply California 4.4 million acre-feet shall first be offered to those users who, under the priority schedule appearing in the Secretary's water contracts would be entitled to any Colorado River water available in excess of 4.4 million acre-feet annually.

The bill does not contemplate or authorize any change in the price or terms applicable to water which is available from the native supply of the main stream of the Colorado River. This will continue to be furnished to users of Colorado River water, to the extent available, in accordance with their contracts with the Secretary.

Title IV. Lower Colorado River Basin development fund—allocation and repayment of costs—contracts: Title IV, which deals with financial matters, has been reorganized. Section 401, at page 42, line 9, relates to cost allocations. Section 402, at page 42, line 17, deals with Indian lands. Section 403, at page 43, line 25, establishes the Lower Colorado River development fund in the Treasury. Section 404, at page 47, line 14, relates to repayment contracts. Section 405, at page 48, line 16, requires annual reports.

Nonreimbursable allocation to the Mexican Treaty: Two important provisions should be identified, as they relate to new matter which appears elsewhere in the bill. These are in sections 401 and 402. Section 401 directs the allocation of an appropriate part of cost of construction to supply the water necessary to satisfy the Mexican Treaty obligation. The same section, at page 43, line 3, directs that costs allocated to this function, including replenishment of "losses in transit,

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evaporation from regulatory reservoirs, and regulatory losses at the Mexican boundary, incurred in the transportation, storage, and delivery of water in discharge of the obligations of that treaty" shall be nonreimbursable. This nonreimbursable investment shall be placed at the base of the cost pyramid, and the costs of importing additional quantities shall be treated as incremental costs.

Development fund: The development fund created by section 403, page 43, line 25, is a basin account, into which will be paid all appropriations for construction, as well as revenues from lower basin power and water contracts. Out of this fund will be paid the costs of construction, operation, and maintenance, and payments to the Treasury of installments of the reimbursable investments, and of interest on the interest-bearing portion of that investment.

Note particularly two burdens placed on the revenues accruing to this fund.

1. At page 45, line 7, appears an oblication, second only to the requirements of money for operation, maintenance, and replacements, to make certain payments to the Upper Colorado River Basin fund required by section 502. These will be described when we reach that section.

2. At page 46, line 15, appears a direction to use revenues in the fund for two purposes: (i) to pay for costs incurred in importing water into the Colorado River for use in the lower basin as provided in section 201(c), to the extent that such costs are in excess of the costs allocated to the Mexican Treaty burden under section 401; and (ii) costs incurred in providing protection of States and areas of origin of imported water as provided in section 202(a).

At page 46, line 14, the words "herein or" should be deleted, since there are no importation works authorized in this bill.

Title V, Upper Colorado River Basin authorization and reimbursements: Title V is new.

Section 501, at page 49, line 3, authorizes construction of five projects in the State of Colorado (one is partially in New Mexico), and this section deals with internal matters in the upper basin. We will leave its explanation to representatives of that area. California has agreed to the inclusion of this section.

Section 502, at page 52, line 5, which is referred to in the revenue provisions of section 403(d)(2), at page 45, line 7, deals with the financial problems created by the filling of Glen Canyon Dam, with resulting impairment of firm power production at Hoover Dam. The Secretary of the Interior on April 4, 1962, promulgated criteria to govern the filling of Glen Canyon reservoir (27 F. R. 6851, July 19, 1962), which reference should be inserted in the bill on page 52, line 13, after the word "project." In general, these critera require compensation to the Hoover Dam power constractors, in power or in money, for reductions in the generation of firm energy at Hoover Dam occasioned by storage of water at Glen Canyon Dam. Payments in money are to be made out of the Upper Colorado River Basin fund, created by the Colorado River storage project, but returned to that fund out of Hoover Dam power revenues after the Hoover Dam repayment period is concluded (about 1987).

Substantial payments have been made out of the upper basin fund to compensate Hoover Dam power contractors for impairment of

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power production at Hoover, and such payments may have to be made in the future under the Glen Canyon filling criteria. Section 502 provides for the repayment of such expenditures heretofore or hereafter made out of the Upper Colorado River Basin Fund. This is to be done by transferring $500,000 each year to that fund from a fund which was created by the Boulder Canyon Project Adjustment Act in 1940. This 1940 fund now receives $500,000 per year from the Hoover Dam power revenues, earmarked for use in investigating and constructing projects, and will continue to do so, under existing law, until 1987. The effect of section 502 of the present bill is simply to earmark that same $500,000 for transfer to the upper basin fund, instead.

If any deficit in reimbursement of the upper basin fund persists after 1987, the remaining deficiency is to be made good out of the new Lower Colorado River Basin Development Fund created by title IV of H.R. 4671.

Title VI. General provisions—Definitions—Conditions: Section 601, at page 53, line 3, is new. It represents a compromise between the upper basin and the lower basin with respect to the coordination of operation of the reservoirs in the upper basin—Glen Canyon, Flaming Gorge, Navajo, Curecanti—and Hoover Reservoir in the lower basin.

This language, admittedly somewhat involved, represents an earnest effort of the States to solve a problem not answered by the Colorado River Compact. Articles III (c) and (d) of the compact require the upper division to deliver water at Lees Ferry, and, if there were no water in storage in the upper basin, this might require curtailment of upper basin consumptive uses in order to discharge these obligations. Lake Powell, in a sense, is a bank account out of which the compact debt can be paid, and the larger the balance in it, the greater the insurance against the necessity of curtailing upper basin consumptive uses to make good on the Lees Ferry guarantees. On the other hand, if too much water is hoarded there, and denied to lower basin users, it may have to be spilled in a subsequent wet year, and wasted. There is necessity for a commonsense balance between the right of the upper division to store water to meet future delivery requirements under articles III (d) and (c), and the lower basin's right, under article III (e), to demand the current release of water stored in the upper basin to meet present needs in the lower basin. Article III(e) says:

> 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.

The technique used to solve this problem is as follows:

Section 601(a), at page 53, line 3, directs the Secretary to promulgate equitable criteria for the coordinated long-range operation of the upper and lower basin reservoirs, and to review these annually in consultation with representatives of the seven States and the parties to contracts with the United States.

Section 601(b), at page 53, line 15, requires that, in the preparation and execution of these criteria, three priorities shall govern the storage of water in the four upper basin reservoirs, and releases of water from Lake Powell (Glen Canyon Dam).

(1) Releases to supply the upper division's share, if any, of the Mexican Treaty burden. But such releases shall terminate when the

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President issues the proclamation specified in section 304(b), at page 36, line 23, that is, a proclamation that works have been completed which are adequate to import 2.5 million acre-feet annually into the Colorado.

(2) Releases to comply with article III(d) of the compact, that is, 75 million acre-feet in each period of 10 consecutive years, minus quantities imported into the Colorado below Lees Ferry for credit to the upper division States. This relates to the 2 million acre-feet of imports referred to in section 201(c)(2), page 30, line 16.

(3) Storage of water not required to be released to meet the upper basin's current obligations under articles III (d) and (c) of the compact, to the extent that the Secretary finds to be necessary to enable him to meet those same compact requirements in the future, without impairing consumptive uses in the upper basin which are consistent with the compact. The Secretary is to consult representatives of the States of the upper division and lower division, and take into account all relevant hydrologic factors, in estimating the quantities that he must retain in storage to meet these future requirements. These factors include, but are not limited to, historic stream flows, the most critical period of record, and probabilities of water supply. The latter term refers to calculations of mathematical probabilities, a technique described to the committee in the August hearings. Water not so required to be stored is to be released from Lake Powell to meet three requirements, which are in addition to the compact's III(c) and III(d) requirements. These are:

(i) Releases to the extent that water so released can be reasonably applied in the three lower division States to the uses specified in article III(e) of the compact. But no such releases to meet III(e) requirements shall be made when the active storage in Lake Powell is less than the active storage in Lake Mead;

(ii) Releases to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell; and

(iii) Releases to avoid anticipated spills from Lake Powell.

The net effect of section 601, in layman's language, is that Lake Powell is not to be drained while Lake Mead remains full, and Lake Mead is not to be drained while Lake Powell remains full, but that both reservoirs shall rise and fall in general but not necessarily exact correlation with each other. Lake Powell is not to be filled to the maximum to protect the upper basin against the recurrence of the most extreme drought, but only against reasonable probabilities of shortage, and Lake Mead, in turn, is not to be maintained at a higher level, in terms of active storage, than Lake Powell. The intent is to spread the risk fairly between the two reservoirs.

We suggest a deletion at page 53, line 15. The first sentence, a product of earlier drafts, should be deleted, to avoid confusion.

The principles set forth in section 601 become operative upon passage of this bill and instruct the Secretary as to operation of Lakes Powell and Mead to meet the "downstream uses of water (other than power)" which are specified in Principle No. 3 of the Glen Canyon Filling Criteria (27 Federal Register 6851, July 19, 1962).

Section 601(c) at page 55, line 7, directs that section 7 of the Colorado River Storage Project Act, which relates to power production, is to be administered in accordance with the foregoing criteria.

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Section 602, at page 55, line 9, says that rights of the upper basin to consumptive use of water apportioned to that basin by the compact shall not be reduced or prejudiced by any use of that water in the lower basin.

Section 604(b) (1) and (2), at page 56, lines 7 and 16, are new. They require the Secretary to make reports, at 5-year intervals, on consumptive uses throughout the basin, and to condition all contracts for Colorado River water on availability of such water under the compact.

Section 604(c), at page 57, line 8, is new. It preserves the function of the Upper Colorado River Commission.

Title VII. The Colorado-Pacific Regional Water Commission: This title, which provides for a Federal-State planning commission, has been amended at page 58, line 19, to provide that it, pursuant to section 201, the Secretary undertakes an investigation involving export of water from the Columbia River Basin, one member shall be appointed by the Governor of each State in that basin. This change was made in response to the testimony of witnesses from the Pacific Northwest in the August hearings.

Conclusion

California believes that H.R. 4671, as now presented, represents a fair balancing of local, regional, and national interests in the development of the resources of the Colorado River Basin.

As between the Central Arizona unit and the existing projects in the three Lower Division states, the bill affords fair protection to existing investments while authorizing the new project needed by Arizona, and brings to a peaceful end 44 years of controversy.

As between the Lower Division and the Upper Division states of the Colorado River Basin, it offers an equitable coordination of the operation of Glen Canyon and Hoover reservoirs, a fair balancing of the urgent present needs of the Lower Basin with reassurance of a reasonable reserve for the future performance of the Upper Basin's Compact obligations so as to avoid the sacrificing of consumptive uses in the Upper States.

As between the water-short Colorado River Basin and the areas of surplus in other river basins, our bill offers sweeping priority protection to the potential areas and states of origin, of which California may well be one.

As to the national interests, the bill offers the stabilization of the economy of seven desert states which are dependent on the inadequate supplies in the Colorado River, on terms which are fair to the Treasury.

In reaching this compromise, each of the seven states, including California, has made concessions, and each of them, including California, as well as the Nation itself, stands to benefit from the common good which this bill is designed to advance.

California recommends favorable consideration of the bill.

Mr. Rogers of Texas. Thank you, Mr. Ely, for a very comprehensive and well-documented statement on a very difficult piece of legislation.

The Chair has before him a statement by Governor Edmund G. Brown to this subcommittee, under date of May 9, 1966, and without objection the statement will be inserted into the record.

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Mr. HALEY. Reserving the right to object.

Mr. ROGERS of Texas. The gentleman reserves the right to object.

Mr. HALEY. I hope that the distinguished Governor of California in this particular instance does not set himself up as an expert. I recall some of his testimony a few years ago in which he did that and was unable to answer what I thought were just basic questions of law in the State where he had been for many years the attorney general.

With that statement I withdraw any objection I may have.

Mr. ROGERS of Texas. Is there objection to the unanimous-consent request?

If not, the testimony will be received for the record at this point.

(The prepared statement submitted on behalf of Governor Edmund G. Brown, of California, reads in full as follows:)

STATEMENT OF GOVERNOR EDMUND G. BROWN

Attorney General Thomas Lynch, speaking for me at your hearing last summer, advised you of my full support for the 37 identical House bills to authorize the Lower Colorado River Basin Project. Since that time, I have encouraged Californians to attempt, in cooperation with representatives of the other Colorado River Basin states, to broaden the basic bill into a comprehensive bill that would meet water supply problems throughout the entire Basin. This they have done. The resulting amended version of the basic bill is now before the Committee for consideration. I personally believe that the negotiators have done a magnificent job, and it is with great pleasure that I advise you of California's support for the amended version of HR 4671 (now available as Committee Print No. 19) and urge early and favorable Committee action.

Shortly after the opinion of the U.S. Supreme Court in *Arizona* v. *California* was announced, I stated that California would not attempt to win by obstruction what she could not win by litigation. The subsequent actions of Californians have fully justified this statement and my underlying conviction. Californians, north and south, have rallied to the cause, and have worked unselfishly to disperse the only cloud detracting from the development potential of the Colorado River Basin and the Pacific Southwest—a short water supply.

The Court had recognized that the problem of shortage was beyond its jurisdiction, and had laid the problem in the lap of the Congress and the Secretary of the Interior. Early efforts of the states to assist in delineating a solution to the water shortage problem seemed doomed to failure. But within three short but furiously active years, the interests throughout the Colorado River Basin have agreed upon mutual objectives in a program designed to set in motion a regional program of water resource development. I can't help but view with enthusiasm and deep satisfaction the compromise legislation now before you. It represents the culmination of long and arduous negotiation, and the first hope of victory in a Colorado River history marked with many pages of controversy and failure to agree on a common course.

I would be less than candid if I represented the compromise bill before you as a perfect piece of legislation or as the final solution to Colorado River problems. It is, however, a comprehensive and worthwhile first step. Rejection of this legislation will strain the foundations of agreement on the Pacific Southwest's future, if not fracture it beyond repair.

Although the revised bill is not perfect, it is workable, desirable, and in my view, it amounts to perhaps the last chance for unity and harmony on water matters among the states of the Colorado River Basin for many years to come.

The role of Chairman Wayne N. Aspinall in furthering western reclamation cannot be overstated. The same may be said with equal justification of his role in bringing about the historic accord we witness on the Colorado today. With his customary foresight Chairman Aspinall several years ago, in anticipation of the Supreme Court's opinion in *Arizona* v. *California*, requested that the Secretary of the Interior formulate a comprehensive basinwide program of water resource development for the Colorado. More recently, he has done everything in his power to encourage expansion of the scope of the proposed Colorado River legislation and achievement of the widest possible area of agreement. His efforts, in my view, have paid off handsomely.

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Resolution of the water problems of the Colorado River and the greater Pacific Southwest has not been a partisan matter in California. Senator Kuchel and the California Congressmen on this Subcommittee—Congressmen Johnson, Hosmer, Tunney, Burton, and Reinecke—can all be justly proud of accomplishments to date and of their personal contributions thereto. You will recall that all but 4 of California's 38 Congressmen joined in sponsoring the bills before this Subcommittee. In addition, I commend Attorney General Thomas A. Lynch and the Colorado River Board of California and its Chairman, Raymond R. Rummonds. Joseph Jensen, Chairman of the Board of the Metropolitan Water District of Southern California, deserves special praise for statesmanship and unrelenting efforts to effectuate the compromise now before you.

The amended bill, as I have indicated, is the result of, and is supported by, compromise. It shows that Arizona, California, and all of the Colorado River Basin States have learned the lesson that no one can litigate himself into a water supply. The decision in *Arizona* v. *California* is an example of an exercise in futility—the meticulous division of 7.5 million acre-feet among Arizona, California, and Nevada, although there really will not be 7.5 million acre-feet to divide—unless further action is taken to augment the river. Nevertheless, the opinion has already proven beneficial because it has shown us that it is within the power of Congress to provide for the movement of water supplies from region to region without artificial inhibitions imposed by state lines. Congress can no longer excuse delays in making water available throughout the West by doubts as to its own authority.

To show that compromise, rather than controversy, is the key to water development, we point to the success of the California Water Project. By reconciling our intersectional differences between Northern and Southern California sufficiently we have been able to proceed with the Great California Water Project. It would be naive to claim that our project is now completely noncontroversial, but the grounds of complaint are becoming less critical as the benefits of development are transformed from prediction to fact. Above all, whatever controversies remain, we still have the same legal and political means of solving them that we always had; but we have our water project, as well.

You are well along the line toward applying this same discovery to the Colorado. The compromise that has been reached represents a consensus of extraordinary scope. The very existence of the crompromise bills and the amended version thereof, shows that it not only is possible for two traditional antagonists, Arizona and California, to compromise differences and reach accord, but it is possible, also, for seven states to agree on joint objectives and a joint program of water resource development beneficial to all. The compromise in these bills is thus interstate, intersectional, and interparty. We hope that this Committee will make it interregional.

The compromise on the Colorado cannot succeed unless it is interregional. There is no reasonable chance that the Colorado River will supply enough water to meet the reasonable and foreseeable demands which will be made on it. There is no solution for any of the States on the Colorado except more water. There can be no argument over *whether* the supply should be increased; there can be argument only as to *how* it will be increased. We support the compromise legislation as amended, because it would be the most solemn assurance that our nation has capacity to give, that the problem will be solved, and because it provides a reasonable means of determining how the problem will be solved.

Water experts throughout the Basin agree that by the turn of the century the supply of the Colorado River will not meet anticipated demands and will fall far short of meeting the apportionments of use of water made by the Colorado River Compact to the Upper and Lower Basins and to Mexico by the Mexican Water Treaty. The immediate outlook, however, is not as gloomy as it might seem.

The realistic picture which faces us immediately is this—there is a reasonable chance that water will be available until about the turn of the century for the Central Arizona Project without impairing use from existing or authorized projects, the Southern Nevada Water Suply Project, the Animas-La Plata Project, the Dolores Project, the West Divide Project, the Dallas Creek Project, the San Miguel Project, and still other projects under investigation in Utah and Wyoming. Arizona has need for water. She has a right to water. Can we, with any fairness, deny Arizona the interim use of water allocated to the Upper Basin but currently surplus to Upper Basin needs, while we debate methods of solution of the problem which will ultimately face all of us? Central Arizona will not

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create the threatened shortages, and a healthy economy in Arizona will help us meet the shortage. To me, the conclusion is clear and inescapable. Let's authorize needed and worthwhile Colorado River Basin projects now, but at the same time take steps to meet the shortage which threatens all the states. This is what the amended bill before you is intended to do, and it is for this reason that I support it.

Let me again point to our experience in California. We are building our State Water Project, on the assumption that needs of the areas from which water is exported will be met as they mature. In terms of western water law, our present contractors for State Project water are not prior appropriators who have an exclusive right to the water supply because they used it first. They, like the Central Arizona Project, can use the water until an equal or superior right is asserted. But we recognize in our State Project that the answer to the assertion of a superior right is not to dry up the first user simply because he does not have priority of right. The answer is to regulate the planning, construction, and financing of projects so that all needs may be met in an orderly fashion, and thereby to put into proper perspective consideration of water rights, which because of some legal superiority, would contemplate extinction of uses of equal or greater utility and importance.

Experience in California shows that some 25 years or more elapse between the time a project is conceived and the time water delivery begins. We have about that period left on the Colorado. By proceeding now, we make it unnecessary to answer unanswerable questions such as what the exact flow of the Colorado will be, and how will the right to the short supply be rationed. We know, as well as it can be known, that for a while the supply will probably be sufficient and that thereafter it probably will not. We also know that no matter how firm his right, no user can drink his shortage. We know that we have enough time to avoid the evil day when shortages will be upon us.

I have not attempted to go into the details of the compromise legislation. I will only say that it provides an excellent approach to regional water development. I do not say there is no better approach, but that none has yet been advanced which seems to offer as much hope of success. I ask the Committee to examine this legislation in the spirit of national interest, because Congress is now sitting on this matter as the court of last resort. Our earlier problems on the Colorado have been litigated, and the litigation has provided no solution. This Committee will decide whether the proposed legislation before it today is the seed of future greatness, or but an empty husk of what might have been.

Mr. ROGERS of Texas. There is one question that I want to ask. It is on page 14 of your statement with regard to section 304(b). Is my understanding correct, from your statement, that at that point that the term "importation" of water as used in this context would mean the importation of surplus water of some sort, and that "importation" should not be fulfilled by desalting water?

Mr. ELY. Not unless the aqueduct of approximately 2.5 million acre-feet into the Colorado River obtains that water at its intake point from desalted water. It makes no difference to us whether the 2.5 million acre-feet that finally arrives in the Colorado is furnished from a desalting plant or from the Columbia River or the rivers in California.

Mr. ROGERS of Texas. The thing that I am thinking about is this, that it is your point that it has to get into the Colorado River from some source?

Mr. ELY. Exactly.

Mr. ROGERS of Texas. If this desalted water were used downstream to help meet the Mexican needs, that still would or could not be used as a release of upstream water?

Mr. ELY. The Mexican Treaty requires that water to satisfy the treaty burden, be delivered to Mexico in the limits of the section of the river, that is, where Arizona confronts Baja California, Mexico.

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Mr. ROGERS of Texas. This is a matter though of a technicality involved in it which should be corrected?

Mr. ELY. I know of no provision in the treaty whereby desalted water, if delivered elsewhere than in the mainstream of the Colorado River, would be credited against the U.S. obligation under the treaty.

Mr. ROGERS of Texas. Well, what I mean is this, that this is a situation in which, as it develops, new negotiations may be in order to work this out at the proper time?

Mr. ELY. Of course, you are correct—new negotiations would be necessary, but I am unable to visualize the factual or geographic situation which would permit the delivery of water to Mexico from a desalting plant located in the United States at any point other than the mainstream of the Colorado River.

Mr. ROGERS of Texas. Now, to have the picture completely clear, let me say to those gentlemen who were not here when we started this morning, we are going to operate under the 5-minute rule.

The Chair now will recognize each member for 5 minutes for questioning, and if further questions are desired, we will go into a second round of questioning, but we must speed up these hearings. Otherwise, we will not be able to hear these witnesses this morning.

Mr. SAYLOR. I want to comment here as to the 5-minute rule. I think Monday's hearings indicated we were making some very good progress. I admit we have a lot of witnesses to hear. However, we have before us right now a witness whom we recognize as an authority, even by those who disagree with him. He has spent, very evidently, months working up a statement, and it has taken him exactly 53 minutes to read it to the committee. It is 30 pages long. It is on an entirely new bill, and now our opportunity to question this witness is restricted to 5 minutes. This indicates that those who wanted this legislation or those who oppose it are to work out a good bill in this short amount of time are just being handcuffed by the Chair. I realize that it is the prerogative of the subcommittee chairman, but it is not in the interest of good legislation. I would prefer that the Chair did not use the 5-minute rule.

Mr. ROGERS of Texas. Let the Chair say that the statement of Mr. Ely is so very comprehensive that I am sure that with his great knowledge it will enable him to answer the questions very quickly, so that others will have an opportunity to ask questions.

Mr. SAYLOR. I want to say to the Chair that during the hearings that took place in 1965, realizing that the Upper and Lower Colorado Basins were at one another's throats, and since they had not come to any conclusion whatsoever, and though I attended the hearings, only on one occasion did I ask any questions, as I realized that it was absolutely necessary for everybody to get together, and because we had 8 days of hearings back in August and September of 1965 on a completely different bill, the indication that those hearings should suffice and that we should now move forward under the 5-minute rule is somewhat incomprehensible.

I have used my 5 minutes.

Mr. ROGERS of Texas. The Chair will recognize the gentleman from Colorado, Mr. Aspinall, for 5 minutes.

Mr. ASPINALL. Mr. Ely, I not only have read your statement but I have studied it before the meeting. I want to commend you and those

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accompanying you for bringing before us a very detailed explanation of the bill. It is almost self-explanatory.

I have one question:

Do you consider that the revised legislation set forth in Committee Print No. 19, to which you testified, makes mandatory the preparation of a final report showing favorable economic feasibility of the importation project in partial phases or in total phases?

Mr. ELY. I do.

Mr. ASPINALL. That is all you have to say?

Mr. ELY. I do, indeed, Mr. Chairman.

Mr. ASPINALL. Mr. Chairman, I yield the balance of my time to Mr. Haley.

Mr. ROGERS of Texas. The Chair will recognize the gentleman from Pennsylvania next in the regular order for his 5 minutes.

Mr. ASPINALL. I yielded my time to Mr. Haley.

Mr. HALEY. Just a minute, now, Mr. Chairman.

Each one has got 5 minutes here. As a matter of fact, I probably only intended to use 1 minute.

Mr. ROGERS of Texas. The Chair has no objection to stating to the gentleman from Florida, that what I thought the chairman wanted to do was to add it onto the gentleman's—from Florida—time. If you will yield at this time, the Chair will recognize the gentleman from Florida.

Mr. HALEY. Thank you very much for those kind words.

May I say to the witness that I want to thank you for analyzing this bill for this committee. It is a complicated bill, and you have done an excellent job, I might say, in telling us exactly what, in your opinion, this bill attempts to do.

Mr. ELY. Thank you.

Mr. HALEY. And on page 3, Mr. Ely, in the decision of the Supreme Court in apportioning this water, you are speaking about the U.S. Supreme Court and not the Supreme Court of the State of California?

Mr. ELY. You are correct, Mr. Haley. The decree in *Arizona* v. *California*—in the U.S. Supreme Court.

Mr. HALEY. Which was the result of the litigation?

Mr. ELY. Yes.

Mr. HALEY. I must say for the record that apparently here is one time that the liberal Supreme Court has found that they may write the laws but they cannot make the Lord send down the water to make the apportionment that is necessary here to these various States. I regret that they do not have that authority but apparently they have in other matters which have gone quite far afield, but thank the Lord that we are still governed by what is available, and the Supreme Court, apparently, cannot make a lot of water.

I thank the gentleman.

Mr. ROGERS of Texas. Mr. Saylor, the gentleman from Pennsylanvia.

Mr. SAYLOR. Mr. Ely, first let me commend you on what I consider to be an excellent statement.

Mr. ELY. Thank you, Mr. Saylor.

Mr. SAYLOR. You have analyzed this new bill in detail and have presented some very enlightening comments in regard to it, and I want to commend you for that.

Mr. ELY. Thank you again.

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Mr. SAYLOR. You refer, first to section 301(c) which goes to the authority of the Secretary of the Interior to divert into the Colorado River up to 2 million acre-feet annually.

Is there anything in this legislation or anything in any plans of which you know wherein it tells us where the first 2.5 million acre-feet are to be directed to enter the river?

Mr. ELY. Yes, Mr. Saylor. First, title II does not authorize any importations. Let us make that plain. Title II is a planning title, instructing the Secretary how to present the plans which he must submit to the Executive and to the Congress.

The bill does direct that the first 2.5 million acre-feet, if Congress hereafter authorized any such importations, be delivered into the Colorado River below Lee Ferry.

Mr. SAYLOR. In other words, the Secretary, if his planning group tells him that the water should enter the river north of Lee Ferry, is limited in this bill by saying that the water must enter below Lee Ferry?

Mr. ELY. No. Perhaps, I misspoke in response to your earlier question. He is to provide in section 201(c), page 30, line 5, for import facilities to provide 2.5 million acre-feet annually for use from the mainstream of the Colorado River below Lee Ferry. He could deliver it above Lee Ferry, but its use would be earmarked for the benefit of the users below Lee Ferry.

Mr. SAYLOR. Mr. Ely, let me ask you this: I do not know from your statement if there is any basic change in the bill or where you acknowledge any basic change, but you do say that the revision which we now have in this Committee Print No. 19 was the result of the interstate conferences that have taken place following the conclusion of the hearing on the bill last year. The discussion which you have started on page 6 is restricted generally and substantially to substantive changes; in other words, you take 30 pages to describe a changed bill before the committee from that of last year. Is this correct?

Mr. ELY. Yes; a fair answer is that these provisions do change very substantially the bill that was before you last August. They are not for the most part inconsistent with it, but are amplifications of the points left open; not a reversal of what we then presented to you, but more in the nature of amplification.

Mr. SAYLOR. Last year, when you testified—on page 569 of the committee hearings—you commented on the Bureau of the Budget recommendations with regard to the Mexican Treaty burden.

Now, have you changed your position with regard to that; or does this bill change your position with regard to that?

Mr. ELY. No. I have not had the time here to read the earlier testimony, but, as I recall it, we asked to have made nonreimbursable the cost fairly allocable to the treaty, including the associated losses. That is my position now. My statement amplifies that in this respect: that the cost allocable be placed at the base of the cost pyramid and the additional costs be treated as incremental.

Mr. SAYLOR. You make a great deal of the protection of the States and the areas of origin and state that you are pretty sure that any water that is imported from any of the States will not violate any State rights at all, and that the States are adequately protected.

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Is there anything in this bill which repeals the basic provision of constitutional law that no Congress can bind a future Congress and that any future Congress can completely disregard any provision that we have in this present bill and make any rules and regulations it wants with regard to importation of water?

Mr. ELY. I do not dispute your basic premise, subject to the constitutional restrictions on compensation under the fifth amendment. But a suggestion was made by an Idaho witness yesterday which I thought was a good one: that the protection for the areas of origin, as written here, should be included in any contract made with the Secretary for the delivery of water imported into the Colorado. These contracts would be entitled to constitutional protection if the water were taken in violation of them by a subsequent act of Congress, and if so, the contracts would be entitled to compensation.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The Chair will yield 3 minutes of his time.

Mr. SAYLOR. I appreciate that, Mr. Chairman.

The next thing is in title III. You comment on that—on page 9—in regard to the size of the aqueduct that is going to Arizona. Very frankly, the magnanimity of California is something that in my opinion leaves a great deal to be desired. The State of Arizona took you into court. Arizona got a decree which says that they were entitled to water. And, now, California comes along, according to your interpretation and the like, and your condescending on behalf of the great State of California, that you are willing to impose a limitation on the size of the aqueduct to take water in that river that actually belongs to Arizona. Now, why?

Mr. ELY. Shall I preface my reply by saying I am glad that you asked that question. The decree awarded California, also, 4,400,000 acre-feet, and did not just simply give Arizona 2,800,000 acre-feet at our expense. It apportioned 300,000 acre-feet to Nevada also.

As Mr. Haley pointed out earlier, unfortunately the court's apportionment of water does not fit the supply made available by even higher authority. The result is that there is a shortage. The court did not deal with the issue of the shortage in its decree. It left that to Congress.

The court left the shortage formula to Congress and it might adopt, we say, should protect existing uses in accord with the water law that prevails throughout the West, that existing users are not to be destroyed to make way for new ones. The bill recognizes this principle and does protect the existing uses.

PROTECTION OF EXISTING USES

Notwithstanding this, the margin of water available under the projection of the water supply presented to you by the three lower States does indicate that for a period of years there is available water for Arizona, not only in excess of 1,200,000 acre-feet, but indeed, water enough for an aqueduct to carry 1,600,000 acre-feet. It is quite true that if Arizona got this much water added to her existing uses, she would be getting more than the 2,800,000 acre-feet decreed to her out of the first 7.5 million acre-feet. I have tried to make it very explicit

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that we are not in our proposal attempting to limit Arizona, to borrow your words, to any quantity other than the decreed quantity which is 2,800,000 acre-feet plus one-half of any excess available above 7.5 million acre-feet in the mainstream, just as we are entitled to 4,400,000 plus one-half of that excess.

The capacity that we have indicated here has no roots in any legal argument whatever. It is rooted in the testimony presented by the three States as to the probabilities of water supply.

Mr. SAYLOR. Is not the basic effect of the limitation that you have placed in this bill that if the Mexican Water Treaty becomes a national obligation, not charged to either the upper or lower basin, and we import water, starting first with 2.5 million acre-feet, that you have actually placed a noose around Arizona's throat, and it is to be controlled in effect, by California?

This, I take it, is basically wrong. And if this bill is to be so written, and Arizona is to be given its full protection, then there should be no limitation on the size of the aqueduct taking water into Arizona. I do not think that your State or any other State out there has a right to impose that limitation.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The Chair recognizes the gentleman from Florida.

Mr. HALEY. In order to move along, I reserve my time.

Mr. ROGERS of Texas. The Chair recognizes Mr. Hosmer, for 5 minutes.

Mr. HOSMER. I reserve my time.

Mr. ROGERS of Texas. The Chair recognizes Mr. Edmondson.

Mr. EDMONDSON. I would like to hear the comments of Mr. Ely upon the point just raised by the gentleman from Pennsylvania.

Mr. ELY. Thank you, Mr. Edmondson.

We have had 44 years of controversy on the Colorado River between these two States. This controversy was resolved and ended by the compromise that both States bring to you in this agreed bill. Each of us, for its own advantage, might ask you to break the bargain and give us more than we have agreed to. California is not asking that. Arizona is not asking that. I do not think that the cause of progress and peace on the river is advanced by the suggestion that either of us reconsider and demand more.

Mr. EDMONDSON. Do I understand correctly that the reservoir size or the aqueduct or the conduit size is a size agreed upon by the States?

Mr. UDALL. Will you yield there?

Mr. EDMONDSON. Yes.

Mr. UDALL. As I heard the other day, my friend from Pennsylvania seems to be anxious to promote unity among the States. On behalf of Arizona, we are satisfied with the specific language that California and Arizona have drawn relating to the size of the aqueduct. We have an agreement in precise language. The point that is overlooked is that it says that if Arizona wants a larger aqueduct than 2,500 cubic feet per second we shall pay for that from our funds. California has agreed to that. So, we do not have a noose around our necks. We would prefer an aqueduct three times this size, if we are going to have imports, but there are many problems and we resolved them in a constructive way, and we are satisfied with the answer.

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Mr. ELY. Mr. Udall is correct. We do not object to an increase of the capacity beyond the 2,500 cubic feet per second if Arizona finds a way to pay for that, other than looking to the development fund upon which we all rely for importation.

Mr. UDALL. Will you yield 1 minute more?

Mr. EDMONDSON. I will be glad to.

Mr. UDALL. One thought, Mr. Ely, that I had in reading the statement which probably represents just a disagreement in semantics. On page 11 of your statement, in discussing the very provision referred to under your item No. 3, you say, "must be financially supported from sources other than the development fund," whereas, it was our understanding of the language in the amendment we agreed to that what we are talking about are the sources of revenue to the development fund, other than those now provided for in the bill, and if we decided to increase our charges to the municipal and industrial water users in Arizona, to have those increased revenues go into the development fund, we could be credited with that money toward the construction of the larger aqueduct, or if we found some other source which is not a charge on this, we could use that.

Mr. ELY. I agree with you.

Mr. UDALL. I thank the gentleman for permitting me to make that comment.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The Chair recognizes Mr. Burton.

Mr. BURTON of Utah. Thank you, Mr. Chairman. I regard you as one of the outstanding, foremost legal experts on matters pertaining to the Colorado River Basin. I think your past experience and history has proven this to be so, and now, today, speaking as the representative of the State of California, I wonder if you stand unqualifiedly behind your concluding remarks contained on page 29, paragraph 3, if you will stand behind them and are willing to stand behind them in any future legal argument that might take place, or in any litigation that may result vis-a-vis the upper and lower basins, or among the several compact States, which remarks are that the present bill contains "reassurance of a reasonable reserve for the future performance of the upper basin's compact obligations so as to avoid the sacrificing of consumptive uses in the upper States."

Mr. ELY. Thank you very much for your personal comments. I am very grateful for them.

The answer to your question is "Yes," but please read the sentence in its entirety because the earlier portion refers to our half of the bargain and the urgent needs of the lower basin, along with the reassurance to which you have referred. The language of section 601 is carefully drawn. I have attempted to characterize it in the way that I have started it here, and it does, indeed, to me mean precisely as I have described it, but my description of it or anyone else's description is not to be taken as a substitute for the agreed language in the bill.

Mr. BURTON of Utah. I will reserve the balance of my time, Mr. Chairman. I intend to yield it to the ranking member of the committee.

Mr. ROGERS of Texas. Mr. Johnson.

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Mr. JOHNSON. Thank you, Mr. Chairman. I want to commend you, Mr. Ely, for presenting a very detailed analysis of the bill. I am for it. I am speaking for one side of northern California, where we have two-thirds of the water and two-thirds of the area that is served. With the protection that is written in here for northern California, I believe that all of our people are in agreement now, because the specific language in there is that the waters needed are to be developed, and if they are higher than we have, then they would be through the export of water, and the bill recognizes that the increased cost would be considered, and will allow us to have consideration in the further development of other water supplies in my State. And with a water production of 7 million acre-feet and being free to develop it, naturally, our State will use that much probably, and with this protection we are pretty much satisfied.

Much has been said here about the Mexican treaty agreement. I am wondering why there is not some mention in here about the treaty agreement with Canada for the development of the area up there, the power production development in Canada, and then to control the release of many acre-feet of water into the Columbia River Basin? As I understand it, this is a treaty agreed to that when the waters come down the Columbia River they are used for power production principally. That is about the only use that is mentioned in the treaty.

That being the case, I presume that they would run the water through all of the power facilities down the river in the various States.

I think that certainly somewhere along the line we will probably be looking to Canada for some more water.

I had the opportunity to meet with the Canadian people in these groups that meet with them from our Congress here, consisting of those and members of their Parliament. We discussed it at each of these three meetings that we had. They are very sensitive at the present time about this subject. They are making very thorough studies up there in Canada as to how much might be needed in Canada, and they are willing to go into an agreement, a further agreement, with the United States, I presume, on the sale of the water to the United States.

I am just wondering if somewhere in the record there is our treaty agreement with Canada, as it pertains to the development in the Columbia River Basin, and if not if it could be made a part of this record.

Mr. ELY. I think, Mr. Johnson, that you have put your finger on a point that the record of the committee hearings might very well include. I am not sure that anything needs to be said in the bill about it, but the Columbia River does receive from Canada an average of about 20 million acre-feet a year. This is not water originating within the Columbia River Basin or the United States; this is a national matter which it receives from Canada, just as we are required to deliver 1,500,000 acre-feet-plus to Mexico. And it would seem to be quite appropriate, at least to the extent that the water is coming from Canada to the United States to relieve the Colorado River for the relief of the international obligation that is assumed by us to Mexico, that we should mention that. I do not mean to limit the assistance that we want

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from Canada, but if 20 million acre-feet is flowing into the river from Canada it is quite a bit of water originating within their boundaries.

Mr. JOHNSON. And this is principally used for power production.

Mr. ELY. This aggregate that comes down, that flows down here, is largely regulated, or will be, by the dams that we have built or that are to be built in Canada under the treaty.

Mr. RONCALIO. Will you yield?

Mr. JOHNSON. I yield to the gentleman from Wyoming.

Mr. ROGERS of Texas. The gentleman is recognized for 5 minutes.

Mr. RONCALIO. I think that we should have a copy of the Columbia River Treaty to be made a part of this proceeding. The gentleman is right, in that it comes into the United States mainly for power use and not for consumptive use.

Thank you.

Mr. ROGERS of Texas. The Chair recognizes Mr. Wyatt.

Mr. WYATT. I, too, have enjoyed your statement thoroughly, and thank you for its thorough preparation.

On page 6 of your statement you discuss the area of origin, and you refer particularly in the second paragraph, "gives the Secretary a general mandate to make provisions for adequate and equitable protection of the interests of the States and areas of origin, including assistance from the development fund established by title IV of the bill, so that water supplies will be available for use in those States and areas at prices to the users of water which are not adversely affected by the exportation of water to the Colorado River system."

What would you contemplate that this language would mean as to the replacement of this water? Where will it come from? What is accomplished by this language?

Mr. ELY. I am going to, if I may, refer this question to the man who is expert on this subject, Mr. Steiner.

Mr. STEINER. Mr. Wyatt, I believe that this would mean that an additional increment would have to be added to the project, this export project, to provide either for the introduction of additional water to the Columbia River Basin, a substitute water supply, or to relieve the Columbia River Basin of the demand in equal quantity.

Mr. WYATT. That is to be taken care of under the second portion of the so-called guarantee?

What I am interested in is knowing where this water is going to be brought into the Columbia River Basin. If it is, where will they turn to for the water?

Mr. STEINER. We would turn to any number of alternative sources, either to Canada, perhaps to the Mississippi Basin. What we have talked about here is the proposal, a study proposal to investigate all alternatives. The Columbia River is one alternative. Sea water conversion is another alternative. Canada is another alternative. The Mississippi may be an alternative. And somewhere in this base plan that the Secretary is to develop if he should turn to the Columbia River Basin, should the day ever arise that the Columbia River Basin requires a portion of this water supply that has been diverted out, then there has to be an additional stage in the plan that does either relieve the Columbia River of this draft or supplies at equal cost an increment of supply, of equal supply to the Columbia at equal cost.

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Mr. WYATT. I understand this. But if this is meant to be protection for the area of origin, and if exports are found to be feasible, what I want to know, if this protection is to be meaningful, I would like to know how feasible, even in generalities of supplementing the Columbia River Basin from some other source it is, and what it is.

Mr. ELY. May I comment?

My own impression of the usefulness of the language you refer to in section 202(a) to the Columbia River Basin States is that, probably, the water supply in the Columbia River Basin is going to be found large enough, so that the quantities of water that we are talking of exporting to the Colorado River would not, in fact, deplete the quantity available for use in the Columbia River to a point where you would have to import from some other source into the Columbia to replace the water. To me, as a layman, it is inconceivable that you would find it necessary to do that. But I do think that the language that we have here on pricing conceivably might be of importance to some project in the Columbia River Basin. Some Project X might find, in some way or other that we cannot foresee, that the diversion from a particular point in the Columbia might require some adjustment in its own plan for diversion which might entail some increase in cost. It might, let us suppose, in some way interfere with its projected power project. Whatever the impact may be upon such a Columbia Basin project, we are assured in section 202(a), or we intend that to be, that the Secretary in planning the importation work shall make adequate provision for the protection of all such projects, without attempting to limit you or require you to spell it out more specifically.

Mr. STEINER. May I add one more comment?

The Secretary would always have the alternative of falling back on desalting. He always has that alternative.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The Chair recognizes the gentleman from Arizona.

Mr. UDALL. One alternative that might be considered is the fact that the heaviest rainfall area of the United States is in the State of Washington, on the west side of the mountains from which water goes into Puget Sound. You might well investigate that and supplement the Columbia by taking some of that and moving it back around into the Columbia.

We pay tribute to you and your associates, not only for the excellent statement you have made this morning but that which you have done over the years.

We look back to Mr. Carpenter and to Mr. Aspinall and to Mr. Norviel, the great architect, and the more solid people with regional vision, in 1922. And I think that when the history of this period is written that your name and the names of Mr. Steiner and Mr. Cole and Mr. Maughan and Mr. Parks, and a lot of others I have omitted mentioning because of the time, will go down in history with these people, and that it will probably be on even a higher plane due to the statesmanship of all of these people who have participated in this so that we have reached the point that we are at today. I wanted to state that publicly.

Mr. ELY. Thank you. You have identified the targets for the tomatoes if there are any mistakes.

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Mr. UDALL. A very quick point here, if I may.

On page 14 of your statement, you make a very clear legislative history as only a technician of your skill can make, and that is on a subject that has been of considerable sensitivity in the State of Arizona. You point out that the priority of 4.4 million which is in the bill for California, a rather heavy burden on us, terminates only upon water being put into the Colorado River. Of course, as you know, if we pass this bill, that California and perhaps even Mexico might get some help from the desalting plants on the coast, or from a tube running down from northern California, none of which would be applied to terminate this priority, and that Arizona might be left forever in a junior situation. I have great confidence in your good faith. You said, let us lay it out on the table. We accepted the qualifications placed upon it here today, but I would hope that you might comment on California's position on this.

Was it our intention, all of us, in reaching the agreement that what we are trying to do is to make the Colorado River whole, and that we do intend to make it whole, and that we do foresee the day when this priority will come to an end in the Colorado River?

Mr. ELY. Emphatically so, Mr. Udall. We are as dedicated to the determination to bring about substantial importations, not less than 2.5 million acre-feet annually into the Colorado River, as you are.

Mr. UDALL. I am very grateful for those comments, because we understand the reason for this interpretation that you have just given. We gave in on this with considerable reluctance, as you know. Your statement here today is a great comfort and is of great importance.

Mr. BURTON of Utah. Will you yield?

Mr. UDALL. Yes.

Mr. BURTON of Utah. With reference to areas of origin, is not the present bill referring to the rights of the respective States who have contributed to this and not to the basin as a whole?

Mr. ELY. Yes.

Mr. BURTON of Utah. Would it not be a fair statement, to say to our colleagues from Washington and Oregon, "Do not worry about this; you do not have anything to worry about; all we need is the water from Canada?"

Mr. UDALL. That is correct. I know that one of the results of the hearings is to reassure these people as best we can. I want to associate myself completely with your remarks on page 7 in which you have spelled out as frankly and as clearly and openly and as completely can be done, the protection that we intend to give to the Northwest in any importation program that comes from that area. In other words, they have perpetual priority for any consumptive use—for any use, not only consumptive use, for drinking water, but other uses. And I would, also, suggest that area of the country would print your statement and my association with it, and that we hear a little bit of that in the Northwest, and that my colleagues would read it carefully, because we mean what we say, do we not?

Mr. ELY. We do, indeed. I hope some attention will be paid in the Northwest to the sweeping scope of the priority that we have attempted to spell out here. It is unprecedented.

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Mr. UDALL. Finally, before my time runs out, I want to say for the benefit of some of my own constituents in the Yuma area that I fully associate myself with your comments on page 13 in which you relate that the holders of present perfected rights and other users under existing contracts with the United States, both in California and Arizona, are protected in their uses as against new uses.

Mr. ELY. That is the intention.

Mr. SAYLOR. Does that include California?

Mr. UDALL. It applies equally to California and Arizona.

Mr. ELY. It does.

Mr. ROGERS of Texas. The gentleman's time has expired.

The Chair recognizes Mr. Reinecke.

Mr. REINECKE. I am glad to have your statement before us, it is always significant.

On page 9, you mention that you feel that the capacity of the aqueduct should be in the bill. Have you prepared an amendment on that?

Mr. ELY. Arizona has done so, and we have agreed to it.

Mr. REINECKE. What would be the effect on cost of the increased capacity of this aqueduct, the effect on the construction specifications of this project, and the like? Larger pumps, bays, et cetera.

Mr. ELY. Well, I can give you only a layman's answer.

Of course, an increase in the capacity from 1,800 cubic feet per second to 2,500 cubic feet per second will have some effect. I would like for Mr. Cole to touch on that, if he may.

Mr. COLE. I think that you are right, Mr. Reinecke, that it will affect it. The Bureau in its preparation of this definite plan report which is in the general procedure will have to cover those changes, the necessary differences in costs, et cetera.

Mr. REINECKE. On page 12, you mention the limitation—or you speaking about shortages, for California to bear the first impact of any shortage. Do you have any suggested language that would take care of that?

Mr. ELY. No, unfortunately. This is a bargain struck in 1928 by the Congress demanding of California's legislature the enactment of a limitation as a condition to the President's proclamation of the effectiveness of the Project Act and of the compact as a six-State agreement. We did enact that Limitation Act in March of 1929. It is an agreement between the Congress and the Legislature of California. It has been construed in the Supreme Court decree. The limitation agreement and the decree are the law of the land, and we do not suggest in any way modifying that. The effect of the bargain so made is to require California to bear the first impact of the shortage which reduces the total water supply of the main stream as construed by the Supreme Court, down to 7.5 million acre-feet.

Mr. REINECKE. You mean from 5.1 down to 4.4?

Mr. ELY. From 5.1 down to 4.4.

Mr. REINECKE. On page 16, with reference to funding, four lines from the top, "if additional assistance is available from the development fund it can be earmarked for reduction." Do you have any practical idea that there may be some money left in the fund after the high cost of importation?

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Mr. ELY. That depends a great deal on whether the two cash registers, Bridge and Marble Canyon powerplants are left in the bill. If they are, then there should be a surplus.

The deletion of Bridge Canyon subtracts about $1 billion from the revenues that will accrue in the funds over a sixty-year period. A deletion of Marble Canyon would subtract about another $500 million. So, the answer to your questions depends, in part upon whether revenues do or do not come in from those two projects as proposed in the bill.

Mr. REINECKE. These funds would not be available except for quite some period of time, which is normally 50 years?

Mr. ELY. You are correct in principle, but they pay off very rapidly at the power rate which is projected by the Secretary.

Mr. REINECKE. One final question, just to make your statement more authoritative.

On page 29, you say:

> California believes that H.R. 4671, as now presented, represents a air balancing of local, regional, and national interests in the development of the resources of the Colorado River Basin.

In view of the fact that Governor Brown has submitted a separate statement—I have looked at it, and a quick glance does not show your name mentioned. Will you tell us what authority you have to speak for the State of California?

There may be some people in the room who do not understand that.

Mr. ELY. The position I have stated here in support of H.R. 4671 has been approved formally by the Colorado River Board of California, by resolution, and has been approved in principle by public announcement by the Governor. He does so in the statement which has been placed in the record for him here today. And it has been approved by the attorney general of California. I should say that all this should constitute a rather full endorsement. Mr. Steiner, to my right, who is here by direction of Governor Brown and as Governor Brown's personal representative, may be able to add to that. Am I correct?

Mr. STEINER. That is correct.

Mr. REINECKE. Thank you. I yield.

Mr. ROGERS of Texas. Your time has expired.

The Chair recognizes the gentleman from California, Mr. Tunney.

Mr. TUNNEY. I would like to congratulate you on your statement. I am sure that this statement makes it very clear to the committee. It is the quality of statement that we have become accustomed to expect from you, Mr. Ely.

Mr. ELY. Thank you.

Mr. TUNNEY. I have just one question, and that is: The bill requires the Secretary to report by January 31, 1970, his findings regarding importation. Is this soon enough to protect the lower basin and its users both domestically, industrially, agriculturally, and municipally? I am especially thinking of the fact that California is currently using 5.1 million acre-feet, and that we are only entitled to 4.4 million acre-feet. Is it soon enough to be able to plan and construct the facilities that would be needed to import the water from either northern California or from the Northwest?

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Mr. ELY. It is a matter of serious concern. This is a compromise, but I think Mr. Steiner is better equipped than I am to comment on this.

Mr. STEINER. It would be pretty difficult, Mr. Tunney, to complete the kind of studies that we have called for and that have been written into this bill in a much shorter period of time.

We would all like to see this job done in 2 years if we possibly could. We, in California, are sitting in a rather awkward spot here, for the reasons that have been identified, and also from the standpoint that California must make the decision in the very early 1970 on how it is going to meet the future requirements throughout the State. We feel that the original plan of development is of great value to California and the entire West—the entire Nation, in fact. And we feel that it would be relatively impossible for that regional plan to proceed in the absence of California's active participation in it and providing a portion of the market.

We do have, as we have testified here in the past, water resources within California which we can develop as a single State and in isolation from the rest of the West. We question of the rightness of this kind of a solitary approach, however. Therefore, here we sit. Either this program must move ahead on a regional basis, and we want to be an active partner in it, or, in the event that it does not proceed, then we have to go it alone. We have demonstrated our ability to do in the past, and I am sure that we can do it in the future.

Mr. TUNNEY. Do you think that this time period is sufficient to enable us to protect ourselves until 1990?

Mr. STEINER. I think it provides us with the protection that we can hope to achieve at this time, although I wish it was greater.

Mr. TUNNEY. I would like to yield the balance of my time to the gentleman from Arizona.

Mr. ROGERS of Texas. The gentleman has 1 minute left.

Mr. UDALL. Would you not agree that if, eventually, the Columbia is adopted as the final plan and the Congress approves the program, in the light of some of the comments of our colleague from Oregon the other day, that Oregon probably will be one of the greatest beneficiaries of any such program in having all of this construction work, consisting of several billions of dollars being spent, plus the potential dropoff of the water into that State?

Mr. ELY. It seems to me that you are exactly correct. We wrote into the bill the quantity of 2 million acre-feet to be dropped off en route. If there is a feeling in Oregon or in Idaho that this is the wrong quantity, then it can be readily deleted from the bill; instead, we can write in "such additional quantities as the Secretary may recommend for use in those States." We do not intend to limit them by this language. We are attempting to indicate in principle our willingness that they should indeed, as you say, participate in the benefits of the aqueduct.

Mr. UDALL. It would bolster their economy largely by the maintenance and operating force connected with the aqueduct.

Mr. ELY. Exactly so.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The Chair recognizes the gentleman from Washington.

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Mr. FOLEY. I am glad to see you here.

Mr. ELY. Thank you.

Mr. FOLEY. I was interested in your colloquy with the gentleman from Arizona, because I think it comes the closest that we have come to in these hearings to the statement which we in the Northwest believe to be the real status of this legislation.

You stated your hope and desire in an agreement between the present States should it not also be said that it is both the hope and the expectation that those importations will come from the Columbia River Basin?

Mr. ELY. As a practical matter, I think probably what you say is correct; to me, at least as a layman, the Columbia with its very large present flow to the sea offers a greater degree of potential interest than the idea of building a desalting plant or looking to lesser sources elsewhere.

Mr. FOLEY. And considering the provisions of subsection (a) of section 201, is it not fair to say that this language listing five various types of investigations that the Secretary is supposed to conduct under the bill, is really more in the expectation that some additional alternatives might be developed by this report rather than they should be a source of augmentation to the water of the Colorado?

Mr. ELY. It is difficult to give an answer that is as informed on this subject, Mr. Foley, as I would like to give you. Again, speaking as a layman, I think it is well within the realm of possibility that the first water taken might be taken from the rivers of northern California, but certainly in less quantity than 6.5 million acre-feet, and that concurrently, or perhaps later, we might look to the Columbia River or other sources. It is conceivable—I do not quite see how this is to be done, but the Secretary, Mr. Udall, brought to the committee's attention in August that a great desalting plant might be built in Mexico, and that the water might be pumped up to Imperial Dam or Morelos Dam to take care of the treaty burden.

Greater advances, that we have not thought about, in the act of desalting brackish, but not truly salt, water in various parts of the basin might come about.

So, while I do not write off these alternatives, I can tell you candidly that I think that the importation is going to come either from the streams of northern California or the Columbia River or in part from both.

Mr. FOLEY. That is certainly what the language of the bill itself would indicate, is it not? The report that the Secretary is ordered to prepare on such things as desalination, weather modifications, et cetera, do not culminate in any feasibility studies that the bill requires for importation?

Mr. ELY. That is partly because of the triggering effect of the importation. We want to be sure that the plan brought back to the Congress is adequate to enable a decision to be made on whether the importation works should be built. Of course, we are looking for the cheapest source of water.

Mr. FOLEY. Would it not also be possible to direct the Secretary to submit a feasibility report on weather modifications and desalination as alternative means of obtaining the water?

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Mr. ELY. This is certainly intended, that he is not to slight these other sources.

Mr. FOLEY. I do not mean that.

Mr. ELY. We are directing him to investigate and to report on all of these, but if he is going to recommend an importation project, we want to be very sure that it comes back to the Congress in a form on which the Congress can make a decision.

Mr. FOLEY. I direct your attention to the bill, to section 201, which states:

> The Secretary is authorized and directed to: (1) prepare estimates of the long-range water supply available for consumptive use in the Upper and Lower Basins of the Colorado River, respectively, of current water requirements in said Basins, and of the rate of growth of water requirements therein to at least the Year 2030.

And then we have the subsection on plans for the first stage of work on the import of water.

And on page 32 of the bill, it reads:

> On or before December 31, 1970, the Secretary shall submit a proposed report and findings on said plan to the effected states and to Federal agencies as required by law.

You do not even permit the Secretary to make his own judgment as to what he wants to submit to the Congress. The bill orders him within 1 year to submit it to the Congress. It seems to me what is here is a legislative directive to submit a report, and only one of the alternative means mentioned by the bill to be submitted by the Secretary, to augment the Colorado River water.

Mr. ELY. The other types of augmentation referred to in section 201(a) are salvage operations, for example. You cannot possibly generate 2.5 million acre-feet of water by any salvage operation within the Colorado Basin. We all know that.

And he is to investigate other sources, such as weather modification, et cetera. If these should happily produce more water, then the quantity imported would be less than otherwise, but the importation of 2.5 million acre-feet that is mentioned is over and above these other hoped-for benefits.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The Chair recognizes the gentleman from Wyoming.

Mr. RONCALIO. I yield one-half of my time to the gentleman from Washington.

Mr. FOLEY. I notice that in the original draft of the bill, there was a provision calling for a specification and report on water renovation which has been stricken from this draft.

Do you have any explanation as to why this was done?

Mr. ELY. It was supposed to be included in the general language, but if you wish specific reference to that, we certainly have no objection.

Mr. FOLEY. There was no reason for its omission?

Mr. ELY. No.

Mr. FOLEY. Referring to the provisions of the bill which presumably gives protection to areas of origin, subsection (b) on page 31, who is to determine, in your judgment, whether there are any requirements which cannot be met because of the importation?

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Mr. ELY. The language is self-executing and all-inclusive. A project built in the Columbia Basin, the effect of which was to deplete the supply available for export, would not be subject to an injunction pursuant to the law of appropriations that might otherwise apply interstate. It did occur to me, Mr. Foley, in listening to some of your questions and the answers yesterday, that this bill might properly be amended in the consent-to-sue clause to make sure that any affected State, not merely the affected States in the Colorado River Basin, should have a right to sue in the Supreme Court to make sure that the Secretary does comply with the provisions of the statute, including this.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The gentleman has consumed 2½ minutes.

The gentleman from Wyoming.

Mr. RONCALIO. I have no questions, but I do have an observation that I would like to make to Mr. Ely.

I have been pleased to be exposed to your operation, and I thank you very much.

Mr. ELY. I thank you.

Mr. RONCALIO. Perhaps, we should utilize your talents to move these people to where the water is, rather than moving the water to the people.

Mr. ROGERS of Texas. The Chair will now recognize the gentleman from California, Mr. Hosmer.

Mr. HOSMER. I further reserve my time, Mr. Chairman.

Mr. ROGERS of Texas. The Chair recognizes the gentleman from Utah, Mr. Burton, who reserved 4 minutes of his time; and the gentleman from Idaho, who reserved 5 minutes and asked that it be yielded to the gentleman from Pennsylvania, Mr. Saylor.

The Chair now recognizes the gentleman from Pennsylvania, 9 minutes.

Mr. SAYLOR. Thank you, Mr. Chairman.

Mr. Ely, on page 15 of your statement, you have the language that appears in section 403 (c), (d), (e), and (f) of the bill, to require that the first water imported into the Colorado from any source whatsoever must be used to satisfy the treaty burden. If Congress, in its wisdom, and the committee, decides that the first water should be put to other use, what would be the attitude of yourself, speaking for the State of California?

Mr. ELY. I would want to know about the use, first.

Mr. SAYLOR. Well, suppose that we decided that it goes to California?

Mr. ELY. Well, while it might be very pleasurable for us, I would regard this, as not being workable in the teeth of the treaty. The treaty is the first mortgage on the river, under its terms. And if the effect of what you are suggesting would be to give California more than 4.4 million acre-feet, let us say, while shorting the treaty deliveries, thus forcing upon the other users the obligation to bear a greater share of the treaty burden than they would otherwise bear if we were not given more than 4.4 million acre-feet, I would say that this could not be done without rewriting both the compact and the treaty.

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Mr. SAYLOR. At what price will the water be delivered into the basin?

Mr. ELY. With respect to so much of the water imported as is required to bring the use by the three States up to the quantities apportioned to them by the Supreme Court out of the first 7.5 million acre-feet, it is contemplated that the imported water would be made available at Colorado River prices. This, for all practical purposes, means a price of zero.

The Boulder Canyon Project Act provides that no charge shall be made for the storage and delivery of water into the Imperial Valley and the Coachella Valley areas—they already had water rights. The Secretary has charged the Metropolitan District 25 cents an acre-foot. He has made no charge to users in Arizona, so far as I am informed. The charge in Nevada is 50 cents an acre-foot. These, presumably, would be the prices, if any, at which imported water would be delivered, up to 7.5 million acre-feet.

Mr. SAYLOR. All right. Now, who is going to pay for it?

Mr. ELY. The cost is to be borne from two sources, so far as those sources are adequate. One is the allocation to the Mexican Water Treaty that is nonreimbursable, both the capital and the operating expense attributable to the importing of water to the extent required to satisfy the treaty. This is not merely the 1.5 million acre-feet but the associated losses which would bring the total so allocated up to a figure of the general order of 1,800,000 acre-feet. That is a layman's figure. The remaining 700,000 acre-feet of the 2.5 million would be allocable to reimbursable features. The cost of that would be borne, so far as practicable, out of the development fund. If a deficit remained, then the amortization period of the importation works would have to be extended.

Mr. SAYLOR. In other words, for the 50-year period, which is used for reclamation projects, it might be such that this would not pay out in that period of time; is that not correct?

Mr. ELY. That is correct, if the development fund were reduced, for example, by a decision of the Congress to exclude Bridge and Marble Canyon Dams, either or both of them.

Mr. SAYLOR. On page 26 of your statement, Mr. Ely, it is interesting to note that you are interested in Lake Powell and Lake Mead, but you do not say anything about the other two reservoirs that are authorized in this bill.

Mr. ELY. Filling of Bridge and Marble?

Mr. SAYLOR. Bridge and Marble Canyon Dams.

Mr. ELY. Those do not involve any issue between the upper and lower basins. They are not large reservoirs. Hopefully, they would be filled out of the water coming to the lower basin at Lee Ferry in the execution of section 601. I do not minimize the problem. The problem does exist. It is not necessarily a big problem.

Mr. SAYLOR. If there is no importation of water, what would be the effect?

Mr. ELY. On the filling of those reservoirs?

Mr. SAYLOR. Yes.

Mr. ELY. Again, they would fill normally during the first few months after they are constructed, with or without imports. The

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imports would come in downstream from them, anyway, if they are brought in at Lake Mead.

Mr. ASPINALL. Of course, there is this advantage to the lower basin, so far as the filling criteria on Lake Mead is concerned, the additional water that would be in Bridge Canyon, whatever it is, would be in addition to that which had relationship between Mead and Powell; is that not correct?

Mr. ELY. That is correct. But under the terms of the bill, the Bridge Canyon Dam is to be operated within a regimen of 10 feet. Holdover storage capacity is very small. And Marble is practically a run of river plant.

Mr. ASPINALL. Once having filled Bridge Canyon, this is in addition to the water that you would find in Lake Mead?

Mr. ELY. That is correct, except as I say, only the top 10 feet of the impounded water by Bridge Canyon is so used.

Mr. ASPINALL. Thank you very much.

Mr. SAYLOR. On page 29, of your statement, your conclusion, is the following:

As between the lower division and the upper division States of the Colorado River Basin, it offers an equitable coordination of the operation of Glen Canyon and Hoover Reservoirs, a fair balancing of the urgent present needs of the lower basin with reassurances of a reasonable reserve for the future performance of the upper basin's compact obligations so as to avoid the sacrificing of consumptive uses in the upper States.

Do you say that this bill guarantees to the upper basin States their right to beneficial consumptive use of 7.5 million acre-feet?

Mr. ELY. No, sir.

Mr. SAYLOR. If there is 15 million acre-feet in the river?

Mr. ELY. No, sir. This deals wholly with the bank account or reserve which can be accumulated in the upper basin reservoirs from which the compact III(c) and III(d) obligations will be paid. It has nothing to do with the apportionment of consumptive use to basin made in article III(a). This deals with the mortgage imposed upon the upper basin by article III (d) and (c) and, in effect, tells the Secretary to accumulate something in the bank account to meet that mortgage, not to let the bank account be depleted to zero, in which event, he might have to curtail consumptive uses in the upper basin to meet those same obligations.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Does the gentleman from California desire to ask any questions?

Mr. HOSMER. Mr. Chairman, I, like my colleagues, wish to thank you for your excellent presentation, Mr. Ely. You have answered a number of questions; you have undergone a considerable grilling this morning. Are there any matters that you would like to expand upon further or any comments that you would like to make?

Mr. ELY. Thank you very much for your personal comment.

I would like for Mr. Rummonds to have the opportunity to say a word.

Mr. RUMMONDS. You have heard the position of the Colorado River Board of California, a legally constituted body of the State government, and that of the six contractors with the Secretary of the Interior for Colorado River water. These six contractors represent the users of 80 percent of the water in southern California at the present time.

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We are in complete accord with the Department of Water Resources. We have the endorsement of the irrigation districts, associations, and the Southern California Water Conference. There is unanimous agreement on the part of the State as a whole in backing this bill.

Mr. ELY. May I add one further comment, Mr. Hosmer?

Mr. HOSMER. You may do so.

Mr. ELY. Questions yesterday went to the understandable interest of the Columbia River Basin States in having a local regional commission of some kind to determine the availability of any surplus in that basin. This, to my mind, is 180° in conflict with the demands of these same interests that somehow the water requirements of the Colorado River Basin be determined by a national commission, this being a national problem. We have no objection whatever to the functioning of a national commission of informed experts who will consider the requirements and the supplies available in both basins, but we do think that it is contrary to that principle to set up an entirely locally controlled commission for operation in the Columbia River Basin.

We think, also, that the investigation proposed in title II should get underway at once. It cannot fairly be delayed 5 years for the commencement of this Federal study until the States of the Northwest have completed their studies. Let them go ahead concurrently.

We do not intend that that study shall deny the States of the Northwest full participation. Of course not. We have no objection to the study in title II being conducted by the Secretary, or by the Bureau of Reclamation, or the Corps of Engineers, all under the general control and direction of a commission from outside the Government. But, surely, the seven-man commission proposed in S. 3107, drawn from outside the Government, is not expected to organize and create a new bureaucracy which somehow shall supersede the Bureau of Reclamation and the Corps of Engineers. It simply cannot do it and should not do it. The commission should, instead, perform the functions of a board of directors which can give the Secretary and the Bureau of Reclamation and the Corps of Engineers general guidelines and direction.

Mr. HOSMER. Mr. Ely, there has been some criticism, expressed yesterday, of putting title II into this bill, calling for studies. You have participated in legislation around here for two or three decades. Do you find anything unusual about this title II, from your experience in the past 30 years?

Mr. ELY. This is what we have grown accustomed to, that the Secretary is directed to make feasibility studies and to bring them to the Congress. Indeed, just this last session this committee recommended and the Congress adopted a bill directing the Secretary to get authorization from Congress to make feasibility studies. Title II performs that function, and should do so, inasmuch as the supply requirements of the entire basin have to be studied to determine whether you are or are not going to import water.

Mr. HOSMER. Thank you.

Mr. ROGERS of Texas. The time of the gentleman has expired.

I have only a minute and a half, Mr. Ely. I think that this has been a very remarkable work of handling your time. I compliment myself on getting through.

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Mr. SAYLOR. I will compliment my colleague, too.

Mr. ROGERS of Texas. Is it the position of California that when the time has come that the importation we will say of 2 million acre-feet of water—I am just using that as an example—assuming that 2 million acre-feet of water would be required to meet the Mexican treaty requirements, that when this is imported into the Colorado River from outside sources, that then the basin is relieved of the burden, insofar as the 2 million acre-feet of water is concerned?

Mr. ELY. The figure is 2.5 million. When the President's proclamation is issued that the works have been completed to do this job, and can continue to furnish it from sources outside of the basin, without injuring those sources, then that proclamation has the effect of relieving both basins from the treaty obligations.

Mr. ROGERS of Texas. Assuming that it would cost, we will say, $50 an acre-foot to import this water, and using the figure of 2 million, just as a figure, what is happening here is that $100 million is being obligated in order to relieve the basin of a burden of 2 million acre-feet of water?

Mr. ELY. I will have to check the decimal point, but, in principle, you are correct. A large amount of capital furnished by the United States is being earmarked for that purpose, just as it might be allocated, on some other project to navigation. It is nonreimbursable, and we think that the treaty function is a nonreimbursable Federal function.

Mr. ROGERS of Texas. But it is at the present time being considered as a reimbursable function. In other words, the Mexican treaty is a burden on the production of the river?

Mr. ELY. That is correct.

Mr. ROGERS of Texas. Now, as you point out, if you followed out the present procedures, then some method would have to be devised to require payments for this importation, would there not?

Mr. ELY. Yes. Let us distinguish, however, between burdens on the water supply and financial burdens, that is, reimbursable burdens on the Treasury. The treaty is now a first mortgage on the water supply of the river to be furnished, in the language of the treaty, from any and all sources. Now, it devolves on the United States, to make good on that guarantee—"any and all" Colorado sources must be supplemented. Part of the storage at Hoover Dam is being used, and let us also assume that Glen Canyon is being used, to supply the treaty. We now know that even more water must be brought in. Therefore, you are quite correct, that no part of the cost of the Hoover or Glen Canyon Dams has been made nonreimbursable because of the treaty. It perhaps might well have. Now, we know that the treaty burden is unsupportable by resources of the Colorado River.

Mr. ROGERS of Texas. The time of the Chair has expired. One further question. In mentioning the matter of the origin, you do not spell origin "O-r-e-g-o-n," do you?

[Laughter.]

Mr. ROGERS of Texas. The subcommittee will stand in recess until 2 p.m.

Thank you.

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(Whereupon, at 12 noon, a recess was taken until 2 p.m., of the same day.)

AFTERNOON SESSION

Mr. ROGERS of Texas (presiding). The Subcommittee on Irrigation and Reclamation will come to order for further consideration of pending business.

The first witness scheduled this afternoon is Mr. H. T. Person, commissioner of the Upper Colorado River Commission, representing the Governor of Wyoming. He will be introduced by our colleague, Mr. Roncalio.

Mr. Roncalio?

Mr. RONCALIO. Thank you, Chairman Rogers, Chairman Aspinall of the full committee, and my colleagues of the subcommittee. It is my particular pleasure today and my honor to present to this subcommittee Dean H. T. Person, dean emeritus of the College of Engineering of the University of Wyoming at Laramie, Wyo.

I first knew H.T. as he is known and revered to the thousands of graduates of the University of Wyoming, in 1938 when he was not too careful about who used to sell apples in the college of engineering laboratories, when I happened to be working my way through school in that pursuit. I learned that engineering was a little difficult for certain types, so I proceeded to the college of law, went on from there.

Since that time, Dean Person has been of great help in developing the resources of Wyoming and has become the dean of his college of engineering and is now dean emeritus. He has appeared before this committee many times. He is a friend of the chairman of the full committee, a friend of the development of the resources of the West.

Mr. Chairman, as you know, he is here today to testify for the Governor of Wyoming. Wyoming is probably the only State in creation that sits in a situation where we may find our water taken from one stream that contributes to the Columbia River and find it diverted down to Arizona, that is now taking it from the Colorado, too. Our water flows in all four directions from the high levels of Wyoming—the headwaters from the Snake, the headwaters of the Colorado, and the headwaters of the Green River.

Mr. ROGERS of Texas. Thank you, Mr. Roncalio.

Mr. Person, we are glad to have you.

STATEMENT OF H. T. PERSON, COMMISSIONER, UPPER COLORADO RIVER COMMISSION, REPRESENTING THE GOVERNOR OF WYOMING

Mr. PERSON. Mr. Chairman, members of the committee, I am submitting this statement on behalf of Gov. Clifford P. Hansen, of Wyoming. I would like permission to insert the statement in the record, and I shall summarize it in 3 or 4 minutes.

Mr. ROGERS of Texas. That is wonderful of you, and without objection, your statement will be included in the record, the same as if read in full. You may proceed to summarize.

Mr. PERSON. Wyoming does recognize Arizona's need for the central Arizona project. We are in substantial agreement with the

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revised version of H.R. 4671, the version dated April 25, 1966. Title II, which provides for the study of the investigation and plans to import water, we think, is absolutely essential to this legislation. We would prefer authorization of an importation project at the same time as we authorize the central Arizona, but we realized probably this is all we could expect to get, investigation of plans to import water.

Under title V, certain upper Colorado River projects are proposed for authorization. In connection with authorization of these projects, the people of Wyoming, and especially the people of Wyoming who are in the Green River Basin, which is the headwaters of the Colorado, are concerned with the sufficiency of the water supply. Of course, we realize that if we get importation, this question would be irrelevant.

It is the feeling of the people of Wyoming that until such time as the importation of water from the Colorado River Basin is insured, projects which result in the use by any State of more water than they are entitled to under the two Colorado River compacts should be considered very carefully, certainly before they are constructed, and possibly even before they are authorized.

Title VI of the bill sets forth operating criteria for the reservoirs on the Colorado River, and we feel these provisions are satisfactory and essential as far as the proposed legislation is concerned.

Mr. Chairman, I think that completes my summary.

(The complete statement by Mr. Person follows:)

STATEMENT OF H. T. PERSON, WYOMING COMMISSIONER, UPPER COLORADO RIVER COMMISSION

Mr. Chairman and members of the committee, my name is H. T. Person. I am the Wyoming Commissioner on the Upper Colorado River Commission, as well as an advisor on several other interstate compact commissions involving the State of Wyoming.

It is my pleasure to present this statement in behalf of the Honorable Clifford P. Hansen, Governor of the State of Wyoming.

On August 26, 1965, Governor Hansen presented a statement of Wyoming's position on H.R. 4671 before this committee. My statement today will be limited to the changes which have been made in H.R. 4671 since Governor Hansen's original statement was made.

Referring to Title V of the new Committee Print No. 19, dated April 25, 1966, certain Upper Colorado River Basin projects are proposed to be authorized and other projects are given a "priority for planning" status.

Wyoming submitted comments to the Secretary of Interior some time ago on the Animas-La Plata Project located in Colorado and New Mexico, and the Dolores Project located in Colorado. No objections were raised to these two projects. In our recent comments on the Dallas Creek, West Divide, and San Miguel Projects, located in Colorado, we raised questions concerning the sufficiency of the available water supply within Colorado's apportionment under the Colorado River Compact and the Upper Colorado River Basin Compact. Engineering studies made by the Bureau of Reclamation, as well as the Tipton Report which was made for the Upper Colorado River Commission, indicate that the water expected to be available for use in the Upper Colorado River Basin will be limited to something considerably less than the 7.5 million acre-feet annually which was anticipated when the compacts were negotiated. In the Tipton Report, text of which was introduced as evidence at the hearings on H.R. 4671 held in August of 1965, it was estimated that there would be available to the Upper Basin 6.3 million acre-feet per year, assuming that the Upper Basin commitment for delivery at Lee Ferry was 7.5 million acre-feet per year. The Bureau of Reclamation study indicates an estimate of 5.8 million acre-feet per year available for use in the Upper Basin. In view of these very serious limitations in the estimated amount of water available to the Upper Basin, we

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feel that a thorough study should be made of anticipated future depletions. The preliminary estimates of present use along with anticipated future depletions which have been compiled by the Upper Colorado River Commission would indicate that Colorado could be using more than her apportionment of water under the two Colorado River Compacts if these five reclamation projects were to be constructed and placed in operation.

It is our suggestion that an accurate determination should be made of the current consumptive uses of water, as well as all commitments that may have been made for future depletions, before proceeding with the authorization of projects which would utilize water that could be in excess of compact entitlements.

Wyoming has a sincere desire to support Colorado in the authorization of these projects, as well as a past record of supporting good reclamation projects throughout the west. However, in the interest of the individual states of the Upper Basin, it appears to be essential that no state should be allowed to utilize more water than its entitlement under the compact provisions. If any one state is allowed to utilize more water than its entitlement, then a burden falls on the remaining states to make up for the deficiency. Wyoming at the present time is utilizing a smaller percentage of her compact entitlement in the Colorado River System than any of the other states. Consequently, it would appear to be of serious concern to us that the other states should be limited to their compact entitlements, and that any projects which conceivably could involve the use of water in excess of compact apportionments should not be authorized. When an importation of water into the Colorado River System has been completed and is in operation, the questions which we have raised here today would obviously become irrelevant. Consequently, we feel that the importation of water into the Colorado River System is one of the most important features of the bill which is now before this Committee. In the interest of comity between the states and in recognition of Arizona's need for the Central Arizona Project, we have accepted the provisions of this bill for an early study of the importation question, even though we feel that there really should be a concurrent authorization of a water importation project and the Central Arizona Project.

Title V includes a proposal to amend the description of the Sublette Project in Wyoming as set forth in the Colorado River Storage Project Act (70 Stat. 105; 43 U.S.C. 620), to insert the words "including the Kendall Reservoir on Green River and a diversion of water from the Green River to the North Platte River Basin in Wyoming." It is our desire that this proposal be investigated as rapidly as possible so that Wyoming will have reliable information on which to base a decision as to what our next logical step in the development and utilization of our Colorado River Compact apportionment should be. At present it appears that the Sublette Project along with the diversion of water from the Green River to the North Platte is probably the most feasible project for us to proceed with in the near future and consequently we are desirous of expediting this study and report.

Wyoming supports the inclusion of the Seedskadee Project in this bill to obtain modification in unit size for an authorized Upper Colorado River participating project. The Seedskadee Development Farm, recommended by the Wyoming Reclamation Projects Survey team and approved by the Congress, has been in operation during the past irrigation season and is currently providing valuable guidance to the Secretary for sound settlement of high-elevation short growing season projects. We recognize that climate and elevation are vital factors which must be taken into account when classifying land and establishing farm unit size. Our basic concern is to create opportunities for a stable and adequate family living and for community growth through irrigation development. The size of farms must be large enough to attain this objective.

Title VI of the new version of H.R. 4671 sets forth operating criteria for the long-range operation of the reservoirs on the Colorado River. The criteria as set forth and the objectives thereof would appear to be acceptable as far as Wyoming is concerned. Our main intent in formulating these criteria is to provide an assurance that there will be sufficient water available to fulfill the consumptive use demands in both the Upper and Lower Basins in conformity with the compacts.

We attach considerable significance to Section 604(a) which states: "Nothing in this act shall be construed to alter, amend, repeal, modify, or be in conflict with the provisions of the Colorado River Compact, the Upper Colorado River

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Basin Compact, the Water Treaty of 1944 with the United Mexican States (Treaty Series 994) * * *." The sanctity of these compacts is something which we desire to preserve and we would certainly not be in sympathy with any legislation which did not conform to these vitally important documents.

Other than as set forth hereinbefore, we are in substantial agreement with the provisions included in this new version of H.R. 4671. I would like to express my appreciation for the opportunity of appearing before your committee today and submitting this statement.

Thank you.

Mr. ROGERS of Texas. Thank you very much.

Mr. Aspinall?

Mr. ASPINALL. Dean, it is a privilege to welcome you back before this committee again. I remember with pleasure the time we spent on the Missouri Basin Survey Commission in 1951 and 1952.

Mr. PERSON. Thank you.

Mr. ASPINALL. The only question I have—this is a statement in behalf of Wyoming's official position, is it not?

Mr. PERSON. Yes.

Mr. ASPINALL. The only question that Wyoming raises is to the availability of water in the Colorado area. Even under the Bureau's estimates of Colorado's entitlement, Colorado would be entitled to approximately 3 million acre-feet of water; is that correct?

Mr. PERSON. Yes.

Mr. ASPINALL. And presently, Colorado's divergence to eastern Colorado amounts to in the neighborhood of 1 million—not quite. It is about 900,000 acre-feet of water.

I do not ask you to ratify that. But I think that is about right. Colorado's total uses out of the Colorado River Basin are somewhere around 1,800,000. Even with the Bureau's figures, as low as they are on their total entitlement, Colorado would still have almost a million acre-feet of water to put to its use. Is that not about right?

Mr. PERSON. I think so, Mr. Aspinall, or very close.

Mr. ASPINALL. These are in round figures. I can understand how Wyoming feels about this, because Wyoming is in the place where Wyoming has surplus waters at the present time under authorizations, but Wyoming does not have any opportunity to use those waters. Wyoming's particular position is that Wyoming does not want somebody else to get the waters to which she is entitled under the Colorado River compact and the Upper Colorado River compact; is that not right?

Mr. PERSON. That is right.

Mr. ASPINALL. Within the realm of whatever those amounts are by the natural flow of the river.

Mr. PERSON. That is right.

Mr. ASPINALL. I think Wyoming's position in this respect is tenable and logical. But I think that you will find that there is sufficient water, even in the periods of shortages like we have had in recent years, to take care of these five projects. The question is what happens after these five projects.

Mr. PERSON. Yes. And we certainly know that there is a large potential for industrial and municipal use in western Colorado.

Mr. ASPINALL. That is right.

Mr. PERSON. And we have seen Colorado's own estimates.

Mr. ASPINALL. This is true. And there is not any water there, and

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these waters which are largely supposed to be used for irrigation would have to give way to the M and I purposes. Is that right?

Mr. PERSON. Yes.

Mr. ASPINALL. OK. Thank you very much.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Person, I have read your statement in full, and I commend you on your statement. Let me ask you this question.

If this committee decided to report out a bill authorizing the central Arizona project as a unit, without the importation of water from any other source, would you support that bill?

Mr. PERSON. No.

Mr. SAYLOR. Why not?

Mr. PERSON. Because we think the importation, the study of importation, is essential prior to the legislation.

Mr. SAYLOR. If the committee decided they would set up a commission or a group of Government agencies to study the entire water problem, would that satisfy your people?

Mr. PERSON. I am not sure. I would have to see what kind of a commission was set up and how soon it would be expected to report.

Mr. SAYLOR. Again, when it reports, why would you put a time limit on it?

Mr. PERSON. Well, the time is coming when we do need more water in the Colorado River.

Mr. SAYLOR. I concede that point. Now, where are we going to put it in? Are we going to put water in the upper basin anywhere?

Mr. PERSON. I doubt very much if they will.

Mr. SAYLOR. In other words, if this importation is to take place, you anticipate the water will be transferred into the lower basin below Lee Ferry?

Mr. PERSON. Possibly. I think that is most likely.

Mr. SAYLOR. Are you familiar with a plan that has received some publicity—some years ago—known as the Parsons plan?

Mr. PERSON. Yes.

Mr. SAYLOR. Well, I am looking at this plan, and it indicates that most everything west of the Mississippi River, with the exception of the States of Washington, Oregon, Idaho, and western Montana, are in need of water. Now, if this is true, why would you want the study, the importation study, to be made only as specified in this bill?

Mr. PERSON. Actually, I think the study as specified in this bill could be pretty general. It would not limit them to one particular plan.

Mr. SAYLOR. Do you feel that the Bureau's figures of 5.8 million acre-feet, which is available for consumption in the four upper basin States, is close to being accurate?

Mr. PERSON. Yes, somewhere in the range of 5.8 to 6.3.

Mr. SAYLOR. How much water is Wyoming putting to beneficial consumptive uses at the present time?

Mr. PERSON. About 270,000 acre-feet.

Mr. SAYLOR. From the Colorado River, that is?

Mr. PERSON. That is right.

Mr. SAYLOR. Have the people of Wyoming, at least those in an official capacity, ever considered the sale of a portion of that water to the lower basin States?

Mr. PERSON. I doubt if we could sell it to them.

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Mr. SAYLOR. You might sell them your rights for a period of time, if anybody wanted to put it to beneficial and consumptive use, but you have the use of those waters, after the license expires.

Mr. PERSON. I do not know the legal implications, but I doubt that we could sell it, and I think that some day we are going to need it.

Mr. SAYLOR. I think it is true that some day you are going to be able to use all the water to which you are entitled in the upper basin.

Mr. PERSON. That is right.

Mr. SAYLOR. And I think some day, the upper States will have all that water for consumptive and beneficial use.

Mr. ROGERS of Texas. The time of the gentleman is up.

Mr. Johnson?

Mr. JOHNSON. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. Mr. Chairman, would the gentleman from Pennsylvania like me to yield my time to him?

Mr. SAYLOR. Yes, thank you.

Mr. BURTON of Utah. I yield my time to the gentleman from Pennsylvania.

Mr. SAYLOR. Dean, by the statement you made you did not think that you could sell it, do you mean because it has to flow downstream, and you might not be able to find somebody down in California who would buy it?

Mr. PERSON. I am not sure whether we could. Probably we could. But I do not think Wyoming would be ready or willing to sell theirs.

Mr. SAYLOR. Well, it might be that somebody out there had better take a good look at it. You might be able to balance your budget, and you might have a surplus in your treasury. You might find that those eager people down south, looking in anticipation of water from some other source and not having the right to put your water to beneficial consumptive use, they might be willing to pay you something for it. Of course, they do not pay anything for the water, the 7.5 million they have down there now. But you know, after all, it is known as the Golden State. You might look at some of those coffers out there in Sacramento and see whether or not you can tap them a little. I recommend that the people in your State take a good look at it.

That is all.

Mr. ROGERS of Texas. Are you through, Mr. Burton?

Mr. BURTON of Utah. Yes, sir.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. I congratulate Mr. Person for a fine statement and for the part he has played in putting this together and bringing forth this fine legislation.

You are one of the pioneers in the effort to solve this regional water problem.

Mr. PERSON. Thank you.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. I have no questions, Mr. Chairman, unless Mr. Saylor wants my time.

Mr. ROGERS of Texas. Mr. Roncalio?

Mr. RONCALIO. Thank you, Mr. Chairman. It would not be appropriate of me to ask questions at this time of my good friend.

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I would like to make one observation: I personally feel that the criteria in title VI may not be adequate to assure Wyoming of maintenance of its proper level of the lake at Flaming Gorge, which is fast becoming one of the outstanding fishing lakes in North America, or to protect the public from drawdowns. Would the dean care to agree with me or——

Mr. PERSON. I prefer not to.

Mr. RONCALIO. I withdraw my question.

Mr. ROGERS of Texas. Mr. Hansen?

Mr. HANSEN. Mr. Person, you stated briefly that you felt that this legislation was not workable without the importation. Is that correct?

Mr. PERSON. We say the importation is essential as far as Wyoming is concerned, the study of the importation.

Mr. HANSEN. So your support would be predicated upon the study of importation?

Mr. PERSON. That is right.

Mr. HANSEN. Then, under the circumstances, you do not feel that these projects that are contemplated in this legislation could be either self-supporting or feasible without importation?

Mr. PERSON. Well, I think they would be feasible. But they depend on Wyoming's water, or part of Wyoming's water, and some time in the future, and it might be hard to get back at that time.

Mr. HANSEN. So you feel necessary projects are somewhat based, without potential in the future, on the continued use of Wyoming water?

Mr. PERSON. Yes.

Mr. HANSEN. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Thank you very much, Mr. Person, for your presentation. It has been very helpful.

Our next witness is Mr. Jay R. Bingham, commissioner of the Upper Colorado River Commission, representing the State of Utah.

Mr. Burton, the Chair recognizes you to introduce Mr. Bingham.

Mr. BURTON of Utah. Thank you, Mr. Chairman.

It is my pleasure once again to introduce to the committee a man whom I know you all know now, Mr. Jay R. Bingham. In addition to being a commissioner for the Upper Colorado River Basin, Mr. Chairman, he is also director of the Utah Water & Power Board.

Mr. Bingham, the distinguished water expert from our State, has had the privilege of representing both Republican and Democratic State administrations before this committee, which proves he is just about as durable as are Utah's water problems. It is a pleasure to have him here representing our able Governor, Calvin L. Rampton.

Mr. ROGERS of Texas. Thank you, Mr. Burton.

Mr. Bingham, it is nice to have you.

STATEMENT OF HON. CALVIN L. RAMPTON, GOVERNOR OF THE STATE OF UTAH, AS PRESENTED BY JAY R. BINGHAM

Mr. BINGHAM. Thank you, Mr. Chairman. I would be happy to briefly refer to the principal points of this statement and submit the statement for the record, if that is permissible.

Mr. ROGERS of Texas. That is very good. The statement is very short. You may do as you please. Without objection, your statement

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will be included in the record, Mr. Bingham, and you may proceed to summarize if you desire.

Mr. BINGHAM. Thank you.

It is a privilege to have the opportunity to be before this committee which has in its hands the very momentous problem of our water development of the future. The three points that I will briefly refer to concern items that are a change from our previous appearance before the committee in August of last year.

The first item of vital concern to the State of Utah is the provision for study of importation, which is now in title II of the legislation. We feel that, and our Governor has characterized it in his August 1965 statement, that a legislative commitment in the interest of import is an essential part of this legislation. We in Utah are in much the same position as Wyoming inasmuch as we have not achieved the full development of our entitlement in the Colorado River, and therefore, I feel that we are more vulnerable to any commitment of water from that source.

The second item of special interest to the State concerns the priority of planning for additional participating projects. And in Utah specifically, we are interested in the language that is now concerned in the legislation in section 3 relating to the Uintah unit and the Ute Indian unit of the central Utah project in San Juan County; the Price River, Grand County unit; the Ute Indian extension of the central Utah; the Gray Canyon and Juniper projects in Utah.

We feel that we need an intelligent approach to the utilization of our water supply and that the early completion of this feasibility report would be extremely helpful. For this reason, we are interested in that portion of the legislation.

In this connection, I would like to state that in Utah, as you know, we have had a long ordeal in getting the central Utah project initiated. One reason that we are ready to proceed now with the major unit of that project has been because of the statesmanlike attitude of the Indian interests, the Ute Indian Tribe of the Uintah and Ouray Indian Reservations. They have agreed to defer the development of a portion of their acreage in order that the water supply for the Bonneville unit could be firmed up and construction proceed.

We are concerned, as Wyoming is, that the authorizations for our projects in Colorado be in conformity with her entitlement in the Colorado. We support that authorization with that understanding.

Finally, an important element, and one very ably commented on by Mr. Ely, is the parts of the bill identified in section 601 and section 602. We believe it carries out the intent of the 1922 compact and gives fuller meaning to Public Law 485 authorizing the upper Colorado River storage project.

Mr. Chairman, we are happy to indicate to this committee our support of legislation enumerating the principle and the ones of principal concern to the State of Utah.

(The full prepared statement of Governor Rampton of the State of Utah follows:)

STATEMENT OF THE HONORABLE CALVIN L. RAMPTON, GOVERNOR OF THE STATE OF UTAH, PRESENTED BY JAY R. BINGHAM

Mr. Chairman, I appreciate the opportunity to again appear before this distinguished committee on this important legislation. In conformance with what *I understand to* be the purpose of the present hearing, I will limit my discus-

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sion to the changes which have been proposed in this legislation since the last committee hearings.

In my prior statement of August 26, 1965, I pointed out that before the State of Utah could support this legislation it would have to be amended to safeguard the interests of the Upper Basin States. Since the last hearings, as you have already been advised by others, there has been a number of meetings between the seven states of the Colorado River Basin in an attempt to arrive at a draft of legislation which could have the support of all of the states. As a result of these meetings and discussions, substitute language has been proposed and is now incorporated into the Recommended Revision of H.R. 4671 (Committee Print No. 19). As we in the State of Utah interpret this amended language, we believe that safeguards have been provided which now makes this legislation acceptable to us. However, I would like to point out that in arriving at a position for the State of Utah on this legislation, our deliberations were based on the premise that the safeguards which I will subsequently discuss are to be included in this Act. If this legislation is amended to take out any of the provisions which directly affect the State of Utah, then our position on the entire Act may be materially altered.

The first proposed amendment which we consider of vital importance in the State of Utah is contained in Title II of the Committee Print. This section initiates a study on the question of the importation of water into the Colorado River Basin from sources located outside of the Basin. As I pointed out in my statement of last August, we in Utah are of the opinion that it is merely a question of time before we in the Upper Basin will be short of water. This will be true even after we have obtained full development of our allocation from the Colorado River. Therefore, I feel that it is imperative that a legislative commitment be made on the question of importation of water and the study of importation be initiated as a part of this legislation which authorizes the development of a large quantity of water in the Lower Colorado River Basin. If our fears are justified that the Colorado River will not yield what was predicted when the Colorado River Compact was negotiated, lack of water will undoubtedly limit development in the entire Colorado River Basin. The states with slower development stand the greatest chance of not having a water supply when they need it.

The second important proposed amendment in this legislation which concerns the State of Utah is the authorization for a priority of planning for additional participating projects under the Colorado River Storage Project Act. The revised legislation includes the Uintah Unit and Ute Indian Unit of the Central Utah, San Juan County; Price River, Grand County; Ute Indian Extension of the Central Utah; Gray Canyon and Juniper Projects in Utah. The above enumerated projects in the State of Utah are important to the future development of the State. I believe it is important that Congress at this time direct the Secretary of the Interior to pursue planning of these projects in order that we may obtain feasibility reports on them as soon as possible.

The planning and construction of the Ute Indian Unit of the Central Utah Project is of particular interest to our state at this time. The Ute Indian Tribe of the Uintah and Ouray Indian Reservation have agreed to defer the development of a portion of their acreage until these projects are constructed if this is accomplished within a reasonable time. The water which might have been used on these lands will now be available for use in the Bonneville Unit of the Central Utah Project. However, if Utah is to utilize this water, it is imperative that these projects be pursued to completion at the earliest date practicable.

With respect to the five Colorado projects which are being considered for authorization, the State of Utah raises no objection to their construction. However, I do have some concern that all of these proposed projects, together with other probable future depletions within the state, may exceed Colorado's entitlement under the Compact. Therefore, I recommend that before construction is initiated, the Bureau of Reclamation complete a detailed report demonstrating that these projects can and will be operated within Colorado's entitlement from the Colorado River.

The third amendment of major importance to the State of Utah in this legislation concerns the operation of Glen Canyon Reservoir. I believe that Sections 601 and 602 of Title VI carry out what we have interpreted as being the intent of the Colorado River Compact of 1922. We have always considered that the Compact contemplated storage of water. If the states of the Upper Basin are

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going to develop their allocation of Colorado River water and meet their obligations to the Lower Basin, it can only be done by the reasonable storage of water in good water years in order to satisfy the requirements of the Compact in water-deficient years. In years of low streamflow, water can be released from Lake Powell to meet the Compact demands and the streamflow can then be diverted directly by the Upper Basin. It is only by using Lake Powell water under this procedure that the states of the Upper Basin will be able to utilize the water allocated to them by Article III(a) of the Colorado River Compact. The Recommended Revision of H.R. 4671 spells out this procedure. The U.S. Bureau of Reclamation has commented on the language of Section 601 to the effect that the "guidelines presented therein is readily understandable," and their comments confirm our interpretation of this important section of the legislation. We also believe that Section 601(b) of this Act is consistent with the intent and purpose of the Upper Colorado River Storage Act (P.L. Act 485).

Mr. ROGERS of Texas. Thank you, Mr. Bingham.

Mr. Aspinall?

Mr. ASPINALL. Mr. Bingham, it is good to have you before the committee. You are fast gaining the same reputation that many fine water experts in the public service of Utah have gained before you.

As I understand it, you support the planning provisions in title V of the proposed revision; is that correct?

Mr. BINGHAM. That is correct.

Mr. ASPINALL. And these, as listed, would more than likely take care of your operations if we give reasonable attention to them in conformity with the entitlements that you have out of the basin fund?

Mr. BINGHAM. That is right.

Mr. ASPINALL. Now, when you are talking about the entitlement under the compact and you refer to Colorado's share, do you refer to the entitlement of water, or the entitlement of net revenues from the basin fund?

Mr. BINGHAM. We are concerned with water, Mr. Chairman.

Mr. ASPINALL. Just like the State of Wyoming?

Mr. BINGHAM. That is correct.

Mr. ASPINALL. That is all.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Bingham, if the central Arizona project authorized in the bill were reported out by this committee without a provision for the study of water and its importation into the Colorado River Basin, would the support of the Governor and yourself, the delegations in Utah, be in favor of the bill?

Mr. BINGHAM. No, sir.

Mr. SAYLOR. May I ask you the same question that I asked the man who preceded you, Mr. Person. Why should a national problem—because everyone can see that there is a national problem with regard to water and its importation—in the areas of surplus and shortage, be solved on a purely regional basis?

Mr. BINGHAM. Mr. Saylor, I think our principal concern goes to the fact that time is running out on the Colorado. We see in this legislation a directive to a competent body to initiate a study now and not be dependent on some yet to be created agency. I think we are principally concerned more with the results and having it determined immediately.

Mr. SAYLOR. Well, I have been reliably informed that the States of the Pacific Northwest already have a survey going on in their area

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which will not be completed until somewhere 5 to 7 years from now as to the potential needs of that area, from the waters of the Columbia River. Now, if this is true, why should Congress pass a bill which will imperil the water of the Pacific Northwest before they have determined what their needs are?

Mr. BINGHAM. Congressman, I think it is important that each State look to its own future water requirements. As we visualize the study contemplated in this legislation, it could proceed concurrently and cooperatively with the States' own efforts, which we commend.

Mr. SAYLOR. Mr. Bingham, this is not a State problem, this is a national problem. We had a representative here yesterday from the State of Texas telling how much water the State of Texas needs. Some of this water has to come down, if it comes, from the Columbia Basin; it must be considered. That is not in the drainage area and is not included in the compact. This is one of the serious things that have come up in the minds of some of us with regard to this legislation.

Now, on page 3 of your statement, you state that the planning and construction of the Ute Indian Unit of the Central Utah Project—

is of particular interest to our State at this time. The Ute Indian Tribe of the Uintah and Ouray Indian Reservation have agreed to defer the development of a portion of their acreage until these projects are constructed if this is accomplished within a reasonable time.

What limitation, if any, has the tribe placed upon their agreement?

Mr. BINGHAM. There is a time suggested in the agreement, but by the year 2005, the placement water will be available, so that the tribe's further development will not be curtailed.

Mr. SAYLOR. Thank you, sir, for your good statement. I cannot agree with you, but it is still a good statement.

Mr. ROGERS of Texas. Mr. Johnson?

Mr. JOHNSON. I yield my time to the chairman of the full committee.

Mr. ASPINALL. Mr. Bingham, the gentleman from Pennsylvania is concerned, and rightfully concerned, just as the rest of us are, on this matter of national studies concerning our water resources. But the Upper Basin feels, does it not, that what is at stake in this legislation is not only a national problem, but it is also a regional problem, and that in order to protect the Upper Basin and its entitlements under the compact, and at the same time to make possible and to guarantee the continuing operation of the central Arizona project, if it is authorized and constructed, that it is necessary to have this particular study immediately. Is that correct?

Mr. BINGHAM. That is completely correct.

Mr. ASPINALL. Utah is interested not only in its first phase of the central Utah project, but it is interested in the ultimate phase of the central Utah project, the ultimate phase which is not yet authorized. Is that not right?

Mr. BINGHAM. This is correct.

Mr. ASPINALL. In order to protect Utah in its present and also in its future ambitions, this study must be made as quickly as possible, whether it is part of the national study or whether it is a regional study. Is that correct?

Mr. BINGHAM. That expresses our position exactly.

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Mr. JOHNSON. I yield back the balance.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. I will reserve my time.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. I just want to apologize to this gentleman. I listed some people whom I considered leaders who brought about this great compromise. I think the name of Jay Bingham will be high on that list.

Thank you.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. Mr. Chairman.

Mr. Bingham, you indicated to the gentleman from Pennsylvania that if substantive changes were made in the legislation as it progresses further, you would not support it. Is that correct?

Mr. BINGHAM. That is correct.

Mr. BURTON of Utah. Let us take this point by point. You said the most important thing for Utah is the importation study. If there is any substantial change in that, the State of Utah would not support the legislation, right?

Mr. BINGHAM. Right.

Mr. BURTON of Utah. If there are any deletions on the proposed feasibility studies, authorized in this bill for the State of Utah, the State would not support the legislation?

Mr. BINGHAM. That is correct.

Mr. ASPINALL. Will my colleague yield?

Mr. BURTON of Utah. Yes, sir, I shall be pleased to yield.

Mr. ASPINALL. That does not mean that they will have to be favorable feasibility studies, does it, Mr. Bingham?

Mr. BINGHAM. No, sir, it means we would like this to be a specific directive to the Secretary to make such study.

Mr. ASPINALL. To find out whether or not it will be feasible.

Mr. BINGHAM. And why they are.

Mr. ASPINALL. Thank you.

Mr. BURTON of Utah. The third section of the amendment you were concerned with was the stipulated authorization of filling criteria for Glen Canyon Reservoir, and if that were deleted or substantively changed, the State would not support it?

Mr. BINGHAM. That is correct. Our support is predicated on the report as it is written.

Mr. BURTON of Utah. Is that the position of the Governor of Utah?

Mr. BINGHAM. It is.

Mr. BURTON of Utah. Is that the position of your own water and power board?

Mr. BINGHAM. The water and power board and the agencies in the State that are directly concerned with the Colorado River matter.

Mr. BURTON of Utah. Jay, you have made an excellent statement and a very honest and forthright presentation. Once again, it is my pleasure to commend you.

We have accompanying Mr. Bingham and attending all sessions of the hearing on this subject this week Mr. Lynn Ludlow, manager of the Central Utah Conservancy District; Mr. Wayne Wilson, Utah Water and Power Board member, and Washington County Commis-

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ioner. We have Mr. Lawrence Siddoway, manager of the Uintah Water Conservancy District and also the Central Utah Water Board.

Mr. BINGHAM. Thank you.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. I have no questions.

Mr. ROGERS of Texas. Mr. Hansen?

Mr. HANSEN. Mr. Chairman.

I would like to ask you, Mr. Bingham, you say that your support n behalf of the State of Utah is predicated on implementation studies s outlined in the legislation?

Mr. BINGHAM. That is correct.

Mr. HANSEN. And that you in the State of Utah could not support his legislation without implementation studies as stated?

Mr. BINGHAM. We believe it to be a vital part of the legislation.

Mr. HANSEN. Thank you.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. I have no questions. I will be glad to yield to Mr. Saylor if he has any.

Mr. SAYLOR. No; thank you.

Mr. REINECKE. I have no questions.

Mr. ROGERS of Texas. Thank you very much, Mr. Bingham.

Our next witness is Mr. Steve Reynolds, State engineer, representing the State of New Mexico; accompanied by Mr. Claud Mann, State legal adviser; and Mr. I. J. Coury, chairman of the New Mexico Interstate Stream Commission.

STATEMENT OF STEVE REYNOLDS, STATE ENGINEER, REPRESENTING THE STATE OF NEW MEXICO; ACCOMPANIED BY CLAUD S. MANN, STATE LEGAL ADVISER, AND I. J. COURY, CHAIRMAN, NEW MEXICO INTERSTATE STREAM COMMISSION

Mr. REYNOLDS. Mr. Chairman, distinguished committee members, I should like briefly to summarize my written statement, and, to some extent, amend and amplify the statement, following which Mr. Coury has a very brief statement which he would like to make if that is satisfactory.

Mr. ROGERS of Texas. Did you say you wanted to read your statement?

Mr. REYNOLDS. I wanted to brief it, sir, if I may.

Mr. ROGERS of Texas. Without objection, your statement will be included, Mr. Reynolds, the same as if read in full. You may proceed to brief it.

Mr. REYNOLDS. Thank you, Mr. Chairman.

Since arriving here in Washington on Sunday, we have been engaged with representatives from the State of Arizona in negotiations concerning the use of water from the Gila River system in New Mexico and Arizona. These negotiations have progressed sufficiently to permit some amendment in the second paragraph of our written statement, even though there are some details not yet resolved.

We wish to amend that second paragraph by saying that New Mexico supports authorization of the central Arizona project. This

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is conditioned, of course, on the successful outcome of these negotiations which we expect.

In this connection, I want to thank Mr. Udall and Mr. Rhodes for the very gracious and fair manner in which these negotiations have proceeded, and to express my great admiration for their capability in representing and protecting the water users of Arizona.

With regard to title II of Committee Print No. 19, New Mexico supports the authorization of investigations and reports dealing with all means of augmenting the water supply of the Colorado River.

We offer no objection to the language of title VI, which establishes guidelines for the operation of reservoirs on the Colorado River.

New Mexico supports the provisions of title V, including project authorization and the priority that would be given to the completion of certain planning reports in our neighboring States and the provision for the reimbursement of the Upper Colorado River Basin fund for expenditures made to meet deficiencies in generation at Hoover Dam during the filling period of the upper basin storage units.

New Mexico is particularly interested, of course, in the authorization of the Animas-La Plata project. This project would furnish water for 16,700 acres of irrigated land in New Mexico and 13,500 acre-feet for municipal purposes. The Secretary of the Interior has acquired the water rights necessary for this project in accordance with our State law, and there is sufficient water within New Mexico's allocation under the compacts for the annual depletion of 34,100 acre-feet that would result from project uses in our State.

The power revenues creditable to New Mexico from the Upper Colorado River Basin fund are sufficient to pay the cost beyond the irrigator's ability to pay for those costs allocated to irrigation. New Mexico is pleased to commit the necessary portions of its allocation of water and its allocation of power revenues and fully supports the authorization of construction of the Animas-La Plata project.

While the State has generally concurred in the Bureau of Reclamation reports on the Animas-La Plata project, we do have some reservations on the Bureau's proposal that the La Plata conservancy district boundaries be extended to include communities such as Farmington and Aztec, which will contract for municipal water supply, in order that ad valorem taxes can be collected in those communities to help pay a part of the cost of the irrigation development. The amount that would be collected in that manner during the repayment period is somewhat in excess of $4 million. It is not clear that this proposed boundary extension is equitable, since these communities are not within the irrigated area to be developed and they will pay a fair price for municipal supplies under contracts with the Secretary of the Interior.

The Bureau advises that their 1965 financial analysis on the storage project shows that the power revenues creditable to New Mexico are adequate, along with the irrigators' repayment ability, to repay the irrigation costs without these ad valorem taxes that might be collected from the communities that I mentioned.

It is for these reasons that we want to review the Bureau's proposal that these boundaries be extended with the Bureau, the municipalities

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in question, and other project interests, before reaching a conclusion on that point.

(The complete statement of Mr. Reynolds follows:)

STATEMENT OF S. E. REYNOLDS, STATE ENGINEER AND SECRETARY OF THE INTERSTATE STREAM COMMISSION OF THE STATE OF NEW MEXICO

My name is S. E. Reynolds. I am State Engineer and Secretary of the Interstate Stream Commission of the State of New Mexico.

New Mexico's position on authorization of the Central Arizona Project remains as it was stated by Mr. Claud Mann and me at the hearings on H.R. 4671 on August 26, 1965. I respectfully invite the committee's careful consideration of the testimony we presented on that occasion along with the correspondence reproduced in the record immediately following our testimony.

With regard to Title II of Committee Print No. 19, New Mexico supports the authorization of investigations and reports on all means of augmenting the water supply of the Colorado River including projects for the importation of water from areas of surplus. The investigations should give first consideration to means of conserving and improving the use of the waters of the natural drainage area of the Colorado River. We agree that investigations and reports of importation projects should include provisions such as those set out in Sec. 202 for the protection of areas of origin.

New Mexico representatives have participated in the negotiations of the Colorado River Basin states which have taken place since the hearings on H.R. 4671 last August and I believe have contributed to widening the area of agreement among the seven states. The language of Section 601 of the committee print was the principal subject of the negotiations. This language establishes guidelines for the operation of reservoirs on the Colorado River. These guidelines will serve to protect to some extent the interests of both the Upper Basin and the Lower Basin while leaving sufficient discretion with the Secretary to permit a practical operation of these reservoirs within the terms of the Colorado River compact. New Mexico offers no objection to the language of Title VI of the committee print.

Sec. 502 of the committee print would provide reimbursement to the Upper Colorado River Basin Fund for expenditures made to meet deficiencies in generation at Hoover Dam during the filling period of storage units in the Upper Basin. While full compensation for expenditures and energy is not provided, New Mexico feels that a reasonable compromise has been reached and supports the provisions of Sec. 502.

Sec. 501 of the legislation being considered would require the Secretary to give priority to the completion of planning reports on certain participating units of the Colorado River Storage Project in Colorado, Utah and Wyoming. We are pleased to support early completion of reports on these projects.

Sec. 501 also would authorize five federal reclamation projects in Colorado. The state of New Mexico has reviewed and commented favorably on the Bureau of Reclamation reports on each of these projects. New Mexico supports authorization of the five projects.

One of these five projects, the Animas-La Plata, would also furnish water for irrigation, municipal, industrial and recreation purposes in New Mexico.

After review of the Bureau of Reclamation's 1962 feasibility report on the Animas-La Plata project, the New Mexico Interstate Stream Commission in a meeting in Farmington, New Mexico on January 20, 1964 acted to recommend to the Governor that the State generally concur in the conclusions and recommendations of the report and offer its cooperation to secure the early authorization and construction of the project. These recommendations were followed in Governor Campbell's January 28, 1964 letter to Secretary Udall.

I am authorized to advise the committee that the state of New Mexico generally concurs in the Regional Director's recommendation to revise the project in the manner described in the Bureau of Reclamation's March 1966 supplemental report on the Animas-La Plata Project.

The Animas-La Plata project as revised will furnish water for 5500 acres of presently irrigated land in New Mexico. These lands are now served from La Plata River. This stream is equitably apportioned between Colorado and New Mexico by the La Plata River Compact which became effective in 1925. But the

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supply of this stream is insufficient and the irrigators in both states are chronically short of water when it is most needed by crops.

By making available a reliable supply of water, the Animas-La Plata project will greatly increase the capability of these presently irrigated lands to produce alfalfa and silage, which is used for livestock feeding in the area. A reliable supply also will make it possible for the irrigators to convert acreage to higher value crops, such as fruit and vegetables.

The project will furnish water for the irrigation of a total of 11,200 acres of new lands in New Mexico; 1700 acres of this total is Ute Mountain Indian land. These new lands will also be capable of producing fruit and vegetables as well as alfalfa and silage for livestock feeding.

The project will also furnish a total of 13,500 acre-feet of water annually for municipal purposes to Aztec and Farmington and smaller downstream communities that could be served by extension of the Farmington system.

Recreation benefits would be furnished by the Meadows reservoir to be constructed on the Ute Mountain Indian Reservation west of La Plata River in New Mexico. Under the project plan a permanent pool of 2600 acre feet and 232 surface acres would be retained in this reservoir for recreation purposes. The Ute Mountain Tribe has expressed its interest in participating in fish and wildlife and recreation development at Meadows reservoir in accordance with the Federal Water Project Recreation Act of 1965.

The Animas-La Plata project is greatly needed to stimulate the economy of northwestern New Mexico. Because of high unemployment and low family incomes prevalent in the area, San Juan County was designated as eligible for assistance under the Area Redevelopment Act of 1961 and currently is eligible for assistance under the Economic Development Act of 1965, which superseded the 1961 act. This program makes available grants and loans to finance public works projects for development of resources, grants for retraining of unemployed individuals, industrial loans, and in general seeks to enhance economic opportunities in so-called "depressed areas" throughout the nation. The unemployment rate in the county in 1965 was 5.7 percent. This rate may be compared with a nationwide rate of 4.2 percent for that year.

Eleven percent of the people in the county—as compared to a statewide average of six percent—depended in some way on public assistance in 1965.

The total construction cost of the project is estimated at $109 million; of this amount about $26 million is allocated for the construction of works benefiting New Mexico. The benefit-cost ratio of the project as computed for a 100-year analysis period is 1.73 on the basis of total benefits and 1.11 on the basis of direct benefits only.

The estimated annual depletion of water by the New Mexico portion of the project is 34,100 acre feet. The Secretary of the Interior has acquired a permit for the appropriation of this water in accordance with New Mexico law. The priority date of this permit is May 1, 1956. As the Bureau report points out the anticipated depletion from project water use in New Mexico is well within the apportionment of consumptive use made to New Mexico by the Upper Colorado River Compact.

The Bureau report reflects that about $14.5 million of the power revenues apportioned to New Mexico from the Upper Colorado River Basin Fund would be needed, along with the amount that the irrigators are able to pay, to repay irrigation costs. The Colorado River Storage project repayment analysis of January, 1965 shows that power revenues creditable to New Mexico would be available in the amount required to repay the costs within the 50-year repayment period after making allowance for the prior commitments to the authorized Hammond and San Juan-Chama reclamation projects.

New Mexico is pleased to commit the necessary portions of its allocations of water and power revenues and fully supports the authorization and construction of the Animas-La Plata project.

The legislation being considered by the committee provides that project construction shall not be undertaken until the Governors of the states of Colorado and New Mexico have agreed upon mutually satisfactory project operating principles and conditions, and that the project shall always be operated by the Secretary of the Interior.

The states of Colorado and New Mexico are in agreement that the project, because of its interstate character, must be operated by the Secretary at all

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times; that there must be an agreement between the states on the operating principles and conditions; and that to be completely effective this agreement must be in the nature of an interstate compact. I am pleased to report that, while we have not yet settled on specific language for the Animas-La Plata Project Compact we are in agreement in principle and there appears to be no reason why the compact cannot be executed and ratified in time to avoid any delay in project construction.

A substantial portion of the project water supply will be used on Indian reservations for irrigation, municipal and industrial purposes. To insure that there are no excessive shortages for any class of users the ratio of project water delivered to project water required should be the same for Indian and non-Indian uses in each state. The language of the act or the legislative history should make it clear that the Congress does not intend the project works to be used to satisfy any preferential rights of the United States or Indian Tribes, such as might be claimed under the Winters doctrine.

For the people of the State of New Mexico, for Governor Campbell, and for myself, I wish to express to this distinguished committee great appreciation of the opportunity to present the views of the State of New Mexico on H.R. 4671.

Mr. REYNOLDS. Mr. Chairman, with your permission, I would like to submit for the record a copy of the statement of Mr. Floyd G. Davis, mayor of Farmington. This statement supports the authorization of the Animas-La Plata project, and expresses the interest of Farmington and other communities in contracting for water from the project.

I would also like to submit for the record a copy of the statement of Mr. A. W. Langenegger, who is president of the New Mexico Farm and Livestock Bureau. This statement also supports authorization of the Animas-La Plata project.

Mr. ROGERS of Texas. Without objection, these two statements will be inserted in the record immediately following the statement of yourself and Mr. Coury.

Mr. REYNOLDS. Thank you, Mr. Chairman. I want to express our great appreciation for this opportunity to present the views of the State of New Mexico on H.R. 4671.

Mr. ROGERS of Texas. I think, Mr. Coury, you could go ahead with your statement before we start the questioning.

Mr. COURY. Mr. Chairman, members of the committee, my name is I. J. Coury.

I reside in Farmington, N. Mex. I am the chairman of the New Mexico Interstate Stream Commission, adviser to the New Mexico commissioner and treasurer of the Upper Colorado River Commission, New Mexico director of the National Reclamation Association, and president of San Juan Savings & Loan Association.

I appear before this committee in support of the upper Colorado River participating projects listed in H.R. 4671 and, in particular, the Animas-La Plata Federal reclamation project which will serve portions of Colorado and New Mexico.

New Mexico has been firmly committed for the Animas-La Plata project for many years and has continually supported its authorization. We have reviewed the March 1966 supplemental report and generally concur with its findings and conclusions.

In short, I urge your favorable consideration authorization of the Animas-La Plata project and the other participating projects in H.R. 4671.

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My appreciation to this distinguished committee for the opportunity to present this brief statement. I appreciate the privilege of appearing before this committee.

Mr. ROGERS of Texas. Thank you very much.

(The statements of Mr. Davis and Mr. Langenegger follow:)

STATEMENT OF MAYOR FLOYD G. DAVIS, FARMINGTON, N. MEX.

Mr. Chairman and members of the Subcommittee on Irrigation and Reclamation, it gives me a great deal of pleasure to appear here today and tell you of the great need we have for municipal and industrial waters from the Animas-La Plata Project. My name is Floyd G. Davis, and I am Mayor of Farmington, New Mexico, and have been selected by the other municipalities in our area to testify in their behalf. I will be speaking for the communities of Aztec, Farmington and the Kirtland District, which represents an estimated 35,000 people.

The basis of our appeal for municipal and industrial water is the problem of supplying sufficient water for our future population and the immediate problem of improving the quality of our present water supply to those areas without treatment facilities.

In support of our estimate for future population growth, I would like to focus attention on the factors that will be stimulating this population expansion, first. Then, I would like to present the existing problem we have in improving the quality of our water.

GROWTH FACTORS

We expect our population to grow because of the development of our resources. These resources are in the form of land and water for agriculture, coal, petroleum products and natural gas, electric energy, recreation opportunities for tourists, and above all, a vast human resource for new industry.

There are agricultural areas surrounding our municipalities in both the San Juan Valley and the Animas-La Plata Valley. As the result of the interest of canning companies in opening up this region as a new growing area, farm incomes and employment have already started to gain. Even though it is small, this gain is significant and resulted in $250,000 of new income in our area last year. Acreage under contracts will be more than doubled this year, and purchases will accordingly increase. We anticipate that within five years a cannery will be built. A major sugar beet company is looking at our area because of the high tonnages and large sugar content of beets that have been grown here; and within ten to fifteen years a beet sugar plant is very possible. Fertilizer companies are also looking at our area because of its agricultural potential and because of the ready supply of natural gas from which to manufacture anhydrous ammonia. Meat packing plants will also be a factor in our future growth because of the increase in forage and feed crops in the future and the ideal conditions that will develop for cattle feeding. New Mexico State University is convinced of our expanding agricultural future and is committed to build a one-third of a million dollar experiment station this year. They have estimated a potential of $86,000,000 annual income from agriculture and related business with the completion of all projects.

We look forward to the continuation of growth from the further development of the energy resources of our area—coal, natural gas, crude oil, and electric power. Nearby coal deposits are already being mined at the rate of 5,000 tons per day, which by 1970 will increase to 25,000 tons per day in supplying fuel for the WEST Electric Power Generating complex. This coal resource has also attracted the interests of petro-chemical companies, and our City is already working with a major firm on the location of a coal-using petro-chemical plant that will be consuming coal at the same rate as our electric power facilities. In the 1970's about 1,000 new jobs are expected to result from this activity alone and the total electric generating capacity of the Four Corners area will exceed three times the present output of Boulder Dam. We are relying on this large volume of low cost power to attract other industrial users. The growth of the Four Corners area in the 1950's was stimulated by an accelerated oil and gas development, which has now leveled off. Estimated reserves of these resources are many times in excess of present requirements. Changing international con-

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ditions are bound to have an effect on our oil and gas industry—stimulating more production and a renewed search for more reserves. This will be accomplished by the construction of new wells and the pressures increasing our population in the 50's will be renewed.

We expect more people and business in our communities because of the emerging tourist industry which will be well underway in the next ten years. There are presently five National Parks and Monuments within an hour's drive of our area, good hunting and fishing, and numerous opportunities for outdoor sports the year round. The completion of U.S. Highway 64, which will put our area on a new trans-continental Highway in 1969, will open up this potential for visitors from all parts of the country, and we expect this Highway to out-draw Route 66 because of the greater number of tourist attractions it will pass through or near by.

In addition to the growth pressures I have already mentioned, others will come from new investment in manufacturing plants to utilize the abundant human resources we have available. There are more than 20,000 Navajo Indians residing on that portion of the reservation in our trade area. This labor resource has already attracted a major U.S. electronics company, Fairchild Semiconductor, Division of Fairchild Camera and Instrument Corporation; and our industrial files contain 55 other projects which will mean new investment and new job opportunities.

In view of these conditions, I believe our estimates of future population and future water requirements to be in line. I would now like to turn to the problem of our quality of water difficulties.

QUALITY OF WATER PROBLEMS

My own community has treated water, assuring our people of a safe and potable water supply. However, the Kirtland District which is presently unincorporated, is working for incorporation as a municipality in order to solve its present problem of a safe water supply.

The Kirtland District does not now have an allocation for either municipal or industrial needs and must have an adjudication of water for municipal and industrial purposes. Presently, each family living in this area gets water from wells or cisterns. Irrigation is practiced throughout the valley and these wells and cisterns are being contaminated with irrigation drainage water containing a high concentration of salt. Because of the increased salinity of the natural water system, a number of families are forced to use bottled water for drinking.

This growing area is also facing the contamination of its present water supply because there are no sewer lines or waste treatment facilities, and drainage from septic tanks and leaching fields is getting into their present well system. One thing we know with certainty is that under no conditions can these people expect the quality of water to improve and have only the prospect of a continuing deterioration of their water quality to look forward to.

Under present conditions, fire protection is a real problem without hydrants to hook-up to, and insurance rates are correspondingly high.

The area surrounding Aztec is all irrigated farming, yet urbanization is creeping in and agricultural land is being sub-divided for homes. These home-builders have the same demands for a good safe water supply as those living in the City, and may be served with City water in the future. Annexation is a very real possibility to solve the fire protection and waste disposal problems they now face. In this case, the population and water demand projections could be doubled as there are nearly the same number of people in the area surrounding Aztec as there are in the City proper.

CONCLUSION

We, in the West, have lived with water problems all our lives and spend a good deal of time studying it and worrying about it. The figures I present as an addendum to this testimony, indicating our projected population and water needs, are realistic and founded on the best knowledge we have and clearly indicate the need we have for municipal and industrial water.

The communities I represent are profoundly sincere in their request for municipal and industrial water from the Animas-La Plata Project. I speak for all of them when I assure you of our willingness and ability to enter into firm contracts for this water when such action is required.

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My appreciation to this distinguished committee for the opportunity to present this brief statement. I appreciate the privilege of appearing before this committee.

Mr. ROGERS of Texas. Thank you very much.

(The statements of Mr. Davis and Mr. Langenegger follow:)

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Projected population and water[1] needs for Farmington, Aztec, and Kirtland district, New Mexico, 1965–2000

Year	Farmington		Aztec[2]		Kirtland[3]	
	Population	Water	Population	Water	Population	Water
1960	23,000		4,100		1,500	
1965	24,000	5,600	4,500	1,600	1,800	420
1970	31,000	8,800	5,300	2,100	2,300	660
1975	37,700	12,300	6,400	3,000	2,900	920
1980	45,900	17,300	7,800	4,100	3,400	1,300
1985	55,800	24,300	9,500	5,800	4,200	1,800
1990	67,900	34,000	11,600	8,200	5,100	2,550
1995	82,600	47,700	14,100	11,400	6,200	3,600
2000	100,500	66,900	17,200	16,000	7,500	5,000

[1] Water needs stated in acre-feet.
[2] Unincorporated area in vicinity to be supplied with water estimated to be equal in size to city.
[3] Unincorporated area in vicinity to be supplied with water estimated to be double the size of the city.

STATEMENT OF NEW MEXICO FARM AND LIVESTOCK BUREAU, LAS CRUCES, N. MEX., PRESENTED BY A. W. LANGENEGGER, PRESIDENT

To: Members of Subcommittee on Irrigation and Reclamation, House of Representatives.

Subject: Testimony presented in support of the Animas-La Plata Project by the New Mexico Farm and Livestock Bureau representing 9,238 farm and ranch families.

The New Mexico Farm and Livestock Bureau has a resolution which has been approved by their voting delegates at annual meetings for the past four years, supporting authorization and completion of the Animas-La Plata Project.

We have long recognized that there is an abundance of undeveloped water, land and natural resources in the Northwestern part of New Mexico.

The farmers in this area should be commended for their efforts to utilize the available land and water. First irrigation was developed by individuals diverting small amounts of water on easily accessible land. Later, this was expanded and improved by several farmers working together to form a community ditch. In recent years irrigation districts have been formed to assure more efficient use of available water.

It is our belief that the Animas-La Plata Project, recommended by the Bureau of Reclamation, is necessary to further development of this area to its full potential.

The project is made more attractive by the development of huge coal deposits in the area and making available municipal and industrial water for the growing cities.

Respectfully submitted.

A. W. LANGENEGGER, *President.*

Mr. ROGERS of Texas. Mr. Aspinall?

Mr. ASPINALL. Mr. Chairman, I am glad to recognize these acknowledged watermen from New Mexico, Mr. Reynolds and Mr. Coury. I am glad to hear about this friendly agreement between the States of New Mexico and Arizona. This is the way that the upper basin—or the lower basin, as far as that is concerned—has had to settle their water controversies throughout the years, and this is just another example.

Mr. Reynolds, do you see any difficulty at all in arriving at a final satisfactory agreement with Colorado in the operation of the Animas-La Plata project?

Mr. REYNOLDS. No, sir, I do not. Both States are well aware of the interstate nature of this project. We are in agreement on the principles to be included in a compact, we believe.

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Mr. ASPINALL. In the future operation of the Animas-La Plata project, the repayment by the users, do you see any difficulty whatsoever as between the areas in Colorado and in New Mexico if, in Colorado, they assume the responsibility of repayment under an ad valorem tax program, as our conservancy districts in Colorado provide, and the users in New Mexico do not assume such a responsibility? Keep in mind that both States—both States—have entitlements out of the net revenues of the basin fund.

Mr. REYNOLDS. Yes, sir. I think that there probably is not as much difference here as may be apparent. Those areas within the boundaries of the conservancy district that are not irrigated would pay ad valorem taxes in our State as well as they would, I understand, in your State.

The question here goes to reaching out now to those communities who have expressed interest in contracting for water to, in a somewhat artificial way, bringing them into this district in order that they pay not only the price contracted for municipal water, but also ad valorem taxes to contribute to developing the irrigation district. Under normal conditions, if these communities did not contract for water for municipal purposes, they would not be included within the district at all.

Mr. ASPINALL. I understand that. But if there did become contractees in this particular matter, then they also become beneficiaries of indirect as well as direct benefits.

Mr. REYNOLDS. It is my understanding that they would pay a fair and reasonable price for the municipal supply under a contract quite separate from the contract of the conservancy district.

Mr. ASPINALL. And it would be the purpose of the State of New Mexico to see that their payments were in line with like payments from the users in the area served in Colorado, is that correct?

Mr. REYNOLDS. Well, sir, I think the State of New Mexico would rely on the Bureau and the municipalities to work out the details of the contract.

Mr. ASPINALL. That is all.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Coury and Mr. Reynolds, it is a pleasure to see you. I am glad to know that the great feeling of brotherly love has pervaded not just Philadelphia, but apparently Arizona and New Mexico. You folks have buried your tomahawks in the sand out there rather than in one another.

If the committee——

Mr. UDALL. Will my friend yield at this point?

Mr. SAYLOR. I shall be happy to yield.

Mr. UDALL. I cannot tell whether he is happy or sad that these tomahawks have been buried, but I rather suspect the latter.

Mr. SAYLOR. I am trying to get Arizona a little water out of this deal, and I am having a great deal of difficulty doing it. You have had to sell your soul to so many different people down there, it is a wonder you are able to look at yourself in the mirror.

May I ask, Mr. Coury, if the committee decided to eliminate the provisions of the study of importation of water from this bill and to proceed with the national water commission recommended by the administration, would you support this bill?

Mr. COURY. Could I let Mr. Mann answer that question?

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Mr. SAYLOR. Absolutely.

Mr. MANN. Well, as a matter of fact, I think the answer is we do not know, because we would have to take it up with the people of New Mexico, with the Governor and the members of the Interstate Streams Commission. That is as far as I think we can go in answering that particular question.

Mr. SAYLOR. In the discussions you have held among yourselves and with representatives of the upper basin States, where do you anticipate that any waters that are imported into the Colorado River Basin will originate?

Mr. REYNOLDS. It appears to me, sir, that that question is rather wide open. I would think the most logical categories to be northern California, the Columbia River Basin, or possibly the NAWAPA plan.

Mr. SAYLOR. The latter plan, of course, contemplates not only the Colorado River Basin but it also includes all of the States west of the Mississippi River?

Mr. REYNOLDS. This is my understanding, that it does, sir.

Mr. SAYLOR. If the committee in its wisdom followed the recommendation of the Bureau of the Budget and eliminated the West Divide, the San Miguel and the Dallas Creek projects from the bill, would you support this legislation?

Mr. REYNOLDS. Yes, sir, we would support it. We would regret it if our neighbor State could not have that development, but we would not, I think, oppose the bill because it did not authorize those projects.

Mr. SAYLOR. Of the total allocation to New Mexico from the waters of the Colorado River, how much water is presently put to beneficial consumptive use?

Mr. REYNOLDS. In the neighborhood of 100,000 feet per annum is being used in New Mexico at this time. Works already authorized or under construction, will, of course, use a lot more than that.

Mr. SAYLOR. What will those works that are now authorized and under construction put to beneficial consumptive use, in round figures?

Mr. REYNOLDS. I think, sir, I can perhaps answer it best in this way: If the Animas-La Plata project is authorized—that is 34,100 acre-feet—and if the Secretary of the Interior contracts for the full amount from the Navajo Reservoir for municipal purposes, that he finds he can contract, our allocatiton will be essentially used up.

Mr. SAYLOR. Would this be based upon a full flow of 7.5 million acre-feet in the upper basin?

Mr. REYNOLDS. No, sir; this is based on a 6.3 total depletion in the upper basin—6.3 million acre-feet annually.

Mr. SAYLOR. If the present figures of the Secretary of the Interior are correct, that the anticipated flow in the upper Colorado will only be 5.8 million acre-feet, have the water authorities in the State of New Mexico determined where the cuts would take place?

Mr. REYNOLDS. This, of course, would—there are some provisions of the bill authorizing the San Juan-Chama project which would have some effect on that, but basically these cuts would have to take place, of course, in accordance with the compact and our State law.

Mr. SAYLOR. If it were possible to bring water from some other area and import it into the Colorado River above Lee Ferry, so that there could be more than 7.5 million acre-feet for beneficial consumptive

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use in the upper basin, does the State of New Mexico have or plan projects that can put that water to beneficial consumptive use?

Mr. REYNOLDS. Our planning has not extended to uses in excess of our share of 7.5 million acre-feet per annum. I daresay if that were possible, we would find places where we could use that water.

Mr. SAYLOR. If licenses were granted by the Secretary of the Interior for the construction of thermal plants to produce electricity, might this be one of the places that you could use some of that water?

Mr. REYNOLDS. Yes, sir.

Mr. SAYLOR. And there is an adequate supply of coal and lignite fuels in the State of New Mexico that could be leased by the Federal Government?

Mr. REYNOLDS. Yes, there are very substantial deposits of coal in the northwest corner of the State of New Mexico.

Mr. SAYLOR. They are in the area known as Four Corners?

Mr. REYNOLDS. Yes, sir.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Johnson?

Mr. JOHNSON. I have no questions.

Off the record.

(Discussion off the record.)

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. I will reserve my time.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. At the risk of starting a mutual admiration society, I want to thank you for your kind comments about myself and Congressman Rhodes. I am sure you would include in those comments our fine Congressman Senner from the Third District, who happens to represent these people along the Gila.

Mr. REYNOLDS. I surely would.

Mr. UDALL. We think you are very able, very aggressive, and a very statesmanlike representative of your people. We think you drive a hard bargain, but I wanted to confirm for the record what you have said previously, that we are near agreement on these thorny and incredibly complex problems that have occupied so much time and attention along the Upper Gila. I express the hope you expressed, that in the immediate future, we would have some definite resolution of these so we could all go forward together.

Mr. Chairman, I have nothing further except to ask unanimous consent that if we reach an agreement which is formalized as a statement or as a memorandum, that I be allowed to insert it in the record at this point so that we can have some record of the outline of the agreement that I hope we can reach if both sides come to some conclusion.

Mr. ROGERS of Texas. That is a rather "iffy" unanimous-consent request. But we will consider it, Mr. Udall.

Mr. UDALL. Mr. Chairman, I do hope to have—we are working on language that will outline the agreement. I do hope to have something that will show.

Mr. ROGERS of Texas. If you do arrive at an agreement, the Chair will certainly honor your unanimous-consent request if there is no objection.

Mr. UDALL. Thank you.

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MAY 12, 1966.

MEMORANDUM

To: Senator Clinton P. Anderson

From:

Congressman John J. Rhodes.
Congressman Morris K. Udall.
Congressman George F. Senner, Jr.

(1) Hooker Dam and Reservoir shall be constructed to an initial capacity of 98,000 acre feet and in such a manner as to permit subsequent enlargement of the structure to give effect to the provisions hereof.

(2) New Mexico shall be entitled to increase her consumptive use from the Gila River System, including tributaries, in excess of the amounts permitted by the Decree in *Arizona* v. *California* in its present form an average of 18,000 acre feet annually in any period of ten consecutive years, including reservoir evaporation. This increase in consumptive use shall not start until delivery of Colorado River water to downstream users in Pinal County has been accomplished in accordance generally with H.R. 4671 (Committee Print No. 19). New Mexico shall be further entitled to increase her consumptive use from the Gila River System, including tributaries, by an additional amount averaging 30,000 acre feet annually in any period of 10 consecutive years. This further increase in consumptive use shall not start until works capable of importing 2.55 million acre feet annually into the Colorado River System have been completed. The additional consumptive uses provided for hereby shall be subject to all present rights in New Mexico and Arizona as established by Globe Equity Decree No. 59 or otherwise and junior thereto. Such consumptive uses in New Mexico shall be made only to the extent possible without economic injury or cost to present downstream users.

Sufficient Colorado River water shall be made available to users of Gila River System water downstream from Coolidge Dam to replace any diminution of supply or reduction in flow resulting from the increase in uses by New Mexico as provided herein, including any uses to replace losses by evaporation from Hooker Reservoir. In determining the amount of water required for this purpose, full consideration will be given to any difference in quality of the waters involved; in addition, downstream users shall be reimbursed for losses of hydroelectric power at Coolidge Power Plant resulting from increased upstream usage. Such reimbursement shall be from the Lower Colorado River Development Fund.

(3) In the event it is necessary to obtain modification of the decree of the Supreme Court in *Arizona* v. *California* to accomplish any of the foregoing objectives the parties shall cooperate diligently to secure a modification accomplished by Interstate Compact or by an amendment to the Decree by the Court, whichever appears to be the most appropriate procedure.

(4) The Buttes Dam and Reservoir shall be so operated as to not prejudice the rights of any users above San Carlos Reservoir as those rights are defined under the Globe Equity Decree No. 59.

(5) Arizona and New Mexico shall cooperate diligently in any way necessary to implement the principles set forth herein.

The contents of this memorandum have been concurred in by Mr. Steve Reynolds, the Chief Water Engineer of the State of New Mexico. It is the intention of Congressman Udall to insert this agreement in the record of the House Interior and Insular Affairs Committee hearings on H.R. 4671 and related bills. However, Mr. Udall will not, of course, make such an insertion until we have received your concurrence.

GEORGE F. SENNER, Jr.
JOHN J. RHODES.
MORRIS K. UDALL.

U.S. SENATE,
COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES,
May 16, 1966.

Hon. MORRIS K. UDALL,
U.S. House of Representatives.

DEAR MO: I am in receipt of the memorandum of May 12 from Congressman Rhodes, Congressman Senner and yourself with reference to the Hooker Dam and Gila River system.

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I am glad to concur in this memorandum since I understand that it has been concurred in by Steve Reynolds, the State Engineer of the State of New Mexico.

Sincerely yours,

CLINTON P. ANDERSON.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. I will reserve my time.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. I have no questions.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. I would like to ask the gentlemen what your entitlement under the compact is now.

Mr. REYNOLDS. Under the upper Colorado River compact?

Mr. WYATT. Yes.

Mr. REYNOLDS. We estimate under the terms of the compact—and estimating the water supply to give the upper basin 6.3 million acre-feet per annum, rather than the 7.5, which it is nominally entitled to—we could make nominal at-site depletions of 770,000 acre-feet annually.

Mr. ASPINALL. Will my colleague yield?

Mr. WYATT. Yes, sir.

Mr. ASPINALL. This is what percentage of the upper basin entitlement?

Mr. REYNOLDS. This is 11¼ percent of the upper basin entitlement, making allowances here, Mr. Chairman, for the salvage by use and the other effects that are reflected between the point of use and the point of measurement at Lee Ferry.

Mr. WYATT. Well, now, I am not certain that I understand you.

What I was wanting to get for the record is the amount of your entitlement under the compact itself. I am not certain that you answered that question. Perhaps you did.

Mr. REYNOLDS. Eleven and a quarter percent of 7.5 million—7.5 million less the 50,000 allocated to Arizona by the compact is 838,000 acre-feet annually.

Mr. WYATT. Now, do you know approximately what you are using now?

Mr. REYNOLDS. Approximately 100,000 acre-feet annually.

Mr. WYATT. What, approximately, will be the amount that you will be using on all the projects that are authorized or built?

Mr. REYNOLDS. Does this include the Animas-La Plata?

Mr. WYATT. Yes, sir.

Mr. REYNOLDS. Then it will approximate 760,000 acre-feet annually, assuming that the Secretary has contracted fully for the municipal-industrial supply available in the Navajo Reservoir.

Mr. WYATT. The amount you will be using will still be less than your entitlement; is that correct?

Mr. REYNOLDS. Yes, sir.

Mr. WYATT. I have nothing further.

Mr. ROGERS of Texas. Mr. Hansen?

Mr. HANSEN. Mr. Chairman, with all the fine words of my colleague from Arizona, I would expect that one of these times, he might find his face enshrined upon one of these totem poles.

I have no questions.

Mr. ROGERS of Texas. Mr. Reinecke?

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Mr. REINECKE. I yield my time to Mr. Saylor.

Mr. SAYLOR. No, thank you.

Mr. REINECKE. I have no questions.

Mr. ROGERS of Texas. Have you gone over this entire central Arizona project pretty thoroughly?

Mr. REYNOLDS. Not in great detail, sir. The fundamental features of it I am familiar with.

Mr. ROGERS of Texas. I mean the cost of it, the allocation of water, and that sort of thing?

Mr. REYNOLDS Not in great detail. Our concern has been principally as to Hooker Reservoir and the water supply on the upper Gila system.

Mr. ROGERS of Texas. I will reserve my questions, then, for some expert on the overall problem, I think.

Thank you very much, gentlemen.

Mr. REYNOLDS. Thank you, sir.

Mr. ROGERS of Texas. We will hear next from the southwestern water conservation district, represented by Judge William S. Eakes; Chief Jack House, speaking for the Ute Mountain Ute Indian Tribe, and Mr. John Baker, speaking for the Southern Ute Indian Tribe.

Gentlemen, we are glad to have you here.

STATEMENT OF JUDGE WILLIAM S. EAKES, IN BEHALF OF THE SOUTHWESTERN WATER CONSERVATION DISTRICT; ACCOMPANIED BY MEMBERS OF THE BOARD OF DIRECTORS AND CHIEF JACK HOUSE, SPEAKING FOR THE UTE MOUNTAIN UTE INDIAN TRIBE; WARREN PYLE, INTERPRETER; JOHN BAKER, SPEAKING FOR THE SOUTHERN UTE INDIAN TRIBE

Judge EAKES. Mr. Chairman, gentlemen of the committee, my name is William S. Eakes. I am a judge of the Sixth Judicial District of Colorado. For many years I was attorney for the Southwestern Water Conservation District of Colorado, and I speak now for the district, which was created by an act of the Colorado Legislature and charged with the express duty of conserving and developing the waters of the San Juan and Dolores Rivers and their tributaries. The San Juan and Dolores Rivers are major tributaries of the Colorado River. The southwestern water conservation district covers a large area, including nine counties, or parts thereof, in southwestern Colorado.

I am accompanied here today by the following representatives of the southwestern water conservation district. I would like to introduce to the committee Mr. Ira E. Kelly, president of the board of directors, representing Montezuma County; Mr. Archie B. Toner, secretary of the board of directors, representing Archuleta County; Mr. Fred V. Kroeger, representing La Plata County; Mr. Lew Williams, representing San Miguel County; Mr. Wade Redford, representing Dolores County; Mr. Clifford Jex of Grand Junction, Colo., the district engineer; and Mr. Frank E. Maynes of Durango, Colo., attorney for the district. Many others from the area are here representing the cities, towns, and water conservancy districts affected by these projects.

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The Southwestern Water Conservation District of Colorado asks the speedy and favorable action of this committee on H.R. 4671 as amended. We support this bill in its entirety because we believe it fair and proper and in the best interest of the Colorado River Basin and of the Nation.

The development contemplated by these projects on our semiarid lands will provide needed employment, stimulate businesses and professions, and generally enhance the economy and general welfare of the area, the States involved, and the Nation.

The Animas River rises in the San Juan Mountains above Silverton, Colo., and flows south to its confluence with the San Juan River at Farmington, N. Mex. The Animas-La Plata project uses Animas River water to irrigate about 72,120 acres of high quality lands in La Plata County, Colo., and San Juan County, N. Mex. The project also provides an adequate water supply for the city of Durango and other municipalities in the vicinity including Farmington and Aztec, N. Mex. The plan makes possible a private powerplant development—and the Congressman will note I said private power development.

Mr. ROGERS of Texas. Yes.

Judge EAKES (continuing). Which will utilize large quantities of coal to be mined in the Ute Indian Reservation and will give employment to a considerable number of the Indian people.

The Dolores River rises in the San Juan Mountains above Rico, Colo., and flows westerly to its confluence with the Colorado River in the State of Utah. The Dolores project contemplates the irrigation and development of some 61,000 acres of land in Montezuma and Dolores Counties, in Colorado. This project, also, supplies municipal water for the cities of Cortez, Cahone, Pleasant View, and Dove Creek, Colo.

The San Miguel River rises in the San Juan Mountains above Telluride, Colo., and flows westerly to its confluence with the Dolores River. The San Miguel project will furnish irrigation water for the development of about 38,950 acres in San Miguel and Montrose Counties in Colorado.

These three projects will greatly enhance the economy of the four corners area in Colorado and New Mexico. This area of the San Juan Mountains is a land rich in natural resources, scenic beauty and an extraordinary potential for growth and development, limited only by the pressing need to develop its water supply. Its people include those of Indian and Spanish descent as well as those descended from the hardy pioneers who explored and settled the Rocky Mountain West.

We, also, strongly support and urge the authorization of the West Divide project in Garfield County, Colo., the Dallas Creek project in Montrose County, Colo., and the Lower Colorado Basin project in Arizona. These projects will do as much for their areas as our projects will do for southwestern Colorado.

Several members of this committee, including Chairman Walter Rogers, Mr. Compton White, Mr. Joe Skubitz, Mr. Laurence Burton and, of course, Mr. Aspinall, have already favored us by personally examining these projects on the ground at field hearings. We hope that all the members of this committee will take the opportunity to

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do the same thing and come to "God's country" in southwestern Colorado and personally see what a wonderful thing these projects will be for the region and the Nation.

It is an honor and a pleasure for us to appear before this committee. This is especially gratifying to us because the chairman of the full committee, Mr. Aspinall, is our Congressman. I appreciate and thank you for the opportunity to present this statement.

Mr. ROGERS of Texas. Thank you, Judge Eakes.

Mr. ASPINALL. Mr. Chairman?

Mr. ROGERS of Texas. Mr. Aspinall.

Mr. ASPINALL. Before we proceed with questioning of Judge Eakes, I would ask unanimous consent that Chief Jack House, his interpreter, Mr. Pyle, Mr. Baker, and the others take the places now held by Judge Eakes, Mr. Kelly, and Mr. Toner, and we will question them all together.

Mr. ROGERS of Texas. If you will come forward, gentlemen, we will hear you next and then proceed with questions and answers.

Mr. ASPINALL. Mr. Chairman, as these witnesses take their positions, I want to acknowledge the personal friendship and working relationship that I have had with all of these people from the southwestern part of Colorado. I particularly wish to welcome Chief Jack House, the hereditary chief of the Ute Mountain Indian Tribe at Towaoc, who is accompanied by his interpreter, Mr. Pyle, and Mr. Baker, tribal chairman of the Southern Ute Tribe at Ignacio. These two Indian American citizens of ours are outstanding in the leadership of their people and their working relationship with their white brothers. I know of no group that has been more responsive to the wishes of the Congressman in trying to work together than these two great leaders of southwestern Colorado.

I would ask that Chief Jack House be permitted to make his statement first, and that Mr. Pyle make the interpretation.

Mr. PYLE. He wishes me to read the statement, sir.

Mr. ROGERS of Texas. You may proceed.

Mr. PYLE (reading statement of Chief Jack House):

Mr. Chairman and gentlemen of the committee, my name is Chief Jack House. I have been a member of the Tribal Council of the Ute Mountain Ute Tribe of Howaoc, Colorado for many years, and have been Chief of the Tribe for the past 23 years.

We have approximately 1,000 people enrolled in the Ute Mountain Ute Tribe. Our reservation lands are located in Northwestern New Mexico and Southwestern Colorado. This is a dry and arid land and my people are engaged in cattle and sheep raising. Water is precious in our country. My people have seen many droughts when there was no water and no feed and my people have seen times when water and feed were plentiful. Fifteen to eighteen years ago, there was no rain at all in our country, and our cattle and sheep died in great numbers. We had to move our livestock to Arizona 500 miles away by truck and train because of the lack of water and feed. This was a great expense and hardship to my people.

My tribe has had a feasibility study done on the Fort Lewis Mesa area of the Animas-La Plata Project and it showed that lack of water is the only thing that is keeping the tribe from developing a tribal herd of cattle on these lands. Such a herd of cattle would certainly be a benefit to my people. Also, we are very strongly interested in the recreation and other benefits that the tribe can have by use of the Meadows Reservoir of the Animas-La Plata Project.

For many years we have heard about these water projects and now I understand that we might get them. The Ute Mountain Ute Tribe is in favor of these

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water projects so water will be available to my people to use for the best interest of the Tribe. If this water is available, my people will be able to improve themselves in many, many ways. We will be able to provide more employment for our young people by use of industrial water. We will be able to further develop our cattle and sheep industry by providing needed pasture and water for our livestock. We will be able to have for my people and other people a recreation area which will also provide my people with an income, and in twenty or thirty years, if my people need a drink of water, it will be there for them.

Lack of water for our lands is a major problem for my tribe. With the water that these projects will provide for our lands, it will give my people much needed help.

Our good friend Congressman Aspinall has always helped us on any project that we have asked and we feel sure that he will do all in his power again to help us get the water that means so much to us.

Mr. ROGERS of Texas. Thank you, Chief House and Mr. Pyle.

Mr. John Baker, did you have a statement?

Mr. BAKER. Mr. Chairman and members of the committee, this is going to be a very, very short statement.

My name is John Baker. I am presently the chairman of the tribal council of the Southern Ute Indian Tribe of Ignacio, Colo. I have had the honor of serving as the chairman of the tribal council for several terms and have been actively engaged in tribal management affairs since 1952.

There are approximately 750 people enrolled in the Southern Ute Indian Tribe and our reservation lands are located in southwestern Colorado. We have a real and vital interest in the future of the Animas-La Plata project. I can recall when the project first began to take shape, the tribe was asked to lend its support. A careful study and investigation of the benefits which would accrue to the tribe clearly showed that it was in the best interest of the Southern Utes to actively support and encourage the authorization and construction of the Animas-La Plata project. Down through the years, we have maintained this support for the Animas-La Plata project, even though the original purpose has changed from primarily argricultural to a diversified purpose including industrial and municipal water supply.

About 80 percent of the tribal members of my tribe live on the reservation lands. As a result, employment opportunities are very limited. In the past, the Southern Ute Tribal Council has utilized the tribal assets in an attempt to develop adequate employment opportunities for our people on the reservation.

Under the plan of development of the Animas-La Plata project, water will be available to the Southern Ute Indian Tribe to further develop our agricultural and livestock economies. Approximately a year and a half ago, the Southern Ute Tribe entered into an agreement with the Peabody Coal Co. for the future development of the coal resources and reserves of the tribe which are located in the geographical area of the Animas-La Plata project. The tribe must have water available to develop these coal resources. The industrial use of this water will enhance the chances for employment of tribal members on the reservation, in addition to providing the tribe with a source of income.

One of the proposed reservoirs in the Animas-La Plata plan is located on Southern Ute Reservation lands. The Southern Ute Tribe, at the present time, has a small commercial recreation lake in south-

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western Colorado, and with the experience and knowledge we have gained through the operation of this lake, we know that a lake, such as the Three Butte Reservoir, can be of great benefit to the tribe. It will provide our people with excellent recreation facilities, additional employment and a substantial income from use by other people.

As I stated earlier, the Southern Ute Tribe has always strongly endorsed the development of water resources in our area and we believe that if we are fortunate enough to have the Animas-La Plata project authorized and constructed that it will result in the economic betterment of our tribe and the surrounding areas in which we live.

Mr. ROGERS of Texas. Mr. Baker, did you desire the resolution attached to your statement to be included as part of your statement?

Mr. BAKER. Yes, sir.

Mr. ROGERS of Texas. Without objection, it is so ordered.

(The resolution referred to follows:)

RESOLUTION No. 3436

RESOLUTION OF THE COUNCIL OF SOUTHERN UTES, MAY 3, 1966

Whereas authority is vested in the Tribal Council by the Constitution and By-Laws adopted by the Southern Ute Tribe and approved November 4, 1936, to act for the Southern Ute Tribe, and

Whereas a hearing before a Subcommittee of the House of Representatives of Congress is being held in Washington, D.C., commencing May 9, 1966 concerning the Animas-La Plata Reclamation Project, which said project is of vital concern to the Southern Ute Tribe, and

Whereas a request has been made upon the Tribal Council to furnish a representative of the Tribe to present the position of the Tribe in relation to the project at said hearing, and

Whereas the Tribal Council, as the result of having followed the progress of said Reclamation Project for many years and knowing of the vital concern of the Tribe in seeking approval of the project, has considered the request for a representative to be at the hearing and has designated John E. Baker, Sr., Chairman of the Tribal Council, to be such representative: Now therefore, be it

Resolved, That John E. Baker, Sr., as Chairman of the Tribal Council, be, and he hereby is, authorized to appear in Washington at said hearing on the Animas-La Plata Project and at such hearing to present, if requested, oral testimony on behalf of the Tribe expressing the position of the Tribe as in full support of the project, as the approval of the project is of great concern to the Tribe as an aid in developing the assets and resources of the Tribe and the economic betterment of the Tribe; and be it further

Resolved, That the hereto attached statement represents the position of the Tribe as supporting the project in full, and that Mr. Baker, as Chairman, is hereby authorized and directed to present this Resolution, together with the accompanying statement, and any oral testimony he shall desire in full support of the project on behalf of the Southern Ute Tribe.

This resolution was duly adopted on the 3rd day of May, 1966.

JOHN E. BAKER, Sr.,
Chairman, Southern Ute Tribal Council.

CERTIFICATION

This is to certify that there were six (6) of the regularly elected Southern Ute Tribal members present at the above meeting at which five (5) voted for, and (0) against, the Chairman not voting as the result of procedural limitations, it being a quorum and the above resolution was passed.

JOAN CLARK,
Secretary, Southern Ute Tribal Council.

Mr. ROGERS of Texas. The Chair will recognize the gentleman from Colorado, Mr. Aspinall, for questions.

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Mr. ASPINALL. Mr. Chairman, I would first ask Judge Eakes a question.

Judge, do you feel that the people of the area of these three projects are vitally interested and will support the projects and will sign contracts to make the necessary repayment as provided under the reclamation law?

Judge EAKES. Yes, sir, I do. There are a number of people here to testify who represent some of the entities who will sign the contracts. I am sure they will endorse it heartily.

Mr. ASPINALL. I would ask Mr. Baker two or three personal questions.

Mr. Baker, how far have you gone in your education program—your own personal education program?

Mr. BAKER. Following World War II, I attended a technical college in Chicago. At that time, we were beginning a program for the Southern Utes, and I was called back to begin work on it. It took us several years. I have been in this area before.

Later, after working for about 14 years as a council member, and at the age of 45, I picked up my family and went to Arizona State University. I started as a freshman because Arizona State did not recognize very many of my other credits, and went 24 months straight. I have never been a sophomore in college, and a junior maybe one semester. Presently, I am a senior down there and expect to return back there this fall.

Mr. ASPINALL. Then when you finish your education, do you expect to return to your tribe and continue with your service to your people?

Mr. BAKER. Well, I expect to, but politics enters the picture. I hope——

Mr. BURTON of Utah. You are not going to run against the chairman, are you?

Mr. BAKER. I hope to be able to return.

Mr. ASPINALL. You did not have any trouble when you returned from college taking up the duties of tribal chairman immediately, did you?

Mr. BAKER. Well, I took political science as my major, and I know a few Congressmen up there who do not seem to have any trouble.

Mr. ASPINALL. I wonder if Mr. Baker could tell—I wanted Mr. Baker to tell us his story, because to me, it is outstanding, a member of a tribe which was placed on the reservation in 1882, if I remember correctly, a tribe which has cooperated and coordinated their activities in the area, and this is poor land that Uncle Sam gave to these people. They have had a great deal of difficulty. Yet here is one of their members who has been able to get an education, and he has given his service, his time, during that process.

I just wanted our people up here on the committee bench to know what you have done, John.

Mr. BAKER. Thank you.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. I have a few questions for the judge.

Judge, your statement does refer to all of the projects that are in this bill.

Judge EAKES. Yes, sir.

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Mr. SAYLOR. Now, you refer first to the Animas-La Plata project, the Dolores project, and the San Miguel project. Is that correct?

Judge EAKES. Those are the three projects, Mr. Saylor, that are in my immediate district. That is the reason that I singled them out for special attention, although in a later paragraph, or on the first page, the third paragraph down, we endorse the bill in its entirety.

Mr. SAYLOR. What effect, if any, would the report of the Bureau of the Budget, dated April 30, 1966, in which they recommend that the Dallas Creek project, the West Divide project and the San Miguel project be postponed, have upon your endorsement?

Judge EAKES. They would not have any on our endorsements. We hope they would not have any on yours.

Mr. SAYLOR. Here I am, supposed to be the loyal opposition; and having to uphold the hand of the administration. That is a very strange position.

Would you support this bill if the instruction dealing with the water supply or the study of the importation of water be deleted?

Judge EAKES. I probably would support the bill myself, but I doubt if my State would under those circumstances. But from the standpoint of my particular area, we would still support the bill, I am quite sure, but our State would pull the rug out from under us at that point.

Mr. SAYLOR. Let me ask you this: Have you heard, in your capacity as attorney for the Southwestern Water Conservancy District, or in your capacity in the Sixth Judicial District of Colorado, that there has ever been any plan that contemplates the importation of water into Colorado itself, into the State of Colorado?

Judge EAKES. Well, the plan, as I understand it, one of the alternates, plans to bring in water below the points where the rivers run from the States to the State of Colorado. However, the idea behind this is that Colorado could acquire additional water supplies through exchange.

In other words, the waters that now run down the river for Colorado to meet the commitments at Lee Ferry could be used in the upper basin States and allow these imported waters to make up the deficiency that would be created in the lower States at that point.

Mr. SAYLOR. Chief Jack House, would you tell us whether or not the statement that you have made applies only to the Animas-La Plata project?

Mr. PYLE (for Chief House). He refers to both projects, the Dolores project and the Animas-La Plata.

Mr. SAYLOR. The Dolores project and the Animas-La Plata?

Mr. PYLE. Yes, sir.

Mr. SAYLOR. Would both of these projects be on the Ute Mountain Indian Reservation? Would their lands be within the two projects?

Mr. PYLE. Yes, sir.

Mr. ASPINALL. Ask the chief.

Mr. PYLE (for Chief House). Yes, sir. It would be—both projects would be on Ute lands, Ute mountain lands.

Mr. SAYLOR. How much land would you have in irrigation in these two projects, can you tell us? That is Indian land. I am just interested in the Indian lands that will be put in irrigation.

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Mr. PYLE. He does not know. He would have to study it.

Mr. SAYLOR. Just one other thing.

Mr. Baker, I join the chairman in commending you, for having the courage to go to college when you are 45. But I am interested in your statement when you said politics raised its head. What does politics have to do with going to college?

Mr. BAKER. Well, it has a lot to do with it. I felt that I was near the end of my term, so I have to do something, so I went to college.

Mr. SAYLOR. You mean your term as chairman of the tribal council?

Mr. BAKER. Well, it appeared to be at an end at that time, so I took a breather and went to college.

Mr. SAYLOR. Well, I certainly hope that members of your tribe, Mr. Baker, are astute enough to appreciate the personal sacrifices that you made to go to college, not only to advance yourself and your family, but in order to advance your people and to advance this country. You are a credit to your people and you are a credit to this country. I congratulate you.

Mr. BAKER. Thank you.

Mr. ROGERS of Texas. Let me join in what Mr. Saylor said, Mr. Baker, and say to you that when I was a freshman in college, I thought I was not going to be a sophomore, either.

Mr. Johnson?

Mr. JOHNSON. Thank you, Mr. Chairman. I have just one question I would like to ask of these gentlemen.

Judge Eakes, and also Mr. Baker, in your statements, you refer to coal potential in the two areas.

Are you both talking about the same coal deposit, the one that is under lease or consideration with the Peabody Coal Co.?

Mr. BAKER. I think you have to consider that area down there as one big tract of land in which the Ute Tribe, the Southern Utes have an interest, and the Ute Mountain Utes also have an interest, and other people that own land in adjoining areas, or in the same area; I think we are all involved. I think that when we talk about the power that is being generated near Ship Rock now, we are also talking about the potential or the beds that we have across the river, you might say, to the north of that plant, which is our land. So I think we are talking about the same development.

Mr. JOHNSON. So there is a large deposit of coal there in Colorado, southern Colorado, and that portion of New Mexico which is included in the tribal lands?

Judge EAKES. This is a tremendous deposit of coal. They have a report from the Department that goes back many years when they first made it. The extensiveness of it is just remarkable. It goes over all that country down there. Miles and miles of it. It can be strip mined rather easily.

Mr. JOHNSON. This will probably be developed by the coal people, including the availability of water, and they would locate a power supply there.

Judge EAKES. The Animas-La Plata project makes water available for this and for private power development. That is what it is for, to produce power. It will be a private development.

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Mr. JOHNSON. That is all.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. No questions.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. I would just like to say you people have a very wonderful area, with which I am entirely familiar. You produce very fine people. Your people can be proud of the Indians and the non-Indian people that have represented them in the hearings.

I would yield a minute of my time, if he wanted it, to the temporary floor leader of the Johnson administration and the Bureau of the Budget, Mr. Saylor.

Mr. SAYLOR. I have said all I wanted to say up until this time. I will wait until the representatives of the Bureau of the Budget come around and give them a supporting hand when they show up.

Mr. UDALL. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. You gentlemen from Colorado are to be complimented on your presentations. You certain come from a very beautiful section of our country. It is probably because it is on the border of Utah.

I would like to say that I spent a very pleasant day with Judge Eakes as his guest for an afternoon and evening, and if you want to catch some nice rainbow trout, go out to the chairman's district and let Judge Eakes take you fishing.

Did I understand you to say, Judge, that you had somebody here from Hinsdale County?

Judge EAKES. Mr. Toner, right over here.

Mr. BURTON of Utah. Mr. Toner. Is that preposterous story that Wayne Aspinall told me, about the prospector from your county, who took five guys up into the mountain one winter and shot them all and spent the winter eating their remains—Is that true?

Mr. TONER. It certainly is. That is true. You know, when they had him up before a court, probably Congressman Aspinall told you what the judge said to him.

Mr. BURTON of Utah. He told me what the judge said. Is it true they were all Democrats?

Mr. TONER. Yes.

Mr. BURTON of Utah. I will be happy to yield to the chairman.

Mr. ASPINALL. Is it true, Mr. Toner, that you are one of the surviving Republicans?

Mr. TONER. Well, as I told you here about 4 years ago, and some of the other representatives here, we never let a Republican die in Hinsdale County, and we eat all the Democrats.

Mr. BURTON of Utah. It is nice to see you again, Jim.

Mr. UDALL. To complete the story, the version I read, and some of the people here might not have heard it, the judge said, "I sentence you to hang; we only had seven Democrats in this county and you ate five of them."

Mr. BURTON of Utah. That is the story.

Mr. ASPINALL. Will the gentleman yield to me?

Mr. BURTON of Utah. Yes, sir.

Mr. ASPINALL. That story is not told correctly, because the judge was a rather picturesque judge in those days, and he used picturesque

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language. He said, "You SOB, there were seven Democrats in Hinsdale County and you ate five of them, and I sentence you to be hung by the nape of your neck until you are dead."

Mr. SAYLOR. Does that mean sons of brotherhood?

Mr. ROGERS of Texas. That is Senate Office Building.

Now that the record is complete, Mr. Wyatt, do you have any questions?

Mr. WYATT. I have no questions.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. Not being able to keep up with this repartee, I yield the balance of my time to the chairman.

Mr. ROGERS of Texas. The chairman yields it back to you.

Mr. TUNNEY. I have no questions.

Mr. ROGERS of Texas. Thank you, Mr. Tunney.

Mr. Hansen?

Mr. HANSEN. Anything I can say at this point would be anticlimax. It has been very interesting.

Thank you.

Mr. ROGERS of Texas. Gentlemen, thank you for your very interesting contribution to the record.

Our next witness seems to be Mr. Philip P. Smith, secretary-engineer of the Colorado River Water Conservation District, accompanied by Mr. Kenneth Balcomb, counsel.

Mr. Smith, would you and Mr. Balcomb come forward?

STATEMENT OF PHILIP P. SMITH, SECRETARY-ENGINEER, COLORADO RIVER WATER CONSERVATION DISTRICT

Mr. SMITH. Mr. Chairman, members of the committee, I regret to say that Mr. Balcomb was taken ill and could not be here this afternoon. You may recall that Mr. Balcomb, as counsel, and that I as secretary-engineer, for the Colorado River Water Conservation District, appeared before this committee last August to present the district's views on H.R. 4671, the 89th Congress, 1st session. We had intended to be here together to submit the district's views on the revision of H.R. 4671, 89th Congress, 2d session, as contained in Committee Print No. 19, dated April 25, 1966.

I might say that the Colorado River Water Conservation District is a political subdivision of the State of Colorado. It is comprised of 12 full counties and about half of 3 other counties in northwestern and west central Colorado. The district contains about 30 percent of the area of the State of California.

The revised version of H.R. 4671 proposes, among other things, the authorization of five multiple-purpose projects of western Colorado as participating projects of the Colorado River storage project, and designates five other western Colorado projects for feasibility investigations as participating projects under the act. These revisions met with the full approval and support of the district.

Before proceeding with my statement, I know Mr. Balcomb, if he were here, would join me in this: that we want to express our appreciation for your courtesy in allowing us to appear before you again today.

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Prior to my employment as secretary-engineer for the district, over 10 years ago, I served 14 years as a project planning engineer for the Bureau of Reclamation, and before that I served 13 years with the Army Corps of Engineers on investigations and construction for water resources development in the Missouri River Basin. I have always been an unequivocal advocate of water resources development and have seldom observed such development that has been regretted for long, if ever. My advocacy of the Dallas Creek and West Divide projects, which are here being considered for authorization as participating projects of the Colorado River storage project, is especially significant to me since I had the privilege of working out reconnaissance plans on the development for them while in the employ of the Bureau of Reclamation. These plans were published by the Bureau—the Gunnison River project of February 1951, and the Cliffs Divide project report of February 1954, respectively. My interest in these two projects is further enhanced by the fact that they are located within the Colorado River Water Conservation District, that they are both very worthy developments and that they have the wholehearted support of local interests.

When I was developing reconnaissance plans for them, I learned that as early as 1900 most of the readily available water supplies in the project areas had been developed for irrigation use and that the farmers and ranchers therein had financed, by individual subscription, investigations for development of additional water supply by the storage of floodflows and the importation of water from streams outside the immediate area of use. Although they learned that the cost of such additional water supply was beyond their ability to finance, I found they had never given up hope of bringing this needed development to fruition, nor have they yet.

Passage of the Colorado River Storage Project and Participating Projects Act, which was signed into law by President Eisenhower April 11, 1965, brought these two projects into the realm of possibility. The act specifically designated the five western Colorado projects, here under consideration for authorization, as potential participating projects and directed the Secretary of the Interior to expeditiously investigate their feasibility. Subsequently, the Bureau of Reclamation has carried out this directive of Congress and has issued its findings in the form of feasibility reports with a finding of feasibility for each of them.

The board of directors for the Colorado River Water Conservation District, immediately following passage of the Colorado River Storage Project Act, took formal action to proceed with: (1) securing decrees, through the State courts, for water rights for the potential participating projects within the district; (2) giving assistance to local interests in organizing water conservancy districts to sponsor and serve as contracting entities for their respective participating projects; and, (3) resolved that water rights for participating projects, obtained by the river district, would be assigned without cost to the respective sponsoring water conservancy district.

In accordance with this action, the river district assisted in the organization of the Tri-County Water Conservancy District, the local sponsor and contracting entity for the Dallas Creek project. The

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district also helped organize the West Divide Water Conservancy District and secured water rights for the West Divide project. Water rights for the Dallas Creek project were secured by the Tri-County Water Conservancy District. To further show their support of and confidence in, these two important multipurpose projects, the board of directors for the Colorado River Water Conservation District, on April 19, 1966, unanimously adopted two resolutions, as follows:

RESOLUTION

Whereas the Colorado River Water Conservation District, comprising twelve counties and portions of three additional counties in Western Colorado, with an assessed valuation in excess of $350,000,000.00, was organized for the purpose, among others, of "The conservation of the water of the Colorado River in Colorado, for storage, irrigation, mining and manufacturing purposes and the construction of reservoirs, ditches, and works for the purpose of irrigation and reclamation of additional land, not yet irrigated, as well as to furnish a supplemental supply of water for lands now under irrigation," and, "To contract with the United States Government, the Bureau of Reclamation, or other agencies of the United States Government, for the construction of any such works," and the issuance of obligations in payment therefor under bonding procedures prescribed by statute; and

Whereas the urgent need for supplemental and additional water supplies to meet the requirements of water users within the area served by the Dallas Creek Project make it imperative that this project be constructed as rapidly as possible: Therefore be it

Resolved, by the Board of Directors, That the Colorado River Water Conservation District will support financially and otherwise the commitments of the Tri-County Water Conservancy District and Montrose and Olathe, Colorado, to subscribe for and pay the cost of municipal and industrial water throughout the Dallas Creek Project to the extent and within the legal limitations of the powers of this District.

The same type of resolution was adopted with respect to the West Divide project, and except that under that project, there is a tremendous fossil fuel resource in the form of oil shales that the U.S. Geological Survey estimated that there is over a billion barrels of oil reserve in this deposit in the vicinity of the West Divide project.

Mr. ROGERS of Texas. That resolution, Mr. Smith, will be included without objection the same as if you had read it.

Mr. SMITH. Thank you, sir.

(The resolution referred to follows:)

RESOLUTION

Whereas the Colorado River Water Conservation District, comprising twelve counties and portions of three additional counties in Western Colorado, with an assesed valuation in excess of $350,000,000.00, was organized for the purpose, among others, of "The conservation of the water of the Colorado River in Colorado, for storage, irrigation, mining and manufacturing purposes and the construction of reservoirs, ditches and works for the purpose of irrigation and reclamation of additional land, not yet irrigated, as well as to furnish a supplemental supply of water for lands now under irrigation," and, "To contract with the United States Government, the Bureau of Reclamation, or other agencies of the United States Government, for the construction of any such works," and the issuance of obligations in payment therefor under bonding procedures prescribed by statute; and

Whereas this District has adjudicated water rights for the West Divide Project and has participated in the investigation, planning and development of the project and in the organization of the West Divide Water Conservancy District, and considers the project to be one of major importance to the future growth and development of Western Colorado; and

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Whereas the potential benefits of the West Divide Project are great and unusual not only for irrigation purposes with a large proportion of supplemental irrigation, but particularly because the Project will provide the best source of high quality domestic water for Grand Valley, Rifle, Silt and Glenwood Springs, Colorado, and the surrounding communities to meet the continuing growth and imminent surge in population that may be expected in these communities; and

Whereas it is imperative that the West Divide Project be constructed to meet the water requirements of the Oil Shale Industry and to make possible the utilization of shale oil on private as well as Federal lands, including those in the Naval Oil Shale Reserve: Therefore be it

Resolved, by the Board of Directors, That the Colorado River Water Conservation District will support financially and otherwise the commitments of the West Divide Water Conservancy District, as well as the towns of Rifle, Grand Valley, Silt and New Castle, to subscribe for and pay the cost of municipal and industrial water throughout the West Divide project, to the extent and within the legal limitations of the powers of this district.

Mr. SMITH. I would also, Mr. Chairman, like to submit Mr. Balcomb's statement. It has been submitted to the committee.

Mr. ROGERS of Texas. Without objection, it will be inserted in the record immediately following yours.

Mr. SMITH. In closing, I want to point out that designation, in the legislation under consideration, of the five potential projects of western Colorado for feasibility study would tend to correct an inequity of the Storage Project Act with respect to potential development in the Yampa River Basin of northwestern Colorado. At the time that act was drafted, the Bureau of Reclamation had completed basinwide reconnaissance planning reports on the San Juan, Dolores, Gunnison, and Colorado main stem basins of western Colorado but had not completed such studies for the Yampa-White Basin. Therefore, several potential projects of that area were not included in the list of projects designated in the act for feasibility study but would be, by this legislation, now included.

I want to thank you for allowing me to make this statement, Mr. Chairman.

Mr. ROGERS of Texas. Thank you, Mr. Smith. It is nice to have had you here.

(Mr. Balcomb's statement follows:)

STATEMENT OF KENNETH BALCOMB, COUNSEL, THE COLORADO RIVER WATER CONSERVATION DISTRICT

Mr. Chairman and gentlemen of the committee, the Colorado River Water Conservation District greatly appreciates the opportunity to again present testimony on this important legislation. The District strongly supports authorization of all five of the Colorado projects named in the proposed amended legislation, though but two of such projects are within the geographic confines of the District. Those two are the West Divide and the Dallas Creek Reclamation Projects.

Other witnesses who will testify concerning these two projects will touch on the need for them for agricultural purposes. I would like to speak directly to the need for municipal and industrial water supplies in or near the service area of the West Divide Project, and to inform the committee so far as my knowledge extends, of the efforts of various companies interested in oil shale to supply themselves with industrial water. Though oil shale is currently thought of as the user of industrial water in this area, the user could also be a coal industry, a pulp industry or an aluminum industry, as such resources are all witrin the immediate area of the shale deposits.

This committee has been repeatedly informed of the magnitude of the oil shale deposits of Colorado, Utah and Wyoming. The prinicipal activities of

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which I am aware of private companies today are along the Colorado river front north of the river from Rifle, Colorado, to DeBeque, Colorado, and in the Piceance Basin just north of the Rifle-DeBeque area. The richest shales are in the Piceance Basin area. The West Divide Conservancy District abuts onto this Rifle to DeBeque area most of its distance and will be able to deliver to that Colorado front area two classes of industrial-municipal water. So far as this Colorado front areas is concerned, the West-Divide Project is geographically the closest source of water. Industrial-municipal supplies of water available from the project total about 77,000 acre feet annually.

Studies by experts indicate that an industry producing 2 million barrels of shale oil per day will require possibly up to 365,000 acre feet of water annually of which some 110,000 acre feet will be returned to the river. Obviously, water must be supplied to such an industry from sources in addition to the West Divide Project. The Congress has directed investigation of two other reclamation projects which could furnish water to such an industry. These are the Juniper Project and the Yellow Jacket Project. Industry reports indicate one can expect a shale industry in the mid to late 1970's. If West Divide is authorized now, and assuming present reclamation construction schedules, the project would be in a position to deliver water to a going industry rather than aid materially in its emergence. Investigation of the Yellow Jacket Project is a year and a half behind West Divide, and Juniper is behind the Yellow Jacket.

Many companies have claims for direct diversion of water from either or both of the Colorado and the White River, but, in most cases these rights must depend upon storage to deliver with any consistency. Consequently, storage rights, have been or are in process of being obtained. Acquiring direct flow and storage rights and then maintaining them is expensive. I would estimate that private companies have expended to date not less than $5,000,000.00 in acquiring the right to direct flow and storage water rights, land acquisition (exclusive of shale lands) and in performing subsequent diligence work required under Colorado law to maintain such rights in good standing. This figure is deliberately conservative because many of the transactions for such purposes are made through nominee or other screen arrangements making it difficult to ascertain the true purpose of the transaction.

If the companies build the facilities required to put such water rights to use and to deliver the water to the point of use, they will have capital investments therein of in excess of $200,000,000.00.

The Colorado River Water Conservation District desires to comment on one other phase of the proposed legislation. The District has heretofore supported this legislation and has diligently worked on the proposed amendments. In the course of preparing amendments conflicts arose on matters not related directly to the legislation within the State of Colorado. These conflicts were hopefully laid at rest by the Colorado Water Conservation Board, the state agency, by inclusion of two sections in the proposed amended legislation. Those sections are part of Title V, and are particularly 501 (d) and (e).

Section 501(d) purportedly deals with the matter of compliance with State laws regarding water rights. It relates, however, only to Colorado, and then only to a portion of the activities of the Bureau of Reclamation in Western Colorado. It is limited in applicability to the Colorado projects authorized herein and to those constructed under the Colorado River Storage Projects Act, Public Law 485. Assuming the purpose of this section to be good, it should not be limited to Public Law 485 projects let alone to just the State of Colorado. We understand there is presently pending in Congress legislation to cure the evil, if any, here present. We submit that such general legislation is by far the better way to cure the problem. We are concerned that such language in this legislation may affect feasibility of the projects, resulting in a situation similar to that recently affecting the Southern Nevada Project.

Section 501(e) deals with Senate Document No. 80 and the Green Mountain Reservoir constructed as part of the Colorado-Big Thompson Project. Congress is, by this Section, being asked to place an interpretation on the document after its inclusion in a decree of the United States District Court for the District of Colorado. By stipulation between the affected parties, that Court included Senate Document No. 80 in its decree, and thereby we contend, made the matter one of contract as well as judgment. Such contract should not be abrogated or even limited by Congressional action. The interpretation of that contract should be left to the Court.

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If I may quickly summarize, the Colorado River Water Conservation District has by resolution unanimously urged the passage of H.R. 4671, as amended, except for the two sections last above referred to. The District, as yet, adheres to that position.

Mr. ROGERS of Texas. Mr. Aspinall, any questions?

Mr. ASPINALL. I have no questions, Mr. Chairman. I just wish to acknowledge the dedication of Mr. Smith to the work he is doing for western Colorado and the Colorado River Conservancy District; also for his contribution to this legislation. Mr. Smith is a qualified engineer and he will be available at any time we wish to question him further on any of the projects that have to do with this legislation.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Smith, before you became secretary-engineer for the district 10 years ago, you worked as a project planning engineer for the Bureau of Reclamation. What was the period of payout included in projects at that time?

Mr. SMITH. We considered it a 50-year payout. However, under the Reclamation Act, the old Reclamation Act, there was a 30-year payout period.

Mr. SAYLOR. Thirty-year, plus a ten-year development period?

Mr. SMITH. Yes, sir.

Mr. SAYLOR. Have you noticed that the plans for all of these five projects that you have referred to, in order to get at least a 1.1–1 cost-benefit ratio, had to use a 100-year payout rate?

Mr. SMITH. Not a 100-year payout. It is a 100-year period of benefit-cost comparison; 100-year life of the project.

Mr. SAYLOR. Do you live near the West Divide project?

Mr. SMITH. Do I live near it?

Mr. SAYLOR. Yes.

Mr. SMITH. Yes, sir; I do.

Mr. SAYLOR. Can you tell me what land is selling for now out in that area?

Mr. SMITH. That is in the Aspen area, and land values are quite high in the area. However, not essentially as agricultural lands; but there are ranches being sold there at rather fantastic prices.

Mr. SAYLOR. This is in the ski area? It is up in the mountains?

Mr. SMITH. No, I would say the ranches on the Roaring Fork Valley, that some of them are quite high priced for that type of land.

Mr. SAYLOR. Well, I had noticed in this report of the Bureau of the Budget that the approximate cost is $1,710 an acre, or an investment for a farm of $273,000. Do you know of any farm of 160 acres that has sold for that price out there lately?

Mr. SMITH. No, sir; I cannot say that I do. But I do know this, that all of the oil companies, and that includes the major oil companies, along with Dow Chemical Co., have held meetings out there. They all feel that these benches south of the Colorado River, which comprise the biggest part of the West Divide project lands, will eventually be taken over as urban areas. The only way that we can hold this water for that area is to put it to beneficial use. That is what we would like to do.

We realize this cost is high, but we do feel that Colorado has the credits in the basin fund to do it, and that is how we would like to use them.

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Mr. SAYLOR. In other words, if you did not use this for agricultural land and used it for the kind of development you are referring to, would not the people there be then in a position to pay more money?

Mr. SMITH. Yes, sir; they would not only pay more money, but they would have to pick up the interest tab when that was converted over from agricultural to municipal or industrial use. But it is remarkable that it takes just about the same amount of water to serve an urban acre as it does to irrigate an acre for agriculture in that particular climate.

Mr. SAYLOR. I noticed in the statement that you submitted for Mr. Balcomb that he opposes section 501(e) of this bill dealing with Senate Document No. 8. Is that generally supported by the organization of which you are the secretary?

Mr. SMITH. Yes, the board supports that position. They feel that this matter is in the Federal court and should remain there.

Mr. SAYLOR. If the bill is changed so that the study of importation of water is put in a separate bill, would your organization support the legislation?

Mr. SMITH. I believe it would, Mr. Saylor.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Johnson?

Mr. JOHNSON. No questions, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. No questions.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Good to see you again, Phil; thank you.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. No questions, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Foley, did you have any questions?

Mr. FOLEY. I am sorry, I did not hear your answer to Mr. Saylor's question. Would you mind repeating that: concerning whether you would support the legislation if provisions for study were contained in separate legislation?

Mr. SMITH. I believe that my district board would support it. They would like to see and have supported the proposal for an importation study, as it is proposed in this legislation. That is what they would prefer to support. But I do think they would support the bill if the studies were made under separate legislation, were authorized under separate legislation.

Mr. FOLEY. If there were not studies proposed for importation of water, and the bill providing for the authorization of the central Arizona project were contained in the bill without either separate or incorporated provisions for study of the import of water, what would the attitude of the board be?

Mr. SMITH. I believe that the board would support the bill for authorization.

Mr. FOLEY. No further questions, Mr. Chairman.

Mr. ROGERS of Texas. Thank you very much, Mr. Smith, for your testimony.

Mr. SMITH. Thank you.

Mr. ROGERS of Texas. The next witnesses are witnesses in support of the Animas-La Plata project—Mr. Victor A. Paulek, Mr. Frederick V. Kroeger, and Mr. Gerald H. Patrick.

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STATEMENTS OF VICTOR A. PAULEK, PRESIDENT, LA PLATA CONSERVANCY DISTRICT; FREDERICK V. KROEGER, VICE PRESIDENT, DURANGO CITY WATER COMMISSION; GERALD H. PATRICK, VICE PRESIDENT, SOUTHWESTERN SALES, PITTSBURG & MIDWAY COAL MINING CO.

Mr. ROGERS of Texas. Mr. Paulek, let me ask you—how long do you think it will take for your statement?

Mr. PAULEK. About 4.5 minutes.

Mr. ROGERS of Texas. Do you gentlemen have statements, too?

Mr. KROEGER. Yes. Mine is very short.

Mr. ROGERS of Texas. You may proceed, Mr. Paulek.

Mr. PAULEK. Mr. Chairman, members of the committee, my name is Victor A. Paulek. I am president of the board of directors of the La Plata Water Conservancy District of the State of Colorado. Our district was organized in January of 1944, pursuant to the laws of the State of Colorado, to act as the official sponsoring and contractual entity for the proposed Animas-La Plata Federal reclamation project in southwestern Colorado.

The proposed Animas-La Plata project has the unanimous approval of the board of directors of the district and has the total support of the people in our area. The La Plata Water Conservancy District is extremely anxious and willing to enter into the obligation of a repayment contract with the United States for this project at any time after the project is authorized.

The Animas-La Plata project is designed to provide a diversion of water from the Animas River to the La Plata River in the San Juan Basin of Colorado. The La Plata River has never produced a great amount of water because its source does not cover a very large area and runoff in the spring is relatively small. The majority of the water is gone by June each year; some years, even earlier, leaving the so-called irrigated areas of the La Plata mostly without water for the rest of the summer. Only the few high priority water users have water for any length of time. Many of the lower rights have water for only a few days in the early summer or not at all—depending on the amount of snowpack. There has been in operation since 1925 an interstate compact between the States of Colorado and New Mexico. This compact divides the waters of the La Plata River on a 50–50 basis between the two States. This system of operating the river is very unhealthy to the so-called irrigated farming areas. The La Plata River does not have the capacity of full service to the existing irrigated lands even with storage. There must be water imported from the Animas River and stored for use later in the growing season if the crucial water supply problem is to be remedied.

The abundance of soils to be served by the project are deep, of good tilth and quality, underlain with gravel and are ideal for irrigation, but they are only partly developed because of the lack of water and rainfall. The flow records on the La Plata River, kept by the water commissioner, show that of the 20,000 acres of land in Colorado with water rights, the acreage actually irrigated varies from 6,000 to 19,000 acres of land per year, and averages out at about 25 percent per year of the requirements for good crop production. About the only crops

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that are very successful in our area, at the present time, are winter wheat and pinto dry beans. These crops fluctuate greatly and are not stable enough in production to make a healthy farm economy. With complete storage facilities and adequate water for these lands, there would be diversification of farming with grass meadows, alfalfa production, fruits, seed crops, vegetables, beef and mutton production and thrifty dairy farms.

I was born in this area where I have lived my entire lifetime. My father filed on land in 1905 and with other pioneers built an irrigation canal to the La Plata River. I have operated a livestock farm in this area for over 40 years. The question may arise—Why do people stay with the soil and suffer hardships caused by poor crops, which are due to lack of enough moisture? The answer is: They see the water flowing down the rivers from the snow melting high in the mountains and have hopes of getting a project, such as the Animas-La Plata project, constructed which would make it possible to apply the water to the excellent loam soil and produce sufficient crops to make an adequate living. The stabilized production of the soil will make it possible for a great many citizens to make and provide for their homes in this area. It will encourage more of our young people to gain the experience and education needed to successfully feed our Nation. It is to be hoped that many of them will continue in the farming business, as we are getting short of skilled people in agricultural management.

The people in my area who are anxious and waiting for the opportunity to produce new wealth from the soil will be more than pleased to have a chance to help pay their share of the cost of the much needed irrigation water. We have every confidence that the Animas-La Plata project is feasible and beneficial from both an economic and engineering standpoint. To assure the growth and economic development of our area, we must continue to strive for a long-range dependable supply of water. We believe that the Animas-La Plata project is the solution to this problem.

As previously indicated, the La Plata Water Conservancy District and its members have the ability and desire to enter into a repayment contract at the appropriate time.

For years, we have lived in the La Plata area with dreams of the future. Our fathers before us have sought for projects to stabilize the flow of the river. Reclamation has studied this area for possible solutions for nearly 30 years. We are still living in faith that sufficient water can come to this area so that our children, and our children's children can have some of the advantages that we have missed.

I thank you for giving us this opportunity to appear before you.

Mr. ROGERS of Texas. Thank you, Mr. Paulek.

Mr. Kroeger?

Mr. KROEGER. Mr. Chairman and gentlemen of the committee, my name is Frederick V. Kroeger. I was born, reared, and live in the city of Durango, La Plata County, Colo. I am president of the Farmers Supply of Durango and have been associated with this retail business for the past 26 years. I am a member of the Colorado Water Conservation Board and the Southwestern Water Conservation District of Colorado. I am appearing before you today on behalf of

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the city of Durango as a member of the city water commission on which I have served for many years.

The city of Durango is the hub of an ever expanding trade and recreation area in Southwestern Colorado. We have enjoyed continuous and steady growth in population and commerce in the last century. While agriculture and livestock have been the backbone of the economy of our area, oil activities, mining, and the lumber industry have played an important part in our growth and development. Tourism has developed at an accelerated rate during the past decade. Fort Lewis College was located within the city in 1956 with an enrollment of 270. This college witnessed growth to an enrollment of 1,346 for the 1965–66 term. The natural resources and climate, as well as the people, point to an optimistic future for our city. Yet, our area will never realize its full potential unless a long-range, dependable water supply is available. The cities and towns in our area have been hard-pressed in the past to develop a sufficient supply of municipal water to meet their growing needs. Under the proposed plan for development of the Animas-La Plata project, the city of Durango will be assured of a long-range, dependable water supply. Such a supply of water for the city of Durango will insure a stabilized economy for the rapidly expanding population; will guarantee the continued growth in our recreation facilities and the continued development of our trade area. It is my undersanding that the towns of Silverton, Colorado, and of Aztec, Kirtland, and the city of Farmington in our sister State of New Mexico, will likewise be assured of a dependable water supply under the project plan.

The people of our city are well aware that they must do their part if these unlimited benefits are to be derived for the city of Durango and the surrounding areas from the construction and operation of the Animas-La Plata project. The residents of Durango have, over the years, been willing to sacrifice for the continued growth of our area and I can assure you that such will be the case when the Animas-La Plata project is authorized and constructed.

Periodically, we have experienced the heartache, the discouragement and the great economic losses that accrue to a community when river flows dwindle, when rains do not come, and assets must be liquidated. The benefits to the city of Durango will include those which shall be realized by an agricultural and industrial economy having a dependable long-range supply of water. It is a certainty that the people of Durango and our surrounding areas, after having spent so many years in a determined effort to have this project constructed, will accept enthusiastically both the benefits and the burdens of guaranteeing success for the project.

We endorse H.R. 4671 and urge the authorization of all the projects encompassed by the bill.

Mr. ROGERS of Texas. Thank you very much, Mr. Kroeger.

Now, Mr. Patrick?

Mr. PATRICK. Yes, sir.

Mr. Chairman and gentlemen of the committee, my name is Gerald H. Patrick, and my residence is 4723 East Mariposa Street, Phoenix, Ariz.

I am vice president in charge of sales, Southwestern Division of the Pittsburg & Midway Coal Mining Co., home office at 15 West 10th

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Street, Kansas City, Mo. It is my job to develop and sell coal in the West. I am here to urge approval of the Animas-La Plata project.

There are vast deposits of coal which can be produced at low cost by surface mining in the Animas-La Plata area. The coal is of no value without water. Water is the key to the development of these vast coal reserves.

If the Animas-La Plata project is approved, it is my opinion that a large steam generating plant will be constructed on the project to utilize the low cost coal reserves. This plant would be similar to the Four Corners plant now in operation near Farmington, N. Mex.

Such a steam generating plant could consist of at least two 750,000 kilowatts to 1 million-kilowatt units which would burn between 4.5 to 6 million tons of coal annually and would cost in the neighborhood of $125 million to $150 million per unit.

The steam generating plant and the coal mine would both be located on the Southern Ute Indian Reservation, thus giving the Ute Indians an opportunity to obtain the same royalties and employment benefits which the Navajo Indians are now enjoying from the Four Corners plant and adjacent coal mines.

The steam generating plant would hire between 25 and 40 men and based on an annual salary of $7,000 (per man) would make the plant's payroll between $175,000 and $280,000 per year. The coal mine would give employment to around 200 members of the Ute Tribe. The average pay scale at such a mine would be between $8,500 and $9,000 a year, making the annual payroll with supervisory personnel around $2 million annually. The royalty payments to the Ute Tribe on the coal would exceed $1 million annually.

Such a mine and plant would also bring additional supporting industry which would aid the economic development of the area.

The taxes from the plant and mine would help the area to improve their schools and local and State governments.

The utility plant would be in position to purchase from the La Plata Water Conservatory District water under a long term contract which would help cover the cost of the project and make it self supporting.

The Ute Indians and the States of Colorado and New Mexico and surrounding States would benefit from the low cost power generated by these large units. Low cost power attracts industry.

It is our hope that you will approve the Animas-La Plata project. We believe it to be an extremely worthwhile project.

Mr. ROGERS of Texas. Thank you, Mr. Patrick.

Mr. Aspinall?

Mr. ASPINALL. Mr. Chairman, I have no questions. I just wish to commend these witnesses on coordinating effectively the interests of the municipalities, the agricultural community, and the industrial users of water.

Do all of you understand that it will be necessary to enter into contracts for payment of this water before construction starts? Is that right?

Mr. PAULEK. That is right.

Mr. KROEGER. That is right.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. May I ask you gentlemen, I understand that this Animas-La Plata project will have a dam erected upon the Animas River.

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Is that correct?

Mr. PAULEK. Yes, sir.

Mr. SAYLOR. That will be above Electra Lake on the other tributary?

Mr. PAULEK. Yes, sir. It is on the main stream above Silverton.

Mr. SAYLOR. This will provide the water supply for the town of Durango and for the irrigation, is that correct?

Mr. PAULEK. That is a storage reservoir, yes, sir.

Mr. SAYLOR. And representing the district, you have heard the comments being made with regard to the study of water from the outside. Would you support this project if that provision of the bill were eliminated?

Mr. KROEGER. The State of Colorado is taking the position that they want the entire bill.

Mr. SAYLOR. I know what the State of Colorado has taken. I did not ask about the State of Colorado. I want to know whether you people in your district would support this bill if that were taken out.

Mr. KROEGER. Our district would have to go with the State, make the same decision they do.

Mr. SAYLOR. Well, suppose Congress decided the State was wrong and we took it out. Then what would you do? Would you give up your project?

Mr. KROEGER. Sir, you ask a very difficult question.

Mr. SAYLOR. This is the type of question we have to answer. Your argument is easy. Congress may be faced with that situation. I would like to know if you people, who have made an excellent presentation, whether or not you are willing to sacrifice your project if the importation study is taken out of this bill.

Mr. KROEGER. I think we would take the same position that the State does on this.

Mr. SAYLOR. If that happens and you lose your project, do not blame me.

Mr. UDALL. Why not?

Mr. ROGERS of Texas. Mr. Johnson?

Mr. JOHNSON. No questions.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. No questions.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. No questions.

Mr. ROGERS of Texas. Mr. Wyatt?

Mr. WYATT. No questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. I am interested in the powerplant that is to be built. Is this the same project?

Mr. PATRICK. No, sir; this is to be a private industry—private power—of the West. As you know, the Four Corners area right now is probably going to end up with one of the largest steam generating plants in the world. When this runs out of water, the same low-cost coal is available in this area, too. I believe the economics will again favor additional units in this area.

Mr. REINECKE. That is a very refreshing answer.

Do you have any idea what tax yield this proposed steam plant would yield to the county?

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Mr. PATRICK. No, sir; I do not.

Mr. REINECKE. This is a private utility that is supposed to build this?

Mr. PATRICK. Yes, sir.

Mr. REINECKE. They will buy the water from the——

Mr. PATRICK. Yes, sir; the same thing they are doing in the Four Corners area. It would also give employment, as in the Four Corners area. It has worked out very well for the Navajo Indians. My company has a coal mine down in the Gallup area which is employing Navajo Indians. I am sure you are aware of the big steam generating plant going in at Mojave, south of the Davis Dam, which will again use Navajo coal.

We in the coal industry think there is a real future for coal in the West. Coal would have to come from this area, this low-cost strip coal.

Mr. REINECKE. How would the steam plant be financed as far as initial installation?

Mr. PATRICK. The steam plant? This again would be most likely members of the West, which are all your big utilities in the southwestern portion of the United States. Arizona Public Service was the first one that took the lead in that area, and then Southern California Edison going in and joining in. I believe there are going to be nine utilities taking power out of the fourth and fifth units in the Four Corners area.

Mr. REINECKE. Are you familiar with or have they made any declaration yet of what the power rates will be in the proposed unit?

Mr. PATRICK. No, they have not. In the Los Animas area, it is going to have to be around 5, 5.5, 6 mills. It is going to be economical power.

Mr. REINECKE. It will have to be competitive?

Mr. PATRICK. Well, yes, sir.

Mr. REINECKE. Will this be a base-load plan, or peaking?

Mr. PATRICK. Base load.

Mr. REINECKE. Thank you very much.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. How long has the Animas-La Plata project been under consideration and discussed in your area?

Mr. KROEGER. Since 1938. It has actually been under discussion and under consideration since 1904, but the last proposal was actively undertaken in 1938.

Mr. FOLEY. How long has the present plan of development been known and considered?

Mr. KROEGER. The present plan of development was altered slightly within the past few months. Other than that, it has been known and so is the same basic plan that was developed in 1938.

Mr. FOLEY. And you supported this proposed plan of development, I assume, for many years?

Mr. KROEGER. Yes, sir, we have.

Mr. FOLEY. Years prior to any discussion of the importation of water into the Colorado River?

Mr. KROEGER. Will you repeat that, please?

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Mr. FOLEY. I assume that you have supported this program long before there was any specific proposal to study importation of water into the Colorado River?

Mr. KROEGER. Yes, we have.

Mr. FOLEY. And at any time prior to this time was the support for this project conditioned on importation of water? Let us say, prior to 1965.

Mr. KROEGER. No, it was not conditioned on that. However, in the discussion on the matter, importation has been growing for several years.

Mr. FOLEY. Well, just to clear the record, I do not quite understand why you conditioned your support for this project now, that you have supported since 1938, on the express study of the importation of water, when the project has been known and supported long before these questions were ever raised.

Mr. ASPINALL. If my colleague will yield.

Mr. FOLEY. Yes.

Mr. ASPINALL. My colleague does not, apparently, have an understanding of the Colorado River Storage Act. He does not, with respect to the position of the gentleman from Durango. Mr. Kroeger happens to be a member of the Colorado State Water Conservation Board. I think Mr. Kroeger's function is to give the position of the water conservation board. I would suggest we ask these other gentlemen. They might come forward with something.

Mr. FOLEY. I did not mean to limit my questioning to Mr. Kroeger, Mr. Chairman. I would be interested in the comments of the other witnesses.

Mr. PAULEK. We have supported the work of the Bureau of Reclamation and been pleased with it in the findings that they have made of the feasibility of the Animas-La Plata project and the other projects in the area. There have been so many delays in my lifetime in the development of these projects. We feel that the time has come for the development of all these projects at the present time, and no need for further delays.

Mr. FOLEY. Irrespective of whatever is done on this importation question?

Mr. PAULEK. Yes, sir.

Mr. ASPINALL. Will my colleaguue yield to me for a moment?

Mr. FOLEY. Yes, sir.

Mr. ASPINALL. Since the operating agreements of the Frying Pan-Arkansas were entered into between eastern Colorado and western Colorado, is it not true that Colorado has worked as a unit, as far as its water resource development is concerned, in all areas?

Mr. PAULEK. That is right.

Mr. ROGERS of Texas. Do you have any further questions?

Mr. FOLEY. No, that is all the questions I have.

Mr. ROGERS of Texas. Thank you very much, gentlemen, for your presentations.

As our next witness, we have Mr. F. F. Montoya, chairman of the La Plata Conservancy District.

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Mr. TUNNEY. Mr. Chairman?

Mr. ROGERS of Texas. Oh, I am sorry, Mr. Tunney.

Mr. TUNNEY. Mr. Chairman, a constituent of mine, Mr. James Krieger of Riverside, Calif., was not able to be present for these hearings, and asked me to insert in the record a statement that he has prepared in support of the Animas-La Plata project.

Mr. Krieger has for many years been active in the search for a solution to the water problems in the Southwest and he is recognized as a great authority on regional water development.

Mr. Krieger's statement also gives support to interbasin importations, which would be authorized, or a study which would be authorized by the legislation before us today.

I also would like to insert in the record at this time a report of the Pacific Southwest Water Committee of the Irrigation Districts Association in California, which supports this legislation. This resolution was unanimously adopted by the Irrigation District Association on April 22, 1966. If it would be appropriate at this time, I would like to insert in the record the resolution along with the statement by Mr. Krieger.

Mr. ROGERS of Texas. Is there objection?

Mr. SAYLOR. I reserve the right to object.

Mr. ASPINALL. I do not intend to object, but I do not wish to have the witnesses that are slated to come before this committee today miss their opportunity to testify at this time. I shall be willing to reserve the right to question the gentleman from California, Mr. Tunney, at a later date concerning the contents of these resolutions.

Mr. SAYLOR. Mr. Chairman, that is the same reservation I wanted to make. I think Mr. Tunney now has become an advocate of the bill, placing himself in the position that he has to answer some of the same questions that we put to some of the other witnesses.

Mr. ROGERS of Texas. Without objection, the document will be received by the chairman, to be inserted at the appropriate time. An opportunity will be afforded the committee members to put questions.

Mr. TUNNEY. The reason I wanted it inserted in the record is because it seems a timely spot.

Mr. ROGERS of Texas. It will be inserted at the appropriate place—both of them.

Thank you, Mr. Tunney.

(The material referred to follows:)

STATEMENT OF JAMES H. KRIEGER

My name is James H. Krieger. I am a practicing attorney in the State of California, specializing in resource development, and a consultant to the Peabody Coal Company. As such I am familiar with the Animas-La Plata Project as it was originally proposed, and as it has been modified by a supplemental report submitted on March 31, 1966 to the Commissioner of Reclamation. I am happy to appear in support of the portion of the modified report dealing with the additional quantities of water allocated to municipal and industrial development in the Animas-La Plata Project, for some of this request has been predicated on inquiries made by the Peabody Coal Company concerning the availability of cooling water for a coal-fired steam generating plant operating in the vicinity of the Three Buttes Reservoir, Colorado.

The Peabody Coal Company has from time to time consulted with representatives of the Bureau of Reclamation in Washington and the Regional Office

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in Salt Lake City concerning the availability of industrial water from the proposed project. It has indicated to the Bureau that it would be interested in obtaining adequate water for cooling two units of a coal-fired steam plant generating 750,000 kilowatts each, with an anticipated plant capacity factor of 75% over an estimated power plant life of 40 years. The Company has developable coal deposits in the area, and believes that the general economy of that area, and in particular the welfare of the South Ute Indians, would be enhanced by the construction and operation of a coal-fired steam plant in the general area of the Three Buttes Reservoir.

Peabody has indicated to the Bureau of Reclamation that 30,000 acre-feet of water will be required to cool the proposed units in their initial years. It is believed that such water, whether utilized through cooling towers or on a once-through basis, would necessitate a total consumptive use of the amount indicated. Approximately the same amount of water would be needed throughout the year on a total flow basis which, the company believes, would not exceed 50 cubic feet per second.

In addition to the local benefits which might flow to both Colorado and New Mexico by reason of the industrial development contemplated by Peabody Coal Company, there are national benefits also to be derived. Enormous quantities of power are projected by the Federal Power Commission and others to meet the growing demands of the country's economy. This demand must be met in the most economic way possible, and it is likely that coal-fired generating plants will provide a large portion of that power load in the years ahead.

Illustrative of Peabody's efforts in this field is the development of the coal fields in Black Mesa, Arizona. These coal fields are owned by both the Navajo and Hopi Indian Tribes, and are leased to Peabody, which company, in negotiations with the Indian Tribes, representatives of the State of Nevada, the Bureau of Reclamation, and the Southern California Edison Company, is going to supply the fuel for two 750,000 kilowatt coal-fired steam generating plants to be located in Nevada on the Colorado River just below Davis Dam.

The development of coal in the Three Buttes Reservoir in Colorado is still another attempt on the part of Peabody to put coal and cooling water together near load centers for the generation of electricity by members of WEST. The power companies have indicated a genuine interest in the development of coal as one of the primary fuels needed to meet the power curve demand of the United States, and Peabody is carefully exploring the possibilities of such a development as a part of the Animas-La Plata Project.

In a still larger sense the fuel suppliers such as Peabody Coal are deeply concerned with the continued development of all the water resources of the Colorado River. H.R. 4671 not only authorizes the particular Animas-La Plata Project, but it provides for the study and eventual importation of large quantities of water from regions of surplus supply into the Colorado River Basin. The effect of such large developments will permit the further development of the abundant natural resources such as coal, oil, shale and gas in the Colorado River Basin and in conjunction with water from the Colorado River. It is in this context that Peabody Coal, as one of the large fuel suppliers in the United States, recommends and urges favorable consideration of H.R. 4671 in general, and the immediate authorization of the Animas-La Plata Project in particular.

Thank you for the opportunity of presenting these views.

REPORT OF THE PACIFIC SOUTHWEST WATER COMMITTEE, IRRIGATION DISTRICTS ASSOCIATION OF CALIFORNIA, SAN FRANCISCO, CALIF., IN SUPPORT OF H.R. 4671 AND IN OPPOSITION TO SINGLE PURPOSE PROJECTS

In the controversy which has arisen between the builders of multi-purpose projects throughout the United States and those who emphasize solely the preservation of our scenic resources, the consequences of pursuing one course or the other are sometimes submerged in the heat of debate. The United States, as a builder of water projects, is charged with the responsibility of developing and conserving all of the country's natural resources, including its natural beauty. The record shows, as in the case of Glen Canyon Dam, Fleming Gorge Reservoir, Hoover Dam, and every other major multi-purpose project in the West, that this has been the goal and achievement of the Department of the Interior.

Congress is now considering H.R. 4671 which would authorize the Secretary of the Interior to plan a vast interregional water development program which

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requires the construction of Bridge and Marble Canyon Dams as part of that entire project. Both structures will be constructed with an eye to enhancing the natural beauty of the Grand Canyon and making this dramatic landmark available to the many hikers, campers, fishermen, boatsmen and nature lovers who savor this American treasure as much as the few well-to-do and sometimes daring outdoor enthusiasts who would preserve the national heritage for themselves alone.

The Department of the Interior views the Colorado River as a resource of many facets. The preservation of its natural scenic beauty is only one of the many important aspects of the system. The development of recreation areas, fish and wildlife preserves, and boating opportunities are equally important. But the River has another value which can be developed in harmony with all these potentials; namely, the use of its falling water to produce power needed during peak periods to augment the base supply of thermal power required throughout the southwest to light our homes, water our crops, and energize our factories. Power can be generated as apart of the whole undertaking, so that the physical requirements of people, as well as their aesthetic and recreational sensibilities, can be met from the same resource. This is the multi-purpose object of Federal water policy. And the revenues from the sale of power and water will pay for all of the reimbursable features of the project.

The oft repeated contention that Bridge and Marble Canyon Dams will inundate the Grand Canyon is preposterous. Nothing man can build can do that. On the contrary, only two stretches of the river will be converted from rapids to smooth water, still leaving 104 miles of virgin river. Where the Colorado River emerges from the Grand Canyon National Park, the water will be a maximum of 89 feet above stream bed. Upstream, the elevation of the reservoir will steadily decrease until it merges with the flowing stream. The effect will be indiscernible against the massive cut of the Grand Canyon. It will provide a scenic and negotiable waterway, opening up this national heritage to millions of Americans.

Construction of Bridge and Marble Canyon Dam is a conclusion reached after exhaustive consideration of all conceivable alternatives. The most feasible means of providing peaking power is by intermittent operation of hydroelectric plants. This power, needed only at intervals of high demand, cannot be provided economically by the construction of larger base load thermal plants. Furthermore, it would be wasteful of our limited fossil fuel resources to use an unreplenishable resource while permitting the constant flow of the Colorado River to spend itself unused, or only partially used, on its journey to the sea.

Without doubt, the great rivers of this Nation will be developed to their full potential. The only question is when, how, and by whom. Multi-purpose projects should be built now when all their benefits are desperately needed by a whole region of our country. The alternative is to defer and perhaps default their construction in favor of a single purpose project serving less than an entire region and licensed by the Federal Power Commission for the sole and single purpose of generating power. We can no longer afford the luxury of single purpose projects.

H.R. 4671 will accomplish with maximum efficiency the full, integrated and scenic development of a beautiful reach of the Colorado River. The Irrigation Districts Association has previously endorsed the principles contained in H.R. 4671. This Committee now reaffirms that endorsement.

Let this statement and all factual data dealing with the whole of resource development on the Colorado River be made available to all United States Senators and Congressmen, the Governors and legislators of all the States, administrative officials—both Federal and State, and all public agencies, organizations—public and private, and to those individuals concerned with the development of our country's resources.

This report was approved by the Irrigation Districts Association of California in convention assembled at San Francisco, California, April 22, 1966.

Mr. ROGERS of Texas. Our next witness is Mr. F. F. Montoya, chairman of the La Plata, N. Mex., Conservancy District, and Mr. Floyd Davis.

We have received his statement from Mr. Davis previously which has been inserted in the record.

Mr. Montoya, the Chair recognizes you.

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STATEMENT OF F. F. MONTOYA, CHAIRMAN, LA PLATA, N. MEX., CONSERVANCY DISTRICT

Mr. MONTOYA. Mr. Chairman, I am F. F. Montoya, chairman of the La Plata, N. Mex., Conservancy District. I am engaged in livestock production and own and operate an irrigated farm and ranch.

It gives me a great deal of pleasure to appear before the House Interior and Insular Affairs Committee to present testimony in support of the Animas-La Plata project in behalf of the people of the La Plata, N. Mex. area.

Agriculture has been traditional with us, and is a way of life with the people I represent. Ever since this country was open for settlement, we have been farmers and ranchers. Our soil is good, the climate is good, and we have been told by the experiment station that we can become one of the most important agricultural areas in the Southwest because of our assets.

Our assets are many, and include a ready and willing labor force of agricultural workers from the Indian reservation areas that surround us. These are the Navajo, the Mountain Ute, and the Southern Ute Indian reservations. We also have an opportunity of marketing our products for more money than we have ever received before through the new contract farming program that was started by the Western Canning Co. last year.

At present, we have problems that make it impossible for us to find sufficient income from the land. Our young people are leaving the farms and ranches, and many owners and operators have been forced to seek employment elsewhere to make enough money to support their families. We find that we are competing for jobs in the nearby cities where there is already high unemployment. Our county, counties near us in Colorado, and the surrounding Indian reservations, were all classed as depressed areas because of high unemployment.

We have had to live with continual water shortages. Unless our water supply is guaranteed, we cannot do anything to change the present conditions, which means the eventual loss of the productive capacity of this area if not corrected.

We are forced to use dry farming techniques because of the continual shortage of water. We have tried to raise productivity by fertilizing as recommended by our agricultural advisors, and found through experience that our crop yields do not increase substantially because of the lack of water at the right time. We have tried to solve the problem ourselves. The States of Colorado and New Mexico have agreed to divide the water on a fair and equal basis, but when there is not enough water to begin with, how can we or the people on the Colorado side of the State line survive under this arrangement? The people on the Colorado side are hurt as badly as we are. The agreement between the States alternating the water has not worked, and will not work to solve the basic problem of an insufficient water supply.

Although I have mentioned many problems, there is only one real problem we face, and that is an assured, continuing, water supply throughout the growing season. The Animas-La Plata project will do this and automatically solve the problems that I have already discussed.

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I am not speaking just for myself, not speaking just for the farmers in my Conservancy District when I ask for approval of this project, but for an estimated 3,000 people from San Juan County who signed their names to a petition directed to the Governor of the State of New Mexico in 1963, indicating their interest and support of the Animas-La Plata project.

At this time, Mr. Chairman, may I present to the committee a copy of this petition and ask that the number of names therein be entered in the record.

Mr. ROGERS of Texas. How long is that petition, Mr. Montoya?

Mr. MONTOYA. I want just the number of names to be entered into the record.

Mr. ROGERS of Texas. The number of names?

Mr. MONTOYA. It is just short. It is just a short paragraph at the top, here.

Mr. ROGERS of Texas. Is it one page?

Mr. MONTOYA. It is just a short paragraph and——

Mr. ROGERS of Texas. Let me see it.

Mr. ASPINALL. Off the record.

(Whereupon, there was a short discussion off the record.)

Mr. ROGERS of Texas. Without objection, the petition will be received in the record and reference will be made to the number of names, but the copy furnished to the committee with the names will be received for the files.

(The petition referred to follows.)

To the Honorable Jack Campbell, Governor of New Mexico:

We, the undersigned citizens of the State of New Mexico, do hereby request and petition the Governor of our State to comment favorably, in writing, forthwith, to the Secretary of the Interior on the furtherance of the New Mexico portion of the Animas-La Plata diversion Project, a bistate storage and irrigation project affecting Colorado and New Mexico, the feasibility of which is fully endorsed by the Bureau of Reclamation in its feasibility report of May 1961.

(Signed by 2,324 residents of San Juan County.)

Mr. ROGERS of Texas. You may proceed.

Mr. MONTOYA. A guaranteed water supply will mean that:

(1) We can substantially increase farm income by participating in intensified farming, whereby our land will produce several times as much gross income as it does today. Alfalfa and corn silage production for feed can be doubled. This increase in feed will support large livestock feeding operations.

(2) Instead of leaving the land and seeking work in nearby towns that are already crowded with unemployed people, we can become full-time farmers and ranchers again and provide job opportunities for the people we are forced to compete with now.

(3) Our climate is such that our vegetables mature in time for an intermediate fresh vegetable market, which has in the past been in short supply. With sufficient water, we can produce enough vegetables to support processing plants, and suppy vegetables during times of short supply from other areas.

(4) No longer will we have the costly job of replacing our diversion dams, irrigation ditches that are periodically washed out by flash floods resulting from sudden storms, when we suffer from too much water at the wrong time.

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We are asking that you have the same faith in our agricultural future as the State of New Mexico, which has already appropriated money for the establishment of an agricultural experiment station in our area to help us.

New Mexico State University has determined that when all the land proposed for irrigation in the San Juan basin, including our area, is developed, total income from agriculturally related business to be $86 million a year providing for thousands of new jobs.

We know our soil is good, we know our people are good. We ask only for the chance to prove the potential we have in becoming self-sufficient and making our contribution to the Nation and to the world.

Now, Mr. Chairman, I would like to submit for the record a statement from the San Juan County Farm and Livestock Bureau in support of the authorization of the Animas-La Plata project.

Mr. ROGERS of Texas. Without objection, the statement will be received for the record.

(The statement referred to follows.)

STATEMENT OF SAN JUAN COUNTY FARM AND LIVESTOCK BUREAU, AZTEC, N. MEX., PRESENTED BY WILLIAM A. UTTON, PRESIDENT

Testimony presented in support of the Animas-LaPlata Project by San Juan (New Mexico) Farm & Livestock Bureau comprised of 276 farm families:

The northwestern part of New Mexico land which will be included in the Animas-LaPlata Project is fertile and suitable for agriculture. Land that has been under cultivation in this area has a great future potential if there were sufficient water, but due to a short supply of water only low-income crops can be produced.

With a full seasonal supply of water more intense crops can be grown. Western Vegetables, Inc. conducted a pilot truck-gardening project in other parts of San Juan County last year which proved to be very successful. They have contracted vegetables from 700 acres in 1966. By 1968 they plan to triple this acreage and are testing new crops to process.

Skyland, Inc. also purchases fruit for processing and is looking toward further developments.

This area is particularly attractive to enterprizes which use commodities requiring large amounts of unskilled labor. We have bordening this area the Navajo, Ute and Apache Indians many of whom are presently unemployed. They are adaptable to this work as has been proven by those who worked in California, Colorado, Arizona and Utah.

Livestock and dairy industries are traditional and proven in this area. A great interest is shown in the increase of these supplies to provide for the growing cities in the southwest.

It would be a great step forward to see the Animas-LaPlata Project developed. This would help accomplish in a measure what the present administration is attempting to do through the Office of Economic Opportunity. It would go one step further in providing permanent employment and produce real goods and services.

It is our desire that the Animas-LaPlata Project be approved by the Interior and Insular Affairs Committee and sponsored and passed by the Congress of the United States.

Mr. MONTOYA. Thank you kindly, Mr. Chairman, for the opportunity of telling my story of why we need the Animas-La Plata project.

Mr. ROGERS of Texas. Thank you, Mr. Montoya.

Mr. Aspinall?

Mr. ASPINALL. Mr. Montoya, I want you to know that I personally am very pleased that you folks in New Mexico and the people of Colorado have been able to get together. For a long time, I thought

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perhaps you would not be. This pleases me very much that you have settled your differences, whatever they may have been.

Mr. MONTOYA. Thank you kindly, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Montoya, I would like to congratulate you on a very fine statement. I have just one question.

On the last page of your statement, your item No. (4), you say that if this project is authorized, you will no longer have the costly job of replacing your diversion dams, and irrigation ditches that are periodically washed out by flash floods resulting from sudden storms, when you suffer from too much water at the wrong time.

How will a dam built on the Animas River, many miles removed from the land that is going to be irrigated, prevent flash floods from occurring in your area?

Mr. MONTOYA. At the present time we do not have enough water and we do not have but one concrete dam in the river. When the water is diverted to the La Plata River, when we are assured of this water, I assume that the Reclamation will go in and make concrete dams and there will be one or two or three, where now there may be half a dozen or more, on the assurance of water.

Mr. SAYLOR. Now, you have come here in support of the Animas-La Plata project. If the committee in its wisdom, decides to eliminate the provisions for the study of the importation of water, would you still support that project?

Mr. MONTOYA. I would.

Mr. SAYLOR. Congratulations. You are the first man who has come in support of the project on the basis of irrigation, and I commend you.

Mr. ROGERS of Texas. Mr. Johnson?

Mr. JOHNSON. No questions.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. No questions.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. No questions.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. No questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. No questions.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. No questions.

Mr. ROGERS of Texas. Thank you very much for coming, Mr. Montoya.

We have several other witnesses, on the Dolores project, the West Divide project, the Dallas Creek project, and the San Miguel project. We can finish with them, and I am willing to stay here. We have already stayed 30 minutes longer than we usually do. If you gentlemen want to summarize your statements very briefly, we will get them into the record, and then if you let the members question you, I think we can get all the witnesses in this afternoon. We are going to have to do it with some degree of expedition.

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Our next witness is Mr. Jack Vinger, director of the Dolores Water Conservancy District, accompanied by Mr. Charles Porter and Mr. James Barrett.

STATEMENT OF JACK VINGER, DIRECTOR, DOLORES CONSERVANCY WATER DISTRICT; ACCOMPANIED BY CHARLES PORTER, DOLORES CONSERVANCY DISTRICT; AND JAMES BARRETT, REPRESENTING CORTEZ AND DOVE CREEK, COLO.

Mr. VINGER. Mr. Chairman and members of the committee, my name is Jack Vinger. I am president of the Dolores Water Conservancy District of the State of Colorado. Our district was organized in November of 1961, pursuant to the laws of the State of Colorado, to act as the official sponsoring, contractual, and operating entity for the proposed Dolores Federal reclamation project in southwestern Colorado.

Mr. ASPINALL. Mr. Chairman, I just want to suggest to the witnesses what the chairman asked. The chairman wanted to put your statements in the record and say that you supported it and whom you represent. That is all he wanted you to do.

Mr. VINGER. Very good, sir.

Mr. Chairman, I would like to introduce and place in the record the statements of myself, Mr. Charles Porter and Mr. James Barrett. In connection therewith——

Mr. ROGERS of Texas. All three that you mentioned have separate statements?

Mr. VINGER. Yes, sir; they do have.

Mr. ROGERS of Texas. Without objection, those statements will be included in the record in the order that you announced, Mr. Vinger.

Mr. Porter, whom do you represent? I think the record ought to show that.

Mr. PORTER. I represent myself as an irrigator right in the middle of the Dolores River project. The — and I represent the Dolores River Conservancy District.

Mr. ROGERS of Texas. Now, Mr. Barrett, if you will state whom you represent.

Mr. BARRETT. The three cities in the county; Cortez, Dolores, and Dove Creek.

Mr. ROGERS of Texas. Your statements will be inserted in the record at this point.

(The statements of Mr. Vinger, Mr. Porter, and Mr. Barrett follow:)

STATEMENT OF JACK VINGER, DIRECTOR, DOLORES WATER CONSERVANCY DISTRICT, STATE OF COLORADO, PERTAINING TO H.R. 4671 AND RELATED BILLS, WASHINGTON, D.C.

Mr. Chairman and gentlemen of the committee, my name is Jack Vinger. I am President of the Dolores Water Conservancy District of the State of Colorado. Our District was organized in November of 1961, pursuant to the laws of the State of Colorado, to act as the official sponsoring, contractual and operating entity for the proposed Dolores Federal Reclamation Project in Southwestern Colorado.

This project has the endorsement of the vast majority of the people in our District. We are willing and capable of entering into a repayment contract with the United States for this project at any time after the project is authorized.

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I wish to present for the record, letters from numerous organizations in the Project area, which indicate the support and need for this project. I believe that these letters, together with the other Statements to be presented here today, will clearly show the necessity of having an additional water supply in our area, especially, the need for storage facilities to create a dependable water supply. With a long-range, dependable water supply, the economy of our area, particularly the agricultural economy, will be greatly strengthened. The municipal and industrial water supply, which will be available from this project, will greatly assist in further developing our cities, towns and industries. The people in our area believe that the Dolores Project is an excellent project and a wise investment, not only for the people in our area, but for the United States.

Again, I wish to emphasize our willingness and ability to accept the obligation of a repayment contract when this project is authorized.

At this time, I take pleasure in introducing to the Committee, two gentlemen from our area who are highly qualified to speak on behalf of the Dolores Project. I present to you Mr. Charles Porter and Mr. James Barrett.

STATEMENT OF CHARLES PORTER, RANCHER, OF LEWIS, COLO., PERTAINING TO H.R. 3671 AND RELATED BILLS, WASHINGTON, D.C.

Mr. Chairman and gentlemen of the committee, my name is Charles Porter. I am a rancher from the little Post Office Town of Lewis, Colorado. Near the 4 Corners—The farm which I own and operate is under the "U" lateral of the Montezuma Valley Irrigation Company. This farm was cleared out of virgin sage brush by my father at the time irrigation water first began to flow in the Companys later ditches, about the year 1910. Since that time, a period of fifty-six years, in only four or five of those years has the irrigating season been adequate and complete. The remaining seasons were short of water in widely varying degrees from poor crop production to almost maximum crop production, but averaging a loss, which if avoided could have changed a break-even operation into one of reasonable farm income and one which could adequately afford to pay for the extra storage water which will be furnished by the Dolores River Project.

The Dolores River Project will change that picture by supplying supplemental water, usually just enough needed to put the finishing touches to a nearly mature crop and make a successful season out a poor to mediocre one. A careful record of water delivery has been kept by the Montezuma Valley Irrigation Company during the last thirty years and the pattern runs about like this; full head of irrigating water cut to 75% on June 15, to 50% on July 10, and to 25% on August 1, which generally forecasts failure for the late maturing crops such as apples, corn for ensilage, pasture and alfalfa. Then there are the disastrous seasons of 1934, 1939, 1950, 1951, 1954, 1956 and 1959. A specific example is the water delivery record of 1954—full head cut to 50% June 4, to 25% July 1, and rotation of a domestic head began August 6. A specific example of loss incurred was in 1951. On my own farm a twenty acre field was planted to pinto beans. It dried out from the blooming stage on and not a bean was harvested on that particular field. Twenty acres yielding twenty one hundred pound bags per acre would have been four hundred bags at the going price 14¢ per pound, extra good that year, equals $5600.00. This example could have been applied to most of the other crops at various times and all too often.

Fruit now grown under the Montezuma Valley Irrigation system is of unsurpassed quality. It is noted for an especially fine flavor and keeping ability. Apples placed in a recommended storage facilities will keep longer than those produced and stored elsewhere. It is my opinion that in any given year supplemental water would have paid its cost exclusive of all other benefits accruing to the Project. I also believe from my years of experience as an irrigator, that the lands of the Montezuma Valley will not require very much more water than is used now, but it will be available during the whole length of the growing season. Farmers who use too much early water against the impending drought will use less and grow more than under the present system.

The Dolores River Project is needed to store water for the servicing of 32,000 acres of land between Yellow Jacket, Colorado, and the Utah line. Much of it while being presently tilled, does not receive sufficient rain fall for good dry land farming. I have carried on this type of farming for several years and do own

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four hundred eighty acres of what is called Full Service Land. This land is semiarid, allows only two crops at the present time. Pinto Beans and wheat, both of which are surplus crops. This would be changed to the raising of crops for which this land will be especially adapted, including fruit such as peaches, apricots, cherries, pears and apples because of its frost free location and lower altitude. Alfalfa, pasture, malting barley, oats and corn for insilage will be grown. An increase in livestock production and a shift to crops which are not in surplus would occur, and also a change from fairly large units to those of family size.

Dolores River Stream flow after July 15 is so low that fishing is limited, however, the reservoir created by the dam would increase lake trout fishing tremendously. The Cahone, Ruin Canyon and Monument Creek reservoirs could also be stocked.

Boating, water skiing and many other recreational benefits of the lake created by the Project will provide additional recreational benefits for hundreds of local people, in addition to the heavy tourist traffic now being experienced because of the proximity of Monument Valley, Mesa Verde National Park and the many other tourist attractions of the area.

With the large reservoir in use, I think there would be considerable value in flood control, and especially in slit control, as the Dolores River is a fast flowing stream, carrying tons of silt to the Colorado River. Only clear water would be released from the reservoir.

There seems to be no question in anyone's mind but that the Dolores River Project will boost the economy of the area as absolutely nothing else can do. There are no other plans for bringing the benefits of irrigation to 32,000 out of the 120,000 acres of dry land in Montezuma and Dolores counties. There have been plans in the past for other small storage reservoirs on the Dolores watershed to supply the much needed supplemental water but the cost was always too much of a deterrent and financial assistance difficult to obtain. I know of no local opposition to the Project, which is rather unusual in any such undertaking and there is general agreement that the full service lands and the partial service lands stand willing and ready to pay their fair share of the cost of the Project.

These are the sentiments of a native grassroots dirt farmer located in the middle of Project land and subject to its benefits and its obligations. How better can resources of Government be used to boost the economy of an area which in turn contributes to the health and wealth of a nation?

Thank you for your kind attention and for the privilege of speaking before you. Questions would be welcome if there are any.

STATEMENT OF JAMES BARRETT, OF CORTEZ, COLO., PERTAINING TO H.R. 4671 AND RELATED BILLS, WASHINGTON, D.C.

Mr. Chairman and gentlemen of the committee, I am James Barrett from Cortez, Colorado. I deem it an honor to have been chosen to testify at this Congressional hearing, on something that has been in my heart and mind for many many years, the Dolores River Project. I have lived within ten miles of the proposed dam sight of this Project since March of 1911. I learned of this Project, which at that time was in little more than the immaginative state, from Mr. Frank Morgan who had settled in the San Juan Basin in 1879. He first had a sawmill on Lost Canyon, a tributary to the Dolores River. He also freighted with ox teams from Alamosa to Rico, Durango, and other small points along the route, and later was engaged in farming and stock raising. As a young man he explored the territory which this Project will serve, and dreamed of its wonderful possibilities, but not until the year 1912 or 1913 was he able, through his own efforts and his own money, to get a preliminary survey made to outline the highest boundary where the water would go. Though the survey was favorable he was unable to generate any substantial aid, and but for the efforts of the late Dan Hunter of Dove Creek, this Project would by now have long been forgotten. I am here to talk for the Cities to be directly affected.

Cortez, which is unanimous in the endorsement of this Project, is situated about ten miles directly south of the proposed dam sight. It is the hub of three U.S. Highways. Being so situated it has a potential of becoming a City of twenty five or thirty thousand. Under present conditions it is constantly

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riving to secure more water, which currently is barely adequate for today's e. The trade area of Cortez is populated by approximately 30,000 people. vast majority of these people are so situated that their lands and property will directly affected by the Dolores River Project. The economy of this area is imarily agricultural in nature and is supplemented by the tourist industry, e wood product industry, and many small manufacturing industries, all of hich will be greatly benefited by the completion of this Project. The 4900 acre et of water allocated to the City of Cortez will meet the requirements of the oposed growth that is anticipated. Further the City is in a financial position meet its obligation.

The Town of Dolores is situated at the upper end of the proposed lake at ıe confluence of the Dolores River and Lost Canyon. Its recreational possibili-es are enormous as well as other benefits which will naturally accrue with the ɔmpletion of this Project. Dove Creek, the County Seat of Dolores County, is tuated some twenty miles northwest of the dam sight. The water for the Town now pumped out of the Dolores River several miles from the Town. With a ımping head of over 900 feet, these high pressure pumps are costly to maintain nd operate and limit the Town water supply in quantity and dependability. his Project would provide additional water for the Town and would assure a ıore permanent and less costly water supply.

When the Congressional Committee made an inspection of this Project in 1963, nder the direction of Mr. William Crabtree the Engineer who has had charge f the preliminary work so far, it was my good fortune to go with them, and am sure that they were favorably impressed with what they saw.

Mr. VINGER. We have a series of statements here showing support. would ask that they be included in the record.

Mr. ROGERS of Texas. The Chair will receive the letters and if ap-ɔropriate, they will be included in the record. If not, they will be ɔlaced in the files with proper reference to be made to them in the ecord.

(The letters follow:)

BASIN FINANCE & REALTY CO.,
Cortez, Colo., April 5, 1966.

Re Dolores River project.

BOARD OF DIRECTORS,
DOLORES WATER CONSERVANCY DISTRICT,
Care of Ivan Patterson,
P. O. Drawer K,
Cortez, Colo.

GENTLEMEN: The Four Corners Board of Realtors would like to express our ıppreciation for the fine effort and accomplishment of the Conservancy District egarding the vital Dolores River Project.

We would also like to urge you to even greater effort at this strategic point in he legislation regarding completion of this project by offering our full support ınd by reminding everyone concerned of the necessity and importance of this ɔroject.

Thousands of acres of our drouth-plagued dry land could become highly ɔroductive irrigated farm land. We have always had the fertile soil and an deal farming climate, all we need is water; this stabilizing effect on our local griculture is an absolute necessity to the future growth of this area.

With nearly ⅔ of the land in Montezuma County belonging to the State and ational government, we have no choice but to utilize the remaining privately wned land to insure maximum benefit.

The recreational possibilities alone should make this project a must. Being ad-ıcent to the San Juan National Forest it offers camping, boating, and fishing ɔportunity to every visitor in complete accord with what the people are entitled ɔ expect in Colorado. Tourist income would of course also help stabilize local ıd area income which has always fluctuated from one extreme to the other.

Virtually every industry in our area would benefit from this project. The ity of Cortez has serious water shortages in sight and even the presently irri-ıted land is constantly harrassed by lack of adequate water storage.

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We of the Four Corners Board of Realtors consider the Dolores River Project to be an absolute necessity to the future of this entire area and therefore reiterate our offer of assistance.

Very truly yours,

WILLIAM W. KENYON,
President, Four Corners Board of Realtors.

CAHONE COMMUNITY CLUB,
May 3, 1966.

MR. I. W. PATTERSON,
Secretary, Dolores River Project,
Cortez, Colo.

DEAR MR. PATTERSON: We would like to go on record as being "for" the Dolores River Project. Not only will this help the farming in our community, it will be a big help to us in beautifying our roadside park. It will also help the businessmen by bringing in more tourists with the recreational facilities.

Sincerely,

CAHONE COMMUNITY CLUB, CAHONE, COLO.

THE CITIZENS STATE BANK OF CORTEZ,
Cortez, Colo., April 1, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.
(Attention: I. W. Patterson, Secretary-Treasurer.)

GENTLEMEN: I have been watching with interest your efforts to finalize the Dolores River Project. I want to urge your continued efforts in behalf of this project.

With both agriculture and tourism such important factors in the economy of the Four Corners area, this project becomes of critical importance. In fact, it seems to me that it is necessary to develop this water if we are to have any success in stemming the tide of the exodus of farmers from our area. As you know, with the uncertain crop conditions for the dryland area, the number of family farms are rapidly diminishing and this project could have an important bearing on the livelihood of many of our residents.

Thank you for your continued efforts on behalf of the Four Corners area and I wish you every success.

Very truly yours,

CHARLES M. SEARLE, *President.*

CITY OF CORTEZ,
Cortez, Colo., March 31, 1966.

Re Delores River project.

BOARD OF DIRECTORS, DOLORES WATER CONSERVANCY DISTRICT,
Care of Ivan Patterson,
Cortez, Colo.

GENTLEMEN: The City Council of the City of Cortez in representing the 7,500 citizens, is unanimous in its endorsement of the proposed Dolores River Project. We would urge that you take whatever steps appear necessary to insure an early completion of this project. The City of Cortez has, for many years, been faced with a rather severe water problem.

The City of Cortez presently has limited decreed water rights on the Dolores River. These rights are inadequate for the future expansion and development of the City. In recent years studies have been made by the City to develop a more nearly adequate water supply and economics have deemed such expansion not feasible.

The City of Cortez is surrounded by a great abundance of raw materials for industrial uses as well as scenic beauty which has enhanced the tourist trade in recent years. Limited water supply has made it difficult to expand these, the major industries of this area.

Cortez serves a trade area which is populated by approximately 30,000 people. Many of the vast majority of these people are so situated that their lands and property will be directly affected by the Dolores River Project. The economy of this area is primarily agricultural in nature and is supplemented by the

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tourist industry, the wood products industry, the mining industry and other small manufacturing industries. All of these industries will of necessity be benefited by the completion of the Dolores River Project.

Several years ago the City of Cortez engaged a firm of professional city planners to make a study of long range plans. Their report provided guide lines for the orderly and systematic growth of the city to a population of 40,000 citizens. All phases have been implemented with the exception of the water program. The 4,900 acre-feet of water allocated for the City of Cortez in the Dolores River Project will meet the requirements of the proposed growth plan. Further, the city is in a financial position to meet its obligations to this project.

The city government of Cortez is willing and ready to assist the Board in any manner to develop this project.

Very truly yours,

BYRL JOHNSON, *Mayor.*

CORTEZ CHAMBER OF COMMERCE,
Cortez, Colo., April 1, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

DEAR SIRS: The Cortez Chamber of Commerce, interested in the development of all elements of the Four Corners Area, would take this opportunity to fully endorse the proposed Dolores River Project.

Said Project, when completed, will add considerably to the economy of the Cortez Area by providing additional payrolls, attracting new residents and business concerns, increasing recreational facilities, extending the tax base and adding to the agricultural economy of the surrounding rural areas.

Basically, Cortez has been the center of a somewhat economically deprived area. Valuations have reminded fairly constant, although the population of the area has reflected a steady, healthy growth. This has meant an additional burden on taxpayers in the city, county and school districts. The Dolores River Project would relieve many of these problems.

At the present time, there is a surplus of labor, although recently opened Montezuma Plywood Company's new plant has relieved this to some small degree. Additional job opportunities resulting from the project would further help to absorb this labor pool.

Cortez, with a trade area of approximately 50,000 people, is the community nearest the Ute Mountain Indian Tribe Reservation, and provides many services for these people. Irrigation water is at present in short supply for the Ute Indians.

Cortez has for many years been a mecca and headquarters for summer tourists. Establishment of additional recreational facilities would further increase this city's role in this capacity.

The Cortez Chamber of Commerce stands ready to assist in any way possible to further the establishment of the project.

Sincerely,

AUGUST STOREY, *President.*

THE ROTARY CLUB OF CORTEZ, COLO.,
April 1, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Care of Mr. I. W. Patterson,
Cortez, Colo.

GENTLEMEN: This is to advise that members of the Rotary Club of Cortez, composed of business men representing a cross section of the areas business and professional community, unanimously endorse the proposed Dolores River Project . We feel that total benefit to be derived from the project will exceed by far its cost. Many of the benefits that will be realized from the project are speculative and intangible based on present facts, but will be real and tangible after the project is completed and in operation. The true value of these intangible benefits could not be accurately determined now, nor even after the project is complete. They will, however, be great and will escalate with development of the area and the attraction of new industry to the area.

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The immediate benefit will, of course, be the stimulation of the areas somewhat depressed economy that will be brought about by local employment during construction phase and by influx into the area of personnel connected with construction.

As soon as irrigation water is available there will be an immediate increase in productivity of farm lands. Farming activity per acre unit will become increasingly concentrated and will in turn result in reduction of average farm size, more farming opportunities, more farm home construction and more business opportunity to process and market the added production. Farm crops will become more diversified. An increase of feed and beef and fruit production will occur. Increase of trade to outside areas will benefit the economy of outside areas as well as that of the locally affected area.

Recreational activities such as boating, fishing, camping and hunting will be greatly increased. These attractions will not only bring vacationers and associated revenue to the area, they will also benefit towns and cities along highways in all directions from the Dolores River Project. Need for additional housing and other facilities to accommodate non-residents will provide expanding opportunities for small business ventures.

One of the greatest potential benefits to the immediate area and to the surrounding areas is the provision and development of a reliable and adequate water supply to support present and future communiy requirement plus additional water readily available to attract and support new industry.

Probably the greatest deterrent to full development of the potential of the Four Corners Area has been the lack of adequate transportational facilities. Much progress toward the elimination of this deterrent has been made through highway improvement in recent years. The Dolores River Project will stimulate additional improvement in transportational facilities.

Factors which enhance the probability of the Dolores River Project being a story book success can be summarized as follows:

1. The area is relatively undeveloped and is surrounded by areas that have realized no more, or even less development.
2. The area has the available potential in lands and other natural resources for development and is ripe for development.
3. Fuel for power is available in the form of electricity, coal, natural gas and even uranium.
4. The Dolores River Project will provide the ingredient of an adequate water supply and the stimulus to further develop the ingredient of transportation.

It is our consensus that all the ingredients necessary to make the Dolores River Project a certain success are present and that every means available should be taken to secure early approval and completion of the project.

Very truly yours,

C. M. BOLES, *President, Rotary Club of Cortez.*

DOLORES CHAMBER OF COMMERCE,
Dolores, Colo., April 22, 1966.

I. W. PATTERSON,
Secretary, Dolores Water Conservancy District Board,
Cortez, Colo.

DEAR MR. PATTERSON: The Dolores Chamber of Commerce would like to go on record as being in full support of the Dolores River Project. The benefits connected with this project are many and we feel it imperative that our support along with the majority of the citizens of the State of Colorado be recognized. These benefits include:

1. Public benefits in the value of increased settlement opportunities, improved community facilities, and stabilization of the economy.
2. Increased profits to local retail and wholesale businesses from handling produce consumed locally without processing.
3. Increased profits of all other enterprises between the farm and final consumer due to handling, processing and marketing of farm products.
4. Increased profits of enterprises supplying goods and services to project farms.
5. Municipal and industrial benefits.

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6. Increased tourism for the area and the State of Colorado as well.
7. Flood control benefits.

Because of the above benefits and including the favorable cost-benefit ratio we strongly urge the Board to an early completion of the Project.

Very truly yours,

DAVID W. MOLINARO,
Secretary-Treasurer.

BOARD OF COUNTY COMMISSIONERS OF DOLORES COUNTY,
Dove Creek, Colo., April 20, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

GENTLEMEN: This letter is being written to urge your board to do everything possible to complete the Dolores River Project. This project, if authorized and completed, would provide the stimulus necessary to reverse the downward economic trend which has prevailed in this area since 1961. The principal economic base of the County is agriculture and livestock, with a limited amount of mining in the Rico area. The Project, when completed, will be located in portion of the West end of the County. Dolores County is approximately 58 per cent public lands.

It is pointless here to attempt to portray all of the many problems in County Government with which we are now faced, however, we feel that is important to indicate some areas of relief which the project would provide:

The tax base of the County has fluctuated from 5.1 million in 1957 to a high of 6.1 million in 1961, with an estimated valuation of 4.9 million for 1966. The County levys for General Fund purposes has fluctuated from 10.00 mills in 1957 to 16.00 mills in 1963 with a current levy of 14.00 mills. If Dolores County had enjoyed the 6 per cent annual economic growth common in Colorado for the years 1962 to 1965, the present valuation would be 7.7 million and our current General Fund Budget could be funded by a levy of 9.00 mills instead of 14.00.

Authorization of the Dolores River Project with attendant construction spending in the area will not only provide jobs and increased economy in the business community, it will enhance the present valuation of many vacant business establishments and allow for new private construction necessary to provide services for an increased population.

Agriculturally, the lands in the project area will probably be divided into small farm units (some farms are now 2000 to 3000 acres in size) with additional improvements being added to the land. Farms will take on the identity of small family operated units devoted to production of diversified crops and livestock. Presently, wheat and beans are the only commodities grown on the lands, both in farm support programs.

Not to be over looked is the tremendous recreational potential in the project. The 58 per cent of Dolores County lands now in federal ownership is presently being used for big game hunting, fishing and related outdoor activities. The formation of a lake immediately adjacent to these lands for fishing, camping, boating and other related activities would certainly provide a true tourist "Mecca" in the Southwest area of Colorado.

We urge your very best effort to provide early authorization of this very vital project.

Sincerely yours,

WALDO T. VINGER, *Chairman.*

APRIL 20, 1966.

Mr. I. W. PATTERSON,
Secretary, Dolores Water Conservancy District,
Cortez, Colo.

DEAR MR. PATTERSON: At the last regular meeting of the Dolores County chapter of the Future Farmers of America we voted unanimously to go on record as being in favor of the Dolores River Project for the following reasons: It will provide more recreation areas and thus encourage tourists to come here, it will aid in soil conservation by enabling the farmers to plant more trees and grasses than he can now and this will increase the life of Lake Powell by preventing it from being filled up by silt, it will enable the farmers to plant a larger

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variety of crops and thus help to stabilize the economy of the area, it will enable the farmers to raise a larger quantity of food for the rising population; it will enable farmers to support their families on smaller plots and thus the land now available will support more families than it has in the past, and with more people moving into this area there will be more room for the people living in the cities.

Sincerely yours,

SAM SAUNDERS, *Secretary.*

DOLORES ROTARY CLUB,
Dolores, Colo., April 6, 1966.

Mr. I. W. PATTERSON,
Secretary-Treasurer,
Dolores Water Conservancy District,
Cortez, Colo.

DEAR SIR: This will inform you, that at a recent meeting of The Dolores Rotary Club, this Club voted to give its full support to your efforts in the Dolores River Project.

The members of this Club feel that with the approval of this project it would go a long ways in stabilizing the economy of this community, words alone can not explain the beauty it would add to the natural beauty we already have in the "Beautiful Dolores River Valley". The Dolores Rotary Club would like to see an early completion date on this project.

If at any time in your supporting of this project, if any member of this club can be of any help in this project, please feel free to call on any of us. "We are supporting this Board 100%".

Very truly yours,

BILL L. BOWDEN, *President.*

DOLORES SCHOOL DISTRICT RE-4A,
Dolores, Colo., April 25, 1966.

Mr. I. W. PATTERSON,
Secretary, Dolores Water Conservancy District,
Cortez, Colo.

DEAR MR. PATTERSON: The Board of Education and administration personally endorses the proposed dam on the Dolores River. We feel that it will be a fine boost to the economy of our entire area.

We hope that it has favorable action in Congress before long.

Sincerely yours,

LEONARD HALL, *Superintendent.*

THE DOLORES STATE BANK,
Dolores, Colo., April 6, 1966.

Mr. I. W. PATTERSON,
Secretary-Treasurer,
Dolores Water Conservancy District,
Cortez, Colo.

DEAR MR. PATTERSON: We would like to take this means of voicing our support of the Dolores River Project. In our opinion this would be one of the most beneficial things that could happen to this area.

Due to the uncertain moisture picture farming in the area which would be put under irrigation by this project is a plain and simple gamble at this time. With the certainty of having water when it is needed the gamble would largely be eliminated and this area could bloom as it should.

In this area when the farmer does well then the whole country does well and vice-versa. By this I mean to say that the prosperity which should come about as a result of this project won't be limited to the farmer but will go right on down the line to the mutual benefit of every resident of the area. We have only scratched the surface in regards to why we are supporting the Dolores River Project and if you should need further information in regards to our feelings on this please feel free to call on us at any time.

Very truly yours,

DONALD K. MAJORS, *Cashier.*

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TOWN OF DOLORES,
Dolores, Colo., April 26, 1966.

Re Dolores River project.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.
(c/o Mr. Ivan W. Patterson, President).

GENTLEMEN: The Town of Dolores wholeheartedly endorses the plan for the Dolores River Project to be built on the Dolores River below the Town of Dolores. We hope all your efforts in connection with the matter will ultimately crystallize into the completion of the same because of the vast area it will open up not only from the standpoint of recreation, but also from the standpoint of agricultural development in Montezuma and Dolores Counties.

If the Town can be of any assistance further to you, please feel free to call upon us.

Very truly yours,

By ARTHUR L. NIELSON. *Mayor.*

TOWN OF DOLORES,
Dolores, Colo., April 4, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

GENTLEMEN: Have been watching the recent developments of the Dolores River Project, and having been interested in this project for a number of years wish at this time to endorse the same on behalf of the Town of Dolores.

The need for this project at this time appears sound for several reasons. First, it will provide water storage for use in the late summer by farmers and stockmen. Regardless of the amount of winter moisture obtained, crops and pasture lands suffer in the late summer for lack of water. This project will provide the necessary storage of early spring runoff.

It was pointed out in the Feasibility Report of May, 1962, "The present direct flow and storage supplies fail to meet requirements". Without this project, future development in this area of farming, livestock raising, recreational and expansion of industrial facilities is sharply curtailed.

The progress of the Town of Dolores has been slow by comparison with other areas of the nation and one of the main reasons for this is that we have a limited tax base because of lands not being used to their fullest capacity. This project would improve this situation greatly, not only for the economy of the Town but also for the Dolores School District by creating immediate employment during construction and the permanent facilities so necessary in the development of a healthy economic future for the community.

There are many reasons, far too many to mention in one letter, as to why we believe this project should be expedited. You may rest assured that we will render any assistance possible to help this project along.

Very truly yours,

JACK D. FREDRIKSEN, *Mayor Pro Tem.*

DOVE CREEK BEAN & ELEVATOR CO.,
March 31, 1966.

MR. I. W. PATTERSON,
Secretary, Dolores Water Conservancy District,
Cortez, Colo.

DEAR MR. PATTERSON: It is our understanding that another hearing or meeting on the Dolores River Project is to be held soon, so we would like to again make known our support of the project.

The Dolores River Project is the only way we see for this area to achieve any expansion of its agriculture. Diversified and more intensive farming is, in our opinion, the most feasible way to help the economy of this area.

Very truly yours,

OWEN OWENS.

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DOVE CREEK, COLO., *March 31, 1966.*

Mr. IVAN W. PATTERSON,
Secretary, Dolores Water Conservancy District.

DEAR SIR: We the members of the Dove Creek Grange do firmly indorse the Dolores River Project. In our opinion it will be most beneficial for our community. It will give us the opportunity to diversify our farming, and increase the recreational facilities. All and all it will increase the economy of the whole area.

Sincerely,

DICK HUMPHREYS,
Chairman, Agricultural Committee, Dove Creek Grange 446.

DOVE CREEK SOIL CONSERVATION DISTRICT,
Dove Creek, Colo., April 5, 1966.

Mr. I. W. PATTERSON,
Secretary-Treasurer, Dolores Water Conservancy District.

DEAR MR. PATTERSON: The Directors of the Dove Creek Soil Conservation District met in a regular session, and among the other items of business discussed was the Dolores River Project hearing in the near future.

We would like to go on record as being in favor of the construction of the Dolores River Project.

The Dove Creek Soil Conservation District comprises an area from Yellow Jacket Canyon in Montezuma County North to the Dolores River and thence West to the Utah State line, and the benefits from such an irrigation project would, for the most part, be in the same area as the Dove Creek Soil Conservation District.

Agriculture in the District and in the proposed irrigation district has been depressed due to the fact that the farmers are now limited to wheat and bean crops and that irrigation would provide a sufficient amount of moisture to allow diversified crops and would thereby benefit all of the residents of the Dove Creek Soil Conservation District, and would tend to stabilize the economy thereof.

Such an irrigation project would allow a good portion of the area to be planted to grass and other feed crops, and would work as a conservation project to conserve the natural resources of the area.

The Conservation accomplished by this project would reduce washing of soil in what is presently dry cropped areas, and would reduce the sedimentation at Lake Powell.

Very truly yours,

HAROLD IVES, *President.*

DOVE CREEK SANITATION DISTRICT,
Dove Creek, Colo., April 8, 1966.

BOARD OF DIRECTORS,
DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

DEAR SIRS: We are writing to urge you to concentrate all your energies and influence upon the Dolores River Project.

We, the Board of Directors of the Dove Creek Sanitation District, feel an urgent need of the added population this project will bring to Dove Creek. We are faced with rising cost and higher payments on our bonded indebtedness over the next several years. Our situation is now serious and can become critical within the next five years. Approval of the Dolores River Project will greatly relieve and eventually solve this problem.

We also feel the whole area around our town will greatly benefit due to increased recreation in the form of hunting and fishing.

In closing let me again urge you not to let up for one minute in your efforts to procure approval for this project.

Sincerely,

JESSE E. WILSON, Jr.
W. T. COKER
MERREL DEREMO
CHARLES STIASNY

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THE TOWN OF DOVE CREEK, COLO., BOARD OF TRUSTEES,
April 13, 1966.

Re Dolores River project.
DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.
(Attention of I. W. Patterson, Secretary-Treasurer).

GENTLEMEN: The Town of Dove Creek, Colorado, a Community which will be greatly benefited by the Dolores River Project, requests early Congressional consideration and action upon the above mentioned Project.

During the past six years the population of the town has decreased by approximately forty percent, and there has been some thirty businesses in the area closed as a result of a declining economic situation. This decline has been caused primarily from a drop in farming and uranium operations in the immediate area of the Town.

It is the opinion of our entire business community that the completion of the Dolores River Project would revitalize this area.

The present water source for the town is an extremely expensive one and very limited. The Project would provide additional water for the Town and would, of course, assure a permanent source and supply of water needs.

The great need in this area for this Project cannot be over emphasized.

Respectfully submitted.

M. C. DEAN, *Mayor.*

FOUR CORNERS CONGRESS OF JAYCEES,
April 1, 1966.

Re Dolores River project.
BOARD OF DIRECTORS, DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.
(Care of Ivan Patterson).

GENTLEMEN: The Cortez Jaycees wish you to know that our organization wholeheartedly gives it endorsement to the proposed Dolores River Project. We would urge that you, as members of the Dolores Water Conservancy District, do whatever is in your power to insure an early completion of the Dolores River Project.

We feel that our area is virtually unique in its setting in that the major industries are agriculture, tourism, lumber and mining. Each of these industries would be greatly benefited by an increased water supply.

As you well know, the Jaycees is an organization made up of young men between the ages of 21 and 35 who necessarily because of their ages must work and look to the future development of their community and area. There is not a man in our organization who wishes to leave this area because of the great growth potential which can only be enhanced by the completion of the Dolores River Project.

Very truly yours,

JUNIOR CALHOUN,
President, Cortez Jaycees.

FRASER MILLING CO.,
Dove Creek, Colo., April 5, 1966.

DOLORES WATER CONSERVANCY DISTRICT.
(Attention: Board of Directors).

DEAR SIR: I am writing you to urge that you do everything in your power to expediate the Dolores River Project.

We at Fraser Milling Company feel that this project is a must item in the future of our county. While we realize that the acreage included in the District will probably be used in the production of livestock and feed for the animals, we feel increased feed and salt sales to these farmers will make up for the loss of grain and bean production.

This project will also add to our economy and stabilize it.

I sincerely hope you will be able to push this to the Congressional Committee this spring.

We certainly do need it.

Very truly yours,

JESSE E. WILSON, Jr., *Manager.*

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CORTEZ LIONS CLUB,
Cortez, Colo., March 31, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

GENTLEMEN: The Cortez Lions Club, as a civic organization concerned with the general well-being of his fellow man, wholeheartedly endorse the Dolores River Project. We further endorse the activities of the Dolores River Conservancy District and its' Board of Directors in their efforts to secure construction of this project.

We have carefully reviewed the report of the Bureau of Reclamation concerning the Dolores River Project and find that it fills many of the communities needs as to the social and economic welfare of the area. We find that Cortez and the surrounding areas served by this project will be a much better place to live, do business and make a more valuable contribution to our nation.

An adequate, dependable source of water supply for our City has long been a problem. This project will insure this communities' future in its' water problems. Industry will be able to use our vast store of raw products. The ever increasing flow of tourists to our area will be better accommodated with the recreation facilities the project will provide. As the general wealth of the community improves, better schools and churches can be provided.

The afore-mentioned report sets forth certain economic values for the project; we feel that the social values of our community will be elevated many-fold. Thus, the Cortez Lions Club joins in the plea for the earliest possible completion of the Dolores River Project. Further, should your Board of Directors require the assistance of the Club in any manner, we stand ready to give 100% effort.

Sincerely yours,

EARL O. HUTCHINSON, *President.*

MIDLAND BEAN CO.,
Colorado Springs, Colo., April 28, 1966.

MR. IVAN PATTERSON,
Secretary, Water Conservative District.

DEAR MR. PATTERSON: I would like to express my views as to the benefits our area would receive from the Dolores Project.

We are at a point now, with the allotments on wheat and the low prices and yields of pinto beans for the last ten years, where our dry land farming occupation is becoming a livelihood no one desires. We are limited to planting beans and wheat. The allotment of wheat forces most of our growers to plant beans.

The Dolores Project would enable our growers to diversify to other crops. It will encourage our young farmers to stay on the farm or come back, they are hard to find on the dryland farms today.

The Dolores Project could give this area a shot in the arm, which we have needed since the oil and uranium days.

Any assistance you may need please feel free to call on us.

HAROLD TANNER.

MONTEZUMA-CORTEZ SCHOOL DISTRICT RE-1,
Cortez, Colo., March 31, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

GENTLEMEN: It is our understanding there will be a Congressional hearing during the middle of April concerning the proposed Dolores River Project.

In addition to the Project's extreme importance to the economy and development of this area, it is also vitally important to our school district.

Our district has a comparatively low tax base, with an assessed valuation per pupil of only $5,090.00, far below the State median of $11,700.00 in Colorado. Only 27.4 per cent of the land in our county is taxable, privately-owned land; the rest is federal tax-exempt land—Mesa Verde National Park, San Juan National Forest, Ute Indian Reservation, BLM land, and two national monuments. Family incomes in our district are relatively low, as evidenced by the high percentage of children eligible for federal programs for disadvantaged children. In spite of our low-ability-to-pay, our district has made and is making a strong local effort to support its schools. This is exemplified by the voters last November approving a bond issue for a high school and a new elementary school.

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The Dolores River Project would enhance the entire economy of our school district. This would provide a stronger and broader tax base for supporting our schools. This would result in more adequate local support for our schools, a spreading and equalizing of the tax burden, less need for financial aid from without the district, a better school program and consequently fewer drop-outs, a higher level of educational attainment, more marketable job skills on the part of our students, greater self-adequacy and independence, and an uplift in personal ambition, aspiration, and productivity.

The Dolores River Project, therefore, would be of immeasurable benefit to the educational opportunity of the youth of our area.

Respectfully,

CALVIN H. BEABER,
President, Board of Education.
WILLIAM CONKLIN,
Superintendent of Schools.

BOARD OF COMMISSIONERS, MONTEZUMA COUNTY,
Cortez, Colo., April 7, 1966.

MR. I. W. PATTERSON,
Secretary-Treasurer, Dolores Water Conservancy District,
Cortez, Colo.
(Care of Empire Electric Association.)

DEAR MR. PATTERSON: This Board of Commissioners urges that everything possible be done to expedite the authorization of the Dolores River Project. We regard the construction of this project as seen as possible to be of vital interest to the people of both Montezuma and Dolores Counties.

As we see it, one of the many advantages to be derived from the project will be a substantial increase in the population of both Counties; another will be a broadening of the tax basis and a material increase in assessed valuation and in the total value of the farm products of the two Counties.

Again may we urge that everything possible be done to expedite the authorization of this project.

Very truly yours,

JOHN LEAVITT, *Clerk.*

THE MONTEZUMA VALLEY IRRIGATION CO.,
Cortez, Colo., April 19, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

GENTLEMEN: Having recently been informed that the Dolores River Project will likely come before a Congressional Committee for hearing in the near future, the purpose of this letter is to urge you to do everything possible to promote an early start and the ultimate completion of the project.

The need for the project is pretty well covered in the Feasibility Report of May, 1962, on pages eight and nine, a part of which I quote:

"Needs of Project Area"

"A dependable water supply through development of additional storage regulation is the most urgent need for continued growth of the project area. The water demands cannot be met by direct flows and the limited storage supplies presently available. Additional water supplies are needed to stabilize and expand agricultural development".

As mentioned above, present direct flow and storage supplies fail to meet requirements, especially during the late growing season, but if the project is completed, water for late use would be made available to users under our system. It would cause more diversified farming and stock raising in the area which presently depends almost entirely upon the growing of pinto beans and wheat.

It would create more farms and farms with less acreage per farm and would bring many more permanent residents to the area. It would also bring in people by the thousands to enjoy recreational advantages. It would solve a domestic water problem which presently confronts a large part of the project area including a part of the Ute Mountain Indian Reservation.

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Benefits that would be derived by completion of the project are so numerous it is impossible to mention them all in one short letter.

If anything additional is needed please do not hesitate to call.

Very truly yours,

EDWARD G. MERRITT, M.D.,
Member, Board of Directors, also President and Chairman of the Board, Dolores State Bank, Dolores, Colo.

THE MONTEZUMA VALLEY IRRIGATION CO.,
Cortez, Colo., April 7, 1966.

DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.

GENTLEMEN: Having recently been informed that the Dolores River Project will likely come before a Congressional Committee for hearing in the near future, the purpose of this letter is to urge you to do everything possible to promote an early start and the ultimate completion of the project.

This letter authorized by our Board of Directors in regular meeting April 6, 1966.

Very truly yours,

By H. G. KEOWN, *Secretary.*

PLEASANT VIEW, *April 27, 1966.*

I. W. PATTERSON,
Secretary, Dolores Water Conservation District.

DEAR MR. PATTERSON: We, of Rainbelt Grange #464, urge the passage of the Dolores River Project. The people of our dry land area feel it will be of great benefit to them. It will benefit them by bringing more people on the farms, the way it is now it takes about 600 acres to support a family. The area suffers from the lack of tax money to support their schools, roads, and other tax supported projects. Our organizations, school, and community activities, suffer from lack of people in the area. We feel it will bring more money to the farms, and area as a whole, because of recreational benefits.

Sincerely,

GLEN WILSON,
Chairman, Rainbelt Grange, Water Commission.

REPUBLICAN CENTRAL COMMITTEE OF MONTEZUMA COUNTY,
Cortez, Colo., April 4, 1966.

BOARD OF DIRECTORS, DOLORES WATER CONSERVANCY DISTRICT,
Cortez, Colo.
(Care of Ivan Patterson.)

GENTLEMEN: The other day an old timer in Dolores told me the reason for his being here . . . "My father came to Dolores in 1898 because he heard there was work on a dam to be constructed below Beaver Creek on the Dolores River."

Although that was years before many of us were born, it is commonplace to visit with native citizens who have lived most of their lives with the expectation of the dam.

Each year the benefits of the Dolores River Storage Project come more sharply into focus. For those of us aware of the area's growth potential, the term 'benefit' has been transmuted into the term 'need'. The completion of this project will supply projected domestic water requirements, substantially enhance the productivity of many thousand acres of farmland as well as provide recreational opportunities consistent with the great vacationland known as Southwestern Colorado. In addition tremendous natural resources can be considered for development if this water supply is harnessed.

Gentlemen, you may count on every member of the Republican Party of Montezuma County to lend every effort which is necessary to facilitate the earliest completion of this project. Area residents have waited long enough.

Your truly,

DEAN P. HANSON, *Chairman.*

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ROMER MERCANTILE & GRAIN CO.,
Dove Creek, Colo., March 31, 1966.

I. W. PATTERSON,
Secretary-Treasurer,
Dolores Water Conservancy District,
Cortez, Colo.

DEAR MR. PATTERSON: We have supported the Dolores River Project for the past 20 years as being a big factor in stabilizing the economy of the Montelores area.

We have customers throughout the dryland areas of both Montezuma and Dolores Counties. Whenever the Pinto Bean crop or the wheat crop is below average we notice a sharp drop in our business causing us to reduce our crew to a bare minimum. Whenever we are forced to reduce the number of employees, the people laid off are forced to go to other areas to seek employment because there is no other industry to absorb them.

When the crops are above average in yields or in price, we should be able make up for the business lost during the poorer years but we are unable to find employees. Those we were forced to lay off in previous years have moved away and are no longer available. With no other employment available, no new people move into the area.

At the present time, with our small work force, 3 of our employees are commuting to work every day from the Cortez area.

The addition of irrigating water to the lands of the Dove Creek and Cahone areas of Dolores County would add a sufficient variety of crops to definitely stabilize the Farm economy.

The addition of industrial water to the area would provide for the possibility of industrial development which would certainly supplement the local economy.

Yours truly,

DAVID L. CORLETT.

SAN JUAN BEAN GROWERS, INC.,
Pleasant View, Colo., April 28, 1966.

MR. IVAN PATTERSON,
Secretary, Water Conservation District,
Cortez, Colo.

DEAR MR. PATTERSON: In expressing the views of our organization, on the benefits that would be derived in this area from the Dolores River Project:

At the present time we are limited in our farming in this area to wheat and beans as cash crops. We feel that with the Dolores River Project, our farmers would be enabled to diversify to a certain extent and broaden and increase their farming operations.

From the recreational stand point, we feel that more tourist dollars would be spent in this area and this in turn could promote more industry in the area.

We feel that the project is of vital importance to this area and the dollars spent would be returned many times.

If we can be of any help in furthering the development of this project, feel free to call on us.

Sincerely,

CLIFTON S. NOBLE, *Manager.*

Directors, Dolores Water Conservancy District.

GENTLEMEN: For many years the Ute Mt. Pomona Grange has worked for the development of the Dolores River project. This project will be more than the Hunter lake back of the McPhee dam and a recreation area. The building of the dam alone will give this area a much needed economy boost. This project will provide supplementary water for irrigation of 28,660 acres under the Montezuma Valley Irrigation Co., give municipal water to Cortez, Dove Creek, and other communities. It will give a supply of irrigation water for 1500 acres owned by the Indians near Towaoc and supply irrigation water for 30,840 acres of good land in the Yellow Jacket, Pleasant View, and Dove Creek areas. Small diversified farming will replace the large two crop farming by many who do not live on

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the land. New homes and farming equipment manufactured elsewhere will be needed. Additional tax revenue for counties, state and nation will be another result of this project.

UTE MOUNTAIN POMONA GRANGE WATER COMMITTEE.
JACK REED, *Master.*
ED. SMITH.
E. H. GILLILAND.

YELLOW JACKET, COLO., *April 28, 1966.*

Mr. I. W. PATTERSON,
Secretary, Dolores Water Conservancy District,
Cortez, Colo.

DEAR MR. PATTERSON: We, the Yellow Jacket Grange #475, would like to go on record as endorsing the Dolores River Project.

We feel that this would be a definite boost to this area because up to date we have to carry on dry-land farming which is very uncertain to say the least. Also with irrigation water we could carry on a more diversified farming plan, going into livestock and fruit instead of the mono-culture of pinto beans. The increased valuation would help our country as a whole to improve our roads, school systems etc. It would be an economic booster to our whole area. The improvement in recreation facilities would attract many more tourists to the area as well as to the state. In return good recreation facilities would be available to the large cities surrounding the Four Corners area.

We urge the board to do every thing possible for the early completion of this project. We would be glad to help in any way possible.

Respectfully,

E. H. GILLILAND,
Master, Yellow Jacket Grange.
JOYCE REED,
Secretary, Yellow Jacket Grange.

Mr. ROGERS. Mr. Aspinall, do you have any questions?

Mr. ASPINALL. We understand, Mr. Vinger, that you represent the western part of the Dolores project and the industrial part, and Senator Porter, you represent the irrigators; is that correct?

Mr. PORTER. Yes, sir.

Mr. ASPINALL. And Mr. Barrett, you represent the municipalities; right?

Mr. BARRETT. Yes, sir.

Mr. ASPINALL. And all three of you can testify that this project is supported by the people and the various interests of the area, which includes all of the projects in the various districts; right?

Mr. BARRETT. That is right.

Mr. ASPINALL. Thank you.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Let me start first with each one of you gentlemen.

Mr. Vinger, if the committee decides to eliminate the survey for the importation of water and put it in a separate bill, do you still support the bill?

Mr. VINGER. Sir, I believe if we were offered the option, we would certainly go that far, and we would go to the point of filling the dam the first time with a bucket if we could finally get this project.

Mr. SAYLOR. Senator?

Mr. PORTER. My answer would be in the same vein, exactly.

Mr. SAYLOR. Mr. Barrett?

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Mr. BARRETT. Yes, sir; I feel the same way as these other gentlemen.

Mr. SAYLOR. In other words, you do not feel that your project, which you and the people whom you represent believe in so keenly, should be prejudiced by a study of a matter which is basically—which has no connection with your project?

Mr. ASPINALL. Well, Mr. Chairman, would the gentleman yield to me?

Mr. SAYLOR. Yes; I will.

Mr. ASPINALL. I do not think that is the position that these gentlemen take. These gentlemen are interested in the integrity of the upper basin, all together. They feel that their project is able to stand on its own feet.

After you have answered Mr. Saylor's question, then I would like to ask you to answer my question: Do you not regard the welfare of the whole Colorado River Basin as needing additional water?

Mr. VINGER. Yes, sir; I believe that is true. I would like to emphasize the fact that if we were offered this option we would come to that point, but we certainly do not think we will ever have a chance of getting the Dolores project without unanimity within Colorado.

Mr. SAYLOR. I say to the chairman, these men who are here representing the Dolores project realize they stand as a unit. They support their project. They realize there is probably a potential shortage of water in both the upper basin and the lower basin, and that importation of water must be considered at some time. I have not at any time said that I was opposed to the importation of water. I do not think we ought to put it in this bill.

I think you are loading down a good bill, which the Supreme Court said should go to the State of Arizona, that the State of Arizona should get some water. In an effort to get that water, they have had to include a number of things which I do not think belong in this bill.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. No.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. No, sir; thank you.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. No questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. No questions.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. No questions.

Mr. ROGERS of Texas. Thank you very much, gentlemen.

Mr. VINGER. With the chairman's indulgence, could I have the committee note the presence in the committee room of Mr. Ivar Patterson, Mr. Jack Kinkaid, Mr. Paul Fury, Mr. Ed Gilliland, Mr. Floyd Cox, Mr. Ed Smith, and Mr. Bob Helms, representing the various people in the area who are here today to promote this project? We have great faith and hopes for this project.

Mr. ROGERS of Texas. The record will so reflect, if you will give the reporter that list of names so that she will have them correct. The record will reflect their names.

We are happy to have you people here to present your views and indicate your feelings.

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Mr. Udall?

Mr. UDALL. I put myself at the mercy of my colleague in asking for a unanimous-consent request.

Mr. ROGERS of Texas. The chairman will hear it, whether he will entertain it or not.

Mr. UDALL. I ask unanimous consent that Mr. George Rocha, chairman of the Hualapai Tribe of Arizona, who has been here for 3 days, be taken out of order next. He has a statement which will take about 5 minutes to read, and I ask that the questioning be limited to 5 minutes.

Mr. SAYLOR. I hate to do this to my friend. I will have to object. But I will sit here and hear Mr. Rocha at the end of the schedule of witnesses that are here today.

Mr. UDALL. I understand my friend's feelings.

Mr. ROGERS of Texas. The objection is heard.

Our next witnesses are Mr. William B. Jackson, chairman of the board of directors, West Divide Water Conservancy District, Mr. Frank Delaney, attorney of the West Divide Water Conservancy District, and Mr. Edward F. Morrill, president of the Colony Development Co.

Mr. ASPINALL. Mr. Chairman.

Mr. ROGERS of Texas. Mr. Aspinall.

Mr. ASPINALL. These are all talented people. One of them, Mr. Frank Delaney, is a former district attorney, very learned in water matters. It is just too bad that we have asked a man with his ability to do his work in 3 or 4 minutes.

But do the best you can, Mr. Delaney.

STATEMENT OF WILLIAM B. JACKSON, CHAIRMAN, BOARD OF DIRECTORS, WEST DIVIDE WATER CONSERVANCY DISTRICT; ACCOMPANIED BY FRANK DELANEY, ATTORNEY, WEST DIVIDE WATER CONSERVANCY DISTRICT; AND EDWARD F. MORRILL, PRESIDENT, COLONY DEVELOPMENT CO.

Mr. JACKSON. Mr. Chairman, gentlemen of the subcommittee, I am William B. Jackson from Glenwood Springs, Colo. I am chairman of the board of directors of the West Divide Water Conservancy District. My appearance today is on behalf of myself as an individal rancher whose property would be under this project, and as a duly appointed representative of the West Divide Water Conservancy District.

Mr. ROGERS of Texas. Thank you, Mr. Jackson. Your statement will be included in the record in full the same as if you had read it.

(The complete statement of Mr. Jackson, follows:)

STATEMENT OF WILLIAM B. JACKSON, DIRECTOR, WEST DIVIDE WATER CONSERVANCY DISTRICT, STATE OF COLORADO

Mr. Chairman and gentlemen of the committee, I am William B. Jackson from Glenwood Springs, Colorado. I am Chairman of the Board of Directors of the West Divide Water Conservancy District. My appearance today is on behalf of myself as an individual rancher, whose property would be under this project, and as a duly appointed representative of the West Divide Water Conservancy District.

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I have reviewed the feasibility report on the West Divide Project and feel that the Bureau of Reclamation has done an outstanding job of reporting the facts as they are, and the project plan that they propose would be of great economic importance to the three counties in which the project is located and to all of the adjacent areas in Western Colorado, and to the State of Colorado as a whole.

As stream flow records in our area bear out, we have a big run-off of water in the spring and early summer. Late summer and fall there is very little water. We must have a controlled water program if we are to expect development in the future. Water is the lifeline of all future development in the semi-arid area in which we live regardless of whether this development is agricultural or industrial. The West Divide area has good lands, can support large population centers, and can raise good crops with proper utilization of our water resources.

One of the greatest assets of this project is that it will offer a future to the young people of our area, both in agriculture and in the towns and cities. It is extremely important that we strive to spread out our resource of youth rather than to let it pile up in the congested industrial city areas.

A conditional decree for storage of water on the Crystal River has been granted the Colorado River Water Conservation District. The Colorado River Water Conservation District has always cooperated with the West Divide Water Conservancy District and we anticipate no problems in obtaining the necessary water rights.

I would like to point out we have the support and good wishes of our communities in and near the District, our County and State. This is well demonstrated by the fact various municipalities, including Silt, Rifle and Grand Valley have made commitments to purchase municipal water from the project.

We are convinced that the conclusions arrived at in the feasibility report as to the need for municipal and industrial water are decidedly on the conservative side. In reports prepared by the University of Colorado and Cornell University several years ago pertaining to the oil shale industry and development in this area, a much greater population and demand for municipal and industrial water was foreseen. As the municipal and industrial demand for water grows I feel this need will be taken care of by the lands annexed by the municipalities and industries. It appears that the water requirements for one acre of agricultural land and one acre of urban land are approximately equal.

The agricultural economy in the West Divide area is based primarily on livestock at the present time. Such specialty crops as cherries, peaches and apples are produced on lands in the western part of the West Divide Project area. As the population of this area increases it can be expected that truck garden type crops will also be included and that the fruit industry will expand.

The project will provide much needed and favorable recreation facilities. Provision has been made to improve stream fisheries in all possible ways. The development of all potential recreational sites on public lands will have a capacity of 109,500 visitor days annually. Development of recreational sites on private lands will also be greatly expanded.

The three questions most frequently asked about the West Divide Project by people within the area graphically portray the feelings of the local people for the project: How soon can I expect water from the West Divide Project? How much water can I receive from the West Divide Project? How much will the water cost from the West Divide Project? We are ready to enter into a repayment contract with the United States for this project as soon as it is authorized.

H.R. 4671 is of great importance to the western states and to the United States. Development of our water resources is the only way we can grow and prosper. The five reclamation projects in Colorado included in this legislation are a step toward that development.

It has been a pleasure to appear before you and, for the reasons mentioned, and many more too numerous to mention, I strongly urge that you do everything possible to expedite the authorization and construction of the West Divide Project.

Mr. DELANEY. Mr. Chairman, members of the committee, I appear as attorney for this district. This district stands ready and willing to enter into a repayment contract with the United States at any time. I want to say to you that I believe this project has the unanimous support of our entire community.

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In that connection, all that I would ask leave to do is to submit resolutions of these cities and municipalities in support of this project; namely, Grand Valley, Glenwood Springs, VeBaque, Silt, and Rifle, in which these municipalities pledge themselves to subscribe for approximately 36,000 acre-feet of the 77,500 that are set aside for M. & I. purposes.

Then, resolutions of our own district and of Garfield County, in which those two entities pledge themselves to subscribe for the entire amount of M. & I. water.

Then we have letters here that, if they do not encumber the record too much, Mr. Chairman, from the Pan American Petroleum Co., the Valley Association, Inc., the town of Rifle, the Humble Oil Refining Co., and, while I note that Mr. Morrow was to appear here on the program, or in this hearing, he did not do so, but I have his statement which I will offer.

Then I have the statement of Mr. Lenhart, who is the executive vice president of the Oil Shale Corp.

Briefly, we think that the oil shale industry is at the initial beginning of a tremendous development. We need this project and we need it badly, both for agriculture and for the initial steps in the development of the oil-shale industry.

Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Thank you, Mr. Delaney.

Without objection, your statement will be included in the record in full as if it had been read.

(The complete statement of Mr. Delaney, above referred to, follows:)

STATEMENT OF FRANK DELANEY, ATTORNEY, WEST DIVIDE WATER CONSERVANCY DISTRICT, STATE OF COLORADO, PERTAINING TO H.R. 4671 AND RELATED BILLS

Mr. Chairman and gentlemen of the committee, my name is Frank Delaney. I am the attorney for the West Divide Water Conservancy District. This District was organized under the "Water Conservancy Act" of the State of Colorado by a Decree of Court entered April 10, 1964. The function of the District is to act as the official sponsoring, contractual and operating entity for the proposed West Divide Federal Reclamation Project in West Central Colorado.

The proposed Project has the support of the District, the County in which the project water is to be used, and the support of the towns located in or near the Project. Another sponsor of the Project is the Colorado River Water Conservation District. This last mentioned District includes all of twelve counties and parts of three other counties of the twenty-one counties west of the Continental Divide in Colorado. One of its objectives is to initiate plans to make beneficial use of water.

Resolutions of the said county and of the District and the towns asking your support for said Project are submitted herewith and we request that the same be included in the records of this hearing.

The West Divide Water Conservancy District is ready to enter into a repayment contract with the United States for this Project if and when the Project is authorized. The entities above mentioned stand ready and willing to obligate themselves to contract for the water allocated to municipal and industrial uses and pay the cost thereof to the extent of the statutory powers conferred upon them, all of which will appear from the said Resolutions.

My statements are based upon my personal observations and knowledge of the project area acquired by experience in two vocations, namely, the practice of the law which has extended over a period of fifty years and the ranching business and contact with its many problems.

I have witnessed the ups and downs of our economy. The general trend has been a slow but consistent growth beginning with the second decade after the cession by the Ute Indians to the United States of the territory to which I *refer in this* statement.

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The livestock business and farming have always been the one dependable, stabilizing factor in our economy.

Said area was favored with many natural resources. The beginning of our settlements stemmed from the mining of silver. Coal mining on an extensive scale came and went and again is in a moderately resurgent state of development. At this time uranium, vanadium, oil and gas have helped us grow.

Isolation, geographical and political, as well as high cost transportation, has in the past impeded our growth. In recent years improved transportation has done much to overcome these problems.

There is one outstanding aspect in our present situation. The proposed West Divide Project is located along one side of the perimeter of the great oil shale deposits of Western Colorado. It is said those deposits have a known kerogen, or oil content, of a trillion barrels. It represents a greater source of wealth than all the gold, silver and other hard rock metals ever mined in the State of Colorado. To produce shale oil, we must have water. To have water we must also have storage reservoirs.

Nature favored our locality with that indispensable resource, water. But, to use the water now available, we must first store it. We hope to keep some of it for beneficial use in our scenic Western Colorado. The streams in our area are a part of the headwaters of the Colorado River.

We have room for those who seek outdoor recreation.

We firmly believe that we stand on the threshold of the actual beginning of the oil shale industry. This industry will undoubtedly furnish an economic future for many thousands engaged in the production of shale oil and related activities.

The West Divide Project will promote and bring to fruition the highest and most beneficial use of the water resources originating in the area herein mentioned. The Project will not only promote a very great increase in our agricultural production of non-surplus crops, but it will also earmark, set aside, and make available, when and as the national interest may require, industrial and municipal water to serve the initial and most important phase of oil shale development. It will give assurance that domestic and municipal water will be available to serve the needs of the communities which will come into existence with shale oil production.

As those communities increase and grow they will take over the mesas and bench lands now devoted to agriculture and the project water originally allocated for irrigation will be converted and changed to urban use with practically no additional cost.

In the meantime, as Mr. Jackson and others have indicated, this project will give impetus to the establishment of new homes for those who follow the vocation of farming.

We recognize the needs of others for water in order to meet the necessities of growing populations throughout the West. We therefore support all phases of H.R. 4671. We request and urge the Congress to approve said proposed legislation.

Mr. ROGERS of Texas. Also, the complete statement of Mr. Edward F. Morrill will be placed in the record as if it had been read in full.

(The statement of Mr. Morrill, above referred to, follows:)

STATEMENT OF EDWARD F. MORRILL, PRESIDENT, COLONY DEVELOPMENT CO., DENVER, COLO.

Mr. Chairman and gentlemen of the committee, my name is Edward F. Morrill. I am the president of Colony Development Company with offices in Denver, Colorado. Colony Development Company is an agency company representing Sohio Petroleum Company, The Cleveland-Cliffs Iron Company, and The Oil Shale Corporation. Colony Development Company has constructed a mine and prototype plant for the production of oil from shale. These facilities, which are in operation on Parachute Creek, north of the Town of Grand Valley in Garfield County, Colorado, are designed to process approximately 1,000 tons of oil shale per day.

Our vital interest in the matters now before this Subcommittee arises from the absolute, basic necessity for water for the production of oil from shale and attendant essential water-using facilities. Colony has investigated the water resources of Western Colorado with a view to determining the availability of water, not only for its own needs but also for those of the oil shale industry

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generally. It concurs generally with the estimates of the total water requirements of an oil shale industry made by Cameron and Jones, Incorporated, for the State of Colorado in July 1959. After appropriate adjustments in the time schedule developed in that study, it appears likely that industry will demand 40,000 acre feet of water annually by 1970–75, which demand will increase to 250,000 acre feet per year by 1975–80.

Colony, on behalf of its parent companies, has taken certain steps to provide for its own initial requirements. In this connection it has negotiated and is negotiating for agreements with the Bureau of Reclamation and with the Colorado River Water Conservation District. Although we believe that these contracts and other rights provide adequately for our short term needs, Colony believes that the West Divide Project will provide additional storage necessary to satisfy the long range requirements of Colony and other participants in the oil shale industry. It therefore urges the authorization of the West Divide Project as an important step in the conservation of Colorado's water resources for use in the development of one of the nation's great energy resources.

Mr. ROGERS of Texas. Now, what was the name of the other gentleman?

Mr. DELANEY. Mr. Lenhart.

Mr. ROGERS of Texas. The statement of Mr. Lenhart will also be included in the record the same as if read in full.

(The statement of Mr. Lenhart, above referred to, follows:)

STATEMENT OF A. F. LENHART, EXECUTIVE VICE PRESIDENT OF THE OIL SHALE CORP.

Mr. Chairman and gentlemen of the committee, my name is A. F. Lenhart. I am Executive Vice President of The Oil Shale Corporation which has offices in New York City and Denver, Colorado.

The Oil Shale Corporation owns interests in oil shale lands in the Roan Creek and Piceance Creek areas in Western Colorado separately and in conjunction with others. The development of these lands will require substantial quantities of water. The West Divide Project and other Bureau of Reclamation Projects appear to be well suited to furnish water needed for the development of The Oil Shale Corporation's oil shale reserves.

In connection with its study of the feasibility of the West Divide Project the Bureau of Reclamation has requested indications of future demands for water use from persons and corporations interested in the development of oil shale lands in the Piceance Creek Basin in Garfield and Rio Blanco Counties, Colorado. It is not possible at this time for The Oil Shale Corporation to state with certainty the volumes of water which the development of its lands will require but its studies indicate that the oil shale industry will need more water than is now available through existing storage projects. It is therefore keenly interested in the construction of the West Divide Project as a supplement to existing facilities.

The Oil Shale Corporation urges the Subcommittee to take favorable action on H.R. 4671.

Mr. ROGERS of Texas. The resolutions and letters that you mentioned will be received and, if appropriate, will be placed in the record. If not, they will be properly referred to in the record and be included in the committee file.

(The resolutions and letters follow:)

WEST DIVIDE WATER CONSERVANCY DISTRICT,
Glenwood Springs, Colo., February 25, 1966.

Mr. ROBERT W. JENNINGS,
U.S. Department of the Interior,
Bureau of Reclamation,
Grand Junction, Colo.

DEAR MR. JENNINGS: After reviewing the Feasibility Report the Board of Directors of the West Divide Water Conservancy District noted that 77,500 acre feet of water was to be impounded for present or anticipated future demands for municipal and industrial water. In the resolution adopted November 23, 1965,

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approximately 55,200 acre feet of water was requested for this municipal and industrial use. In view of requests from local municipalities and other interests, it is the feeling of this Board that this additional M. and I. water will be in great demand and by motion duly made and seconded and unanimously approved the said resolution was amended and it was requested that the Bureau of Reclamation formulate the plans for the West Divide Project to impound water for present or anticipated future demand and need for municipal and industrial water in an amount of approximately 77,500 acre feet.

Very truly yours,

WILLIAM B. JACKSON, *President.*

RESOLUTION

Whereas the area in the Eastern part of the West Divide Water Conservancy District is rapidly being subdivided and converted into small tracts for residential uses and the trend toward suburban and recreational developments is rapidly accelerating in the part of the District, South and East of the City of Glenwood Springs and the Town of Carbondale; and

Whereas the farms and ranches between Carbondale and Glenwood Springs, as well as in the central and Western part of said District, including the municipalities of Silt, Rifle and Grand Valley, are now in need of a greater, more dependable and higher quality supply of water and the supply of water for the towns of New Castle and Carbondale may become inadequate to serve the increasing population; and

Whereas many oil companies and other investors are expending large sums of money to acquire and develop oil shale deposits and many companies are interested in the production of shale oil by conventional methods and it now seems probable that a technological break-through in the production of shale oil from oil shale in situ seems imminent; and

Whereas it is now recognized by all competent authorities that a much greater supply of municipal and industrial water than is now available in the oil shale area will be needed by the growing industry in the near future; and

Whereas the Board of Directors of the West Divide Water Conservancy District believe it to be for the best interests of the District, the communities adjacent to, but not included in, said District, and of the State of Colorado that the supply of water for municipal and industrial purposes be assured.

Now therefore, be it resolved as follows:

1. That the Bureau of Reclamation is hereby requested to formulate the plans for said project to impound water for present or anticipated future demand and need for municipal and industrial water in an amount of approximately 55,200 acre feet.

2. That this District shall agree to take the necessary steps to assure a demand for the use of such storage water within a period of time which will permit paying out the costs allocated to water supply for municipal and industrial uses within the life of said project, all as provided in the Water Supply Act of 1958 and amendments thereto.

I, Evelyn Robertson, Secretary of the West Divide Water Conservancy District, do hereby certify the above and foregoing to be a full, true and complete copy of a resolution unanimously adopted by the Board of Directors of said District at a special meeting held on the 22nd day of November, 1965, pursuant to notice.

In witness whereof, I have hereunto set my hand and caused the seal of said District to be affixed this 6th day of December, A.D. 1965.

EVELYN ROBERTSON, *Secretary.*

RESOLUTION

Whereas the Bureau of Reclamation has submitted a favorable feasibility report on the West Divide Project which is designed to supply water for the irrigation of lands in Garfield, Pitkin and Mesa Counties in Colorado and also to supply water already needed for municipal and industrial uses; and

Whereas a major part of the water to be supplied from said Project will be used on lands in Garfield County and much of the municipal and industrial use of project water will also be in said Garfield County; and

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Whereas the authorization and construction of said Project will result in very important increases in agricultural production and also in the diversification of crops raised in said County and will also encourage and promote the development of the oil shale industry and supply badly needed water for the municipal and industrial purposes already needed by entities that have invested large amount of capital in oil shale land and incidental facilities; and

Whereas such industry is destined to be of tremendous importance to all of Colorado and, particularly, areas in and adjacent to Garfield County; and

Whereas under the terms of H.R. 4761 now pending in Congress, said West Divide Project is one of the projects included for authorization and construction: Now, therefore, be it

Resolved by the Board of County Commissioners of Garfield County, Colorado, That said Project would be of tremendous economic value to Garfield County and said Board hereby approves said proposed legislation and, within the scope of legal limitations of this Board, pledges its support to bring about the authorization and construction of said West Divide Project; and be it further

Resolved, That a copy of this resolution be mailed to the Honorable Wayne Aspinall, Chairman of the Committee of Interior and Insular Affairs of the House of Representatives and to our Senators and other members of Congress from Colorado.

Dated this 6th day of April, A.D. 1966.

STATE OF COLORADO,
ss:
County of Garfield,

I hereby certify the above and foregoing to be a true copy of the Resolution passed and approved by the Board of County Commissioners of Garfield County, Colorado, on April 6, 1966.

In witness whereof I have hereto set my hand and the official seal of said County this 6th day of April, A.D.

[SEAL] CHAS. S. KEEGAN, *County Clerk.*

RESOLUTION

Whereas there is pending before the United States Congress certain proposed legislation which would authorize the construction of the Colorado River Basin Project, including the West Divide Participating Project, of the Colorado River Storage Project and Participating Projects Act, Public Law 485, 84th Congress, 2nd Session; and

Whereas the West Divide Participating Project is sponsored by the West Divide Water Conservancy District, which includes within its boundaries the City of Glenwood Springs, Colorado; and

Whereas the West Divide Participating Project will result in major improvement of the agricultural economy, in the commercial trade area of Glenwood Springs and will also make available substantial quantities of dependable high quality water for municipal and industrial uses, which will greatly enhance the economy and well being of Glenwood Springs; and

Whereas the physiographic setting for the City of Glenwood Springs is such that its major growth must be southward along the valley of the Roaring Fork River and to some extent westward along the valley of the Colorado River; and

Whereas the City of Glenwood Springs has an excellent good quality gravity water supply available for municipal use, which enters the City limits from the northeast; and

Whereas as the City grows to the southward, the desirability of complementing the City water supply by a source from the south becomes evermore evident; and

Whereas the population of Glenwood Springs nearly doubled during the decade 1950–1960 and it is now evident that the City will easily repeat that growth performance in the decade 1960–1970.

Whereas the West Divide Project will offer an excellent opportunity to so complement the City water supply when needed: Now, therefore, be it

Resolved By the City of Glenwood Springs, Colorado, by and through its City Council at a Special Meeting thereof in Glenwood Springs, Colorado, on this 5th day of March 1966, as follows:

(1) That the City of Glenwood Springs, Colorado supports the passage and authorization of the Colorado River Basin Project, including the West Divide Project;

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(2) That the West Divide Project include in its definite plan of development a provision for supplying 3,000 or more acre feet per annum of high quality or best quality project water for municipal use by the City of Glenwood Springs, Colorado;

(3) That such deliver be made to the southern part of the City in the Roaring Fork Valley in the Cardiff area; and be it further

Resolved, That a copy of this resolution be mailed to the Honorable Wayne Aspinall, Chairman of the Interior and Insular Affairs Committee of the House of Representatives; to the Senators and other Members of Congress from Colorado; to Regional Director 4, United States Bureau of Reclamation, P. O. Box 11568, Salt Lake City, Utah; to Projects Manager Robert W. Jennings, United States Bureau of Reclamation, P. O. Box 1728, Grand Junction, Colorado; and to Mr. K. William Geib, the Glenwood Springs representative on the Board of Directors for the West Divide Water Conservancy District.

Dated this 6th day of March, A. D., 1966.

STANLEY KOCHEVAR,
City Clerk, City of Glenwood Springs.

RESOLUTION

Whereas the area in the Eastern part of the West Divide Creek Water Conservancy District is rapidly being subdivided and converted into small tracts for residential uses and the trend toward suburban and recreational developments is rapidly accelerating in the part of the District South and East of the City of Glenwood Springs and the Town of Carbondale; and

Whereas the municipality of Grand Valley is now in need of a greater, more dependable and higher quality supply of water and the supply of water becomes inadequate to serve the increasing population; and

Whereas many oil companies and other investors are expending large sums of money to acquire and develop oil shale deposits and many companies are interested in the production of shale oil by conventional methods and it now seems probable that a technological break-through in the production of shale oil from shale in situ seems imminent; and

Whereas it is now recognized by all competent authorities that a much greater supply of municpal and industrial water than is now available in the oil shale area will be needed by the growing industry in the near future.

Now, therefore, be it resolved as follows:

1. That the Bureau of Reclamation is hereby requested to formulate the plans for said project to impound water for present or anticipated future demand and need for municipal and industrial water in an amount of approximately 5000 acre feet for Grand Valley.

2. That the Town of Grand Valley further requests the West Divide Creek Conservancy District to take the necessary steps to assure the storage of water sufficient to take care of the municipal and industrial uses for the Town of Grand Valley.

MINNIE L. WILSON,
Town Clerk.

Passed at Regular Council Meeting March 3, 1966.

RESOLUTION

Whereas the Bureau of Reclamation has submitted a favorable feasibility report on the West Divide Project which is designed to supply water for the irrigation of lands in Garfield, Pitkin and Mesa Counties in Colorado and also to supply water already needed for municipal and industrial uses; and

Whereas the authorization and construction of said Project will result in very important increases in agricultural production and also in the promotion and development of the oil shale industry and supply badly needed water for the municipal and industrial purposes already needed by entities that have invested large amounts of capital in oil shale land and incidental facilities; and

Whereas it is now recognized by all competent authorities that a much greater

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supply of municipal and industrial water than is now available in the oil shale area will be needed by the growing industry in the near future; and

Whereas such industry is destined to be of tremendous importance to all of Colorado and, particularly, areas in and adjacent to Garfield County; and

Whereas under the terms of H.R. 4761 now pending in Congress said West Divide Project is one of the projects included for authorization and construction; and

Whereas the municipality of DeBeque, Colorado is now in need of a greater, more dependable and higher quality supply of water to serve the increasing population and any increase in industry: Now, therefore, be it

Resolved by the Council of the Town of DeBeque, Colorado, That the Bureau of Reclamation is hereby requested to formulate plans for said project to impound water for present or anticipated future demand and need for municipal and industrial water in an amount of approximately 5,000 acre feet for DeBeque, Colorado, and that the West Divide Water Conservancy District take the necessary steps to assure the storage of water sufficient to take care of the municipal in industrial uses for the town of DeBeque.

Dated this 2nd day of May, A.D. 1966.

MAXINE A. ALLEN,
Town Clerk.
WAYNE THORP,
Mayor.

THE TOWN OF SILT, CITY HALL, SILT, COLO.

RESOLUTION

Whereas the Town of Silt may soon be in need of a greater more dependable and higher quality supply of water; and

Whereas it is now recognized by all competent authorities that a much greater supply of municipal and industrial water than is now available in the oil shale area will be needed by the growing industry in the near future; and

Whereas the Board of Trustees of the Town of Silt, believe it to be for the best interest of the Town of Silt, that the supply of water for municipal and industrial purposes be assured: Now, therefore, be it

Resolved, That the Bureau of Reclamation is hereby requested to formulate the plans for the West Divide Water Conservancy District Project to impound water for present or anticipated future demand and need for municipal and industrial water for the Town of Silt in an amount of approximately 3,000 acre feet.

STATE OF COLORADO,
County of Garfield,
Town of Silt:

I, Helen E. Pyles, Clerk of the Town of Silt, Colorado, do hereby certify the above and foregoing to be a full, true and complete copy of a resolution unanimously adopted by the Board of Trustees of said Town at a regular meeting held on December 6, 1965.

In witness whereof, I have hereunto set my hand and the seal of said Town this 14th day of December, A.D. 1965.

HELEN E. PYLES, *Town Clerk.*

CITY OF RIFLE,
Rifle, Colo., March 6, 1966.

Mr. ROBERT JENNINGS,
Director, U.S. Bureau of Reclamation,
Grand Junction, Colo.

DEAR MR. JENNINGS: May we take this opportunity to indicate our sincere interest in the proposed Divide Creek Reclamation Project.

The City of Rifle must look to the future in all areas of governmental function and as we all know one critical area is water. We are faced with many problems in source of supply, pumping, treatment and distribution. Fluctuating flows, periods of high turbidity and changes in the character of raw water contribute to these problems. At this time the City is in the process of slow steady growth and our present ability to treat and deliver water does not provide a large factor for future expansion.

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We feel that inauguration of the Silt Project, which we are most happy to see, will bring some growth as will several other projects that are pending at this time. Our deep concern however is the opening of shale resources in this area on a commercial development basis. When and if this occurs, and we feel it will ultimately, our need for a good, economic and sufficient water supply, will be most critical. To extend present facilities with existing sources of water supply could impose a tremendous burden on our community.

The Divide Creek Project could provide the City of Rifle with water sufficient to handle any growth we might experience, on an economical basis and allow us, as a community, growth and progress without reservations as to whether or not we can support the same with our basic need—water.

Of equal importance to the area, are farm and ranch lands that must have adequate water for irrigation, livestock and domestic use. We must recognize the fact that at present and in the future agriculture is, and will be, our basic industry here. New lands under irrigation improved and readily available water for land presently in use will have far reaching effects on our economy.

And further yet, possible growth of other industry in the area will be directly related to the availability of water for industrial purposes. Needless to say the potential for our area is of great proportions but we must begin today to prepare for tomorrow.

Consequently we feel that the Divide Creek Reclamation Project will be vital to our future. We, therefore, ask that every effort be made to go forward on this project, to a conclusion, in the best interests of the people and the area it will serve.

Very truly yours,

P. E. FLOYD, *City Manager.*

RESOLUTION

Whereas the area in the Western part of the West Divide Creek Water Conservancy District is rapidly being subdivided and converted into small tracts for residential uses and the trend toward suburban and recreational developments is rapidly accelerating in the part of the District in the area of the City of Rifle and the Town of Grand Valley; and

Whereas the municipality of Rifle is now in need of a greater, more dependable and higher quality supply of water and the supply of water may become inadequate to serve the increasing population; and

Whereas many oil companies and other investors are expending large sums of money to acquire and develop oil shale deposits and many companies are interested in the production of shale oil by conventional methods and it now seems probable that a technological break-through in the production of shale oil from oil shale in situ seems imminent; and

Whereas it is now recognized by all competent authorities that a much greater supply of municipal and industrial water than is now available in the oil shale area will be needed by the growing industry in the near future.

Now, therefore, be it resolved as follows:

1. That the Bureau of Reclamation is hereby requested to formulate the plans for said project to impound water for present or anticipated future demand and need for municipal and industrial water in an amount of approximately 20,000 acre feet for Rifle.

2. That the City of Rifle further requests the West Divide Creek Water Conservancy District to take the necessary steps to assure the storage of water sufficient to take care of the municipal and industrial uses for the City of Rifle.

STATE OF COLORADO,
County of Garfield,
City of Rifle, ss:

I, Frances McAlister, Clerk of the City of Rifle, Colorado, do hereby certify the above and foregoing to be a full, true and complete copy of a resolution unanimously adopted by the City Council of said City at a meeting held on the 16th day of February, 1966.

In witness whereof, I have hereunto set my hand and caused the seal of said City to be affixed this 25th day of February, A.D. 1966.

FRANCES MCALISTER, *City Clerk.*

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VALLEY ASSOCIATION, INC.,
Glenwood Springs, Colo., April 8, 1964.

The DIRECTOR,
Region 4, Bureau of Reclamation,
Salt Lake City, Utah.

DEAR SIR: This company has been formed to assist in the development of water supplies for the oil shale industry in the Colorado River area and to further the development of facilities which will be necessary to the new industry.

Such actions as the recent release of water from the Glen Canyon Reservoir and such possibilities as a successful legal action by the Mexican Government to enforce delivery of better quality water under the United States-Mexico Treaty convince us that positive and aggressive action should be taken now to assure the availability of water of good quality for a production of no less than 2,000,000 B.O.P.D. even though that level of production may not be reached until possibly 1985.

Consequently this company is now willing to commit itself to its share of a long range plan outlined in the enclosed "Statement of Intent," dated April 3, 1964. Because of the work and responsibility of both the Federal and State governments in the development of natural resources, this plan, or any other, can only materialize if the government and private activities are coordinated. The plan, therefore, includes suggestions as to actions which could be undertaken by the government.

So far as the Bureau of Reclamation is concerned we feel that the overall program for water use which the Bureau has been working out for the Western Slope can be assisted and accelerated by more definite commitments on the part of potential users of municipal and industrial water. We also believe that the pattern of water storage and distribution in a traditionally agricultural area will have to be changed and may well be improved by the assurance of a firm future municipal and industrial use of reasonably definite quantities of water.

This company is now willing to contract for the delivery of 18,000 acre feet of water of quality suitable for municipal and industrial use from the Ruedi Reservoir and to be delivered in the Grand Valley area commencing in about 1968 and increasing to 25,000 feet the third year thereafter and remaining at that level, or above, until the requirement can be satisfied by the West Divide and/or other Federally financed projects.

The company is also willing to commit itself for water from the West Divide Project as soon as more definite information is available concerning completion dates. We feel that the allocation of only 15,000 acre feet to municipal and industrial supply is extremely conservative and that it will need to be raised to 50,000 acre feet by 1980, provided that the oil shale industry does get underway in the 1965–1968 period. It is believed that Public Law 85–500 provides for anticipating future demands of this kind and we are prepared to give the type of reasonable assurance which the law requires, that we will contract for the presently earmarked 15,000, reserving the right to increase this gradually to 50,000 acre feet, or such amount as may be mutually agreed upon by the Bureau and ourselves by the close of 1965, at which time more definite data would be available.

We take this opportunity to express our appreciation of the foresight shown by the Bureau in preparing plans which will permit the beneficial use of the oil shale reserves and help create a new industry which will greatly strengthen the national economy.

Very truly yours,

J. H. SMITH, Jr., *President.*

VALLEY ASSOCIATION, INC.,
Glenwood Springs, Colo., April 3, 1964.

STATEMENT OF INTENT

This company has been formed for the purpose, amongst other things, of assisting in the development of means of satisfying the water requirements of the oil shale industry in the Colorado River Basin and we would like to take this opportunity to express our views on the matter and to offer assistance and support to the work being done by the Bureau of Reclamation, the Colorado State Water Board and the Colorado River Water Conservation District.

Great thought has been given to the long-term development of the Western Slope of Colorado, and action has been taken by resolution and otherwise by

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the Congress, the State Legislature, the Colorado Water Conservation Board, the Colorado River Water Conservation District, and others to assure that sufficient water would be left available in the natural watershed of the West Slope to permit reasonable expansion and industrialization.

In addition, specific action, such as filings on water, has been taken by private companies to establish rights. It is believed, however, that the provision of water to the oil shale industry and its associated community is a sufficiently complex problem to warrant a review and updating of the work already done, particularly in the light of the indefiniteness of the variety of water projects that are under consideration today, all of which are interrelated because they all place demands on the same general source of water although using different devices for obtaining it. This source is limited in quantity; flows at varying rates depending on the season and is subject to a constant deterioration in quality.

Thus, despite the intentions of such government statements of principle as Senate Document 80, 75th Congress, 1st Session, we are faced with the probability that oil shale production will be limited by the availability of water at a reasonable price. (*Landsberg*, "Resources in America's Future, 1962, page 405.)

It is for this reason that we recommend a plan be developed for the optimum use of water in the area concerned, taking into consideration the needs of all potential users, domestic, agricultural and industrial, in the foreseeable future. This will involve the close cooperation of the Bureau of Reclamation, the Colorado State Water Board and the Colorado River Water Conservation District, each of which has long demonstrated its interest in the matter. In addition, it will be necessary for the potential users of water, particularly in the oil shale industry, to come up with more specific information on the amount and programming of their needs. At the present time there are widely varying estimates of the water requirement to produce a barrel of oil per day; widely varying estimates of the effect quality-wise on the return flow and widely varying estimates on the date on which a substantial amount of water will be required. Yet we know that to develop storage which is essential will take several years and we know that under present Colorado law failure to commence work on a water system leaves the water wide open to appropriation by others.

This company is now prepared to provide funds to accelerate action looking toward delivery of water for municipal and industrial purposes to both the South and North sides of the Colorado River in the vicinity of Grand Valley, Colorado.

We believe that the Stage Development Plan prepared by Mr. Philip Smith, Secretary-Engineer of the Colorado River Water Conservation Board, presents the best program to follow although certain developments since 1960 will call for some revision. We are prepared to accept the customary economic and financial responsibility that goes with recommending and supporting action by the various government agencies concerned. We urge similar commitments and support from others concerned with oil shale because it is clear that failure to take definitive steps now could well leave the industry with less water than required and under any circumstances, will lead to an uncoordinated and inefficient development. Additionally, we stress that because it is essential to have an assured flow of water of reasonable quality day in and day out, contractual commitments must soon be made by the potential users.

The program we would like to follow will be along these lines:

Initial development phase

It is within reason to believe that there is sufficiently privately owned water from the Colorado River, various streams and wells to handle the initial operations—say, a 50,000 BOPD plant—but it must be realized that unless there is assurance of water for a continuing expansion, the first plant will not materialize at all.

GREEN MOUNTAIN RESERVOIR

Senate Document 80 provides that water not required for certain purposes shall be available for the development of shale oil or other industries. This does not assure any water, although it might provide much water some years. A review of the other prior requirements should be made to see if it would not be reasonable to guaranty a definite amount of water even though substantially less than what might be expected some years. Otherwise Senate Document 80,

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although held to be a firm contract by the Federal District Court, is illusory as far as oil shale interests are concerned. It is quite possible that a firm commitment from the Green Mountain Reservoir to deliver 50 acre-feet a day for 90 days during the critical period for the first 50,000 BOPD unit would be the assurance necessary to justify the capital investment required, but without delaying until other water systems were constructed. Such a commitment would continue at least until water becomes available from the Ruedi Reservoir, and would be a small contribution on the part of the State in comparison to the tax income which the new industry would generate for the State. (At this point, it may be well to remind that the Denver Research Institute Study indicates that a 1,000,000 BOPD production will generate the following *annual* tax revenues:

Federal	$560, 000, 000
State	42, 000, 000
Local	26, 000, 000

Such figures would have lead to aggressive action on the part of some State governments by this time.)

Failure to achieve some definite commitment for such a small amount of water will either force the creation of an inefficient, patchwork water system, or delay the commencement of operation which by itself could bring about the loss of water to others who have immediate use for it.

RUEDI RESERVOIR

A letter dated February 25, 1960, from the Secretary of the Interior to the President of the United States, pointed out that the substitution of the Ruedi Reservoir for a smaller one permitted almost four times the storage capacity originally planned and that the justification for the larger unit included the provision of an assured water supply for the support of the oil shale industry, amongst other things. The Colorado Water Conservation Board (CWCB) and the Colorado River Water Conservation District (CRWCD) have both further investigated this, and the CRWCD has obtained conditional decrees on the water, in accordance with the operating principles of the Frying Pan-Arkansas Project adopted by the State of Colorado April 30, 1959.

Two projects are under study for use of Ruedi water—Basalt and Bluestone—and it is believed that use of Ruedi water for the shale development is entirely compatible with these two projects. Ruedi reservoir would yield about 70,000 acre-feet annually, of which 3,000 to 5,000 acre-feet would be required for replacement of Frying Pan-Arkansas project diversions. The Basalt project would require about 40,000 acre-feet annually from Ruedi reservoir and the Bluestone project would require about 20,000 acre-feet increased diversions annually from the Colorado River. It is assumed that the increased return flows from the potential Basalt and West Divide projects, plus releases from Green Mountain reservoir under provisions of Senate Document 80, would adequately supply the Bluestone project requirements. Therefore, about 25,000 acre-feet would be available annualy from Ruedi reservoir for municipal and industrial uses commencing about 1968–1969.

This company is now willing to contract for the delivery of 18,000 acre-feet which would be on call to firm up direct flow rights and of a quality suitable for the uses indicated, commencing in about 1968 and increasing to 25,000 acre-feet or above in 1970 and until such time as the requirement can be satisfied by the West Divide or other Federally-financed projects.

We would like to emphasize here that the operating principles of the Frying Pan-Arkansas Project do not permit the sale of Ruedi water outside the natural basin of the Colorado River without the consent of the CRWCD, and that this company would wish to have an opportunity to be heard before any such sale is authorized.

So far as payment for the water sold within the natural basin is concerned, it is understood that the Water Supply Act of 1958 (Public Law 85–500) is pertinent, and that charges for the use of water shall be established by the Secretary of the Interior by appropriate contract. It is understood that charges will be computed by the cost allocation method, with interest, and that they are not necessarily based on payment ability. This company seeks no preferential treatment on payments, but does feel that it will be entitled to at least as favorable treatment as accorded to any subsequent applicant for water of same quality for a similar use.

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IRON MOUNTAIN RESERVOIR

The CRWCD has a conditional decree on water which could be stored in the proposed Iron Mountain Reservoir and some work has already been initiated on the project. This company is now willing to contribute $2,500.00 to accelerate and further the investigation and to assure that there is due diligence in maintaining the decree. No preferential treatment with regard to payment is expected from the contribution other than in general the company should be entitled to at least as favorable treatment as accorded to any subsequent applicant for water of same quality and for similar use. The company will also be ready to negotiate a contract for water storage as soon as definitive data is developed, and is prepared to increase its contribution to the costs of investigation after consultation with the CRWCD.

WEST DIVIDE PROJECT

The Colorado River Storage Project and Participating Projects Act (P.L. 485) includes provision for the West Divide Project which will directly serve the area along the Colorado River adjacent to some of the richest shale deposits. It includes in its purposes the supplying of municipal and industrial water to the industry, and the matter was studied and reported on by the Director of Region 4 of the Bureau of Reclamation to the Director of the CWCB, on June 29, 1956. It has remained under study since that time and there is no reason to believe that the project is not the most feasible for the long range solution of the problem. The water to be used is conditionally decreed to the project. Storage is the essential feature, and appropriate sites are on hand. The quality of the water varies but is within reach of that required.

The project, however, is some years off and it is difficult to estimate the requirement that will exist at the projected completion date of project. It is reasonable to assume this date will fall between 1972 and 1977. At that time it is equally reasonable to assume there will be either no shale industry or a large one. The Cameron and Jones Report indicates a production of 1,250,000 BOPD in 1975 with a water requirement of approximately 250,000 acre-feet of which possibly 90,000 would be returned to Colorado River. Clearly, this production will have been reached gradually and in early stages will have been serviced by water from the sources listed above. The question then is, will we have produced too much storage by the late 1970's if all of these projects go through. It is believed the answer is in the negative, if today's considered estimates of this country's future energy requirements are reasonably correct.

There is provision in the West Divide Project now for 15,000 acre-feet of municipal and industrial water. This estimate is based on the municipal water requirement for a population increase of 45,000 persons resulting from a 150,000 barrels per day oil shale industry as estimated by the Cameron and Jones Report for Phase III, or the primary expansion, anticipated to take place in 1970. This 15,000 acre-feet of high quality water from the West Divide project would supply only the domestic and municipal demand, assuming the industrial water demand for oil shale production would be derived from the lower quality Colorado River flows. It is believed that the figure would need to be raised to 50,000 acre-feet for the period 1980–1990, provided that within the period 1964–1968 an industry in the general dimension of 50,000 BOPD were started. As the oil shale industry expands in this manner it is assumed the additional influx of people will require the subdivision of part of the West Divide project irrigable lands on the south side of the Colorado River for housing and municipal purposes. The project irrigation water allocated to these lands could therefore be converted to municipal and domestic water which would adequately supply the increased municipal water demand. The increased industrial water requirement would be provided from the Colorado River and releases from Ruedi resorvoir. For this reason, this company would be prepared to make a commitment now on 15,000 acre-feet to be delivered commencing about 1980 but feels it would be more realistic to wait until mid-1965 and then, on the basis of the situation in the oil shale industry, make a commitment which would recognize the truly radical transformation that could be expected in the area.

YAMPA-WHITE FLATTOPS PROJECT

This project includes reservoirs at the Rio Blanco Site on the Yampa and the Bearwallow Site on Canyon Creek in the amounts of 136,000 and 47,000 acre-feet respectively, which could be used to serve the Piceance Valley area. This

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is considered the third stage in the CRWCD "Stage Development Plan" and has not been studied by this company as yet. Development of the oil shale industry in the Piceance Basin is dependent to considerable degree on the Department of the Interior's decision on use of Federal Lands. While awaiting this decision, we believe Flattops is worthy of continued investigation and study, although at this time we are not prepared to make a commitment on it.

YELLOW JACKET PROJECT

Municipal and industrial water for oil shale development in the lower portion of the Piceance Valley could be provided from the White River through the Josephine Canal, a potential feature of the Yellow Jacket project which is now under investigation by the Bureau of Reclamation. It is our understanding that as a result of requests from at least one major oil company with oil shale holdings on the lower reaches of Piceance Creek, the Bureau of Reclamation is investigating the feasibility of including this municipal and industrial water supply in their Yellow Jacket project plan. We believe that this is worthwhile and should be pursued.

Submitted by

J. H. SMITH, Jr., *President.*

PAN AMERICAN PETROLEUM CORP.,
Denver, Colo., February 15, 1966.

Re water requirements, oil shale deposits, Western Colorado.

Mr. ROBERT W. JENNINGS,
U.S. Department of the Interior,
Bureau of Reclamation,
Grand Junction, Colo.

DEAR SIR: Pan American Petroleum Corporation, as an oil shale land owner within the Bluestone Water Conservancy District and a company interested in a potential oil shale industry in this area, has been requested by your office to express its interest in the development of a quantity of water for agricultural and municipal-industrial uses from sources within your jurisdiction, and in the State of Colorado encompassed by the Colorado River Water Conservation District. As we understand, the purpose of your request is to compile information from various parties to determine the amount of water that may be needed by each sometime in the future for processing of shale oil; thus enabling your office to channel various water storage and transfer feasibility studies toward such an end.

Based on our current economic and technical information, Pan American Petroleum Corporation estimates for the purpose of your feasibility studies that it would require between 6,200 and 12,400 acres feet of water annually with no return flow to support one to two shale oil plants, each with a production capacity of 50,000 barrels of shale oil per day and a 20 year plant life. The above estimate of 6,200 acre feet of water per year for each plant includes potable and sanitary needs of the work force while on the job. It does not include domestic and municipal requirements for the employees and their families, nor does it include any water for the associated service population needed for the above work force.

In making this estimate, we consider that this company is under no obligation whatsoever. That is to say, that we consider that we are making no commitment to enter into any contractual arrangement with proper governmental authority, or anyone else to purchase water at this time. However, our estimate of possible water requirements for future shale oil operations is in accordance with our best information, as of this date. No doubt it will be absolutely necessary to be assured of a dependable water supply for any plant constructed, if shale development proves to be feasible at any time in the future, perhaps within the next several years.

Within the Piceance Creek Basin and specifically within the Roan Creek Area, Pan American currently owns 2,833.35 acres of oil shale lands and it can be reasonably assumed that at some later date, additional oil shale lands will be acquired. We are therefore definitely interested in your feasibility studies and desire that they be completed. Our interest at this time pertains to three specific projects: Bluestone, West Divide and Yellow Jacket. Insofar as the

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Bluestone Project is concerned, we are particularly interested in the inclusion of the Una Reservoir as the major storage facilitiy of the program. However, being fully aware of the multiple use of water resources, we also desire consideration be given to the study excluding the Una Reservoir. Any water made available under this alternate plan would be, of course, primarily used for agricultural purposes.

On behalf of my company, I wish to take this opportunity to express our appreciation to the Bureau of Reclamation, Colorado River Water Conservation District and the Bluestone Water Conservancy District for the efforts they have expended in furnishing advice and counsel to us on this important and vital natural resource.

In the event further information is desired from this office, kindly advise.

Very truly yours,

W. C. IMBT,
District Exploration Superintendent.

HUMBLE OIL & REFINING CO.,
Denver, Colo., October 13, 1965.

Re West Divide project.

Mr. R. W. JENNINGS,
Projects Manager, Bureau of Reclamation,
Grand Junction, Colo.

DEAR SIR: Humble Oil & Refining Company would like to express its interest in, and its desire to negotiate with the Bureau for an agreement concerning, the West Divide Project.

We understand that such an agreement, if it can be negotiated and consummated, will require Humble to bear its prorated share of the cost of construction, operation and maintenance of the project in accordance with the law and the procedures of the Bureau.

Humble Oil & Refining Company is most interested in the development of the oil shale resources of Western Colorado and neighboring states. While we have made certain efforts to secure waters from other sources, very substantial quantities of water will be needed for the extraction of shale oil and for municipal and industrial uses in connection therewith. We feel that there is a distinct possibility that Humble and the Bureau will be able to negotiate a mutually agreeable contract, whereby Humble might bear some of the costs of and secure the use of some of the waters developed in the West Divide Project.

We hope that you will consider our interest and request along with the other factors in the development of the West Divide Project. If you desire to discuss this matter more fully with any of our representatives at any time, please let us know.

Very truly yours,

WILLIAM S. LIVINGSTON.

GLENWOOD SPRINGS, COLO., *April 6, 1966.*

Hon. WAYNE N. ASPINALL,
House of Representatives,
Washington, D.C.

DEAR SIR: We, the district directors of the Mt. Sopris Soil Conservation District, after a complete study of the Feasibility Report prepared by the Bureau of Reclamation on the West Divide Project in Western Colorado, do urge its support by the Colorado Congressional delegation. It is our conclusion that the project will bring great economic benefits, not only to the project area, but also to all of the surrounding communities and the State of Colorado.

Very truly yours,

MOUNT SOPRIS SOIL CONSERVATION DISTRICT.
MELA C. CERISE, *Director.*
RICHARD C. MARTIN, *Director.*
FLAVEN J. CERISE, *Director.*
ALVIN W. OULD, *Director.*
WILLIAM B. JACKSON, *Director.*

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To the Honorable Wayne N. Aspinall, House of Representatives:

We, the district directors of the Book Cliff Soil Conservation District, after a complete study of the Feasibility Report prepared by the Bureau of Reclamation on the West Divide Project in Western Colorado, do urge its support by the Colorado Congressional delegation. It is our conclusion that the project will bring great economic benefits, not only to the project area but also to all of the surrounding communities and the State of Colorado.

Signed, this 14th day of April, A.D. 1966.

Directors, Book Cliff Soil Conservation District, Garfield County, Rifle, Colorado.

HERBERT BOOR.
CARL K. BUNKLAN.
MILTON NICHOLS.
W. F. CLOUGH.
DEE FREELAND.

Mr. ROGERS. Mr. Aspinall?

Mr. ASPINALL. Mr. Delaney, I do not want to give away your age, but how long have you lived in Glenwood Springs and the area around Glenwood Springs?

Mr. DELANEY. I have been practicing law in that community for over 50 years. I have lived in the general area all of my life, which is over 70 years.

Mr. ASPINALL. You were closely associated with the late Hon. Edward Taylor, is that correct?

Mr. DELANEY. I knew him very well and talked to him many times on many subjects.

Mr. ASPINALL. In fact, you helped draft the Taylor Grazing Act, is that right?

Mr. DELANEY. I get credit for that where I am not entitled to it, sir.

Mr. ASPINALL. You are modest, as far as that is concerned.

Did you ever see a community effort in this area which has the unanimity and support which the West Divide project has?

Mr. DELANEY. I do not believe I ever did.

And, Mr. Congressman, may I say another thing? I am certainly pleased at the unanimity of support among the seven States.

Mr. ASPINALL. I thank you very much.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Jackson, as a member of the Board of Directors of the West Divide Water Conservancy District, if this bill were changed so that your project was included despite the report from the Bureau of the Budget, but the section of the bill providing for the study for the importation of water should be removed, would you support the bill?

Mr. JACKSON. I would not, but I am not sure what the Board of Directors of the West Divide District would do.

Mr. SAYLOR. Mr. Delaney, what is your answer to the same question?

Mr. DELANEY. Does it have to be yes or no, or can I give a little explanation?

Mr. SAYLOR. Being a good lawyer, which apparently you are, you can give an explanation if you wish.

Mr. DELANEY. Well, this is the way I look at it, Congressman Saylor. I heard some of the answers made here in the course of this hearing, in which witnesses conceded that this was a national problem. Yes, the development of our water resources is a national problem.

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But we in the Colorado River Basin have a regional problem, and it is entirely different from what New York's problem would be, or some of the problems in these other areas.

We feel, the way I feel about it, we have now reached the point where there is more unanimity in our approach to the development of this regional program as a whole than I have ever seen in about 40 years that I have been more or less connected with these water problems, in a little way or sometimes in a different way. Therefore, I feel that the time has come when we all have to hang together or we will hang apart.

And I would like to know what the motives of this committee or of Congress would be in denying what I believe is a very, very desirable development from the national standpoint, before I would be willing to say that this committee or the Congress itself was right and our seven States of the Colorado River Basin were wrong. That would be my answer.

Mr. SAYLOR. Well, I think, Mr. Delaney, it has been very evident that this bill being presented and heard now before the subcommittee, is something that is relevantly new, it is not the same bill on which hearings were held last year or held the past number of years. It is nothing that the Secretary of the Interior has ever recommended to the committee. When he appears tomorrow, he is going to have to maintain the same position he has done up until now. Certain basic features in this present bill he cannot approve.

Now, I support good reclamation projects. I fight bad ones. From the information that I have seen, the West Divide project, without having seen the last report which was forwarded on the third day of May by the Secretary of the Interior to the Speaker of the House of Representatives, I understand is a favorable report. It deals with the development of your area for agricultural purposes. It deals with the development of your area for the tremendous oil shale reserves that you have. And this project could stand on its own feet. A separate bill authorizing this project could pass the Congress.

Now, what is happening, as I see it, some of you people are prejudicing your own project with the price of the lower basin's demands, particularly the demands of the State of California. It is very evident that the outfit that holds the big club in this whole thing over the other six States, whether you like it or whether you do not, are the ones who are insistent on all of these changes. The representatives of the State of California have been the ones that have laid down the guidelines and decided what has to be in this bill.

I have no objection to your unanimity. I am glad that you are getting together. I have sat here for a good many years with the chairman, your good Representative here, Mr. Aspinall, and seen the upper and lower basin States fight. I lost the battle in a project for the authorization of the Upper Colorado Storage project. But after it was authorized, I have cooperated with the chairman in making some changes that made that a much better bill today than it was when it passed Congress in 1956.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Udall?

Mr. UDALL. I just want to say to Mr. Delaney, do not let any one change your opinion, because unity is important. As you said, the

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States have to go forward together, or we will probably suffer separately.

My father was a lawyer in a small town in the high country of northern Arizona. I think the thing that impressed me was, with the perspective you have of 70 years of these water fights, to see how important it is that at last we have gotten together. I respect you and your opinion very much, and that of your colleagues at the table. We will stand with you and you stand with us, and we are not going to let anybody divide us.

Mr. BURTON of Utah. I suggest we all march along together here to finish this hearing.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. I support Mr. Udall's position completely, and I have no questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. I want to indicate, if it was California that put this together, somehow I was left out. I rather imagine it was our friend across the river to the east that had more to do with this than California.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. I have no questions.

Mr. ROGERS of Texas. Thank you very much.

Our next witnesses are Mr. Robert K. Lewis, president of the Tri-County Conservancy District, accompanied by Mr. Bob Field, manager, and Mr. John A. Hughes, attorney.

STATEMENT OF ROBERT K. LEWIS, PRESIDENT, TRI-COUNTY CONSERVANCY DISTRICT; ACCOMPANIED BY BOB FIELD, MANAGER, AND JOHN A. HUGHES, ATTORNEY

Mr. LEWIS. Mr. Chairman, gentlemen of the committee, I am Bob Lewis and I am here in support of the Dallas Creek project. I think you have my statement.

Mr. ROGERS of Texas. Without objection, your statement, Mr. Lewis, will be inserted in the record in full, the same as if you had read it.

The gentleman from Pennsylvania reserves the right to object.

Mr. SAYLOR. I do not reserve the right to object, but I think Mr. Lewis should state that he appears not only as a rancher, but also that he has been designated by the board of directors of the Tri-County Water Conservancy District to appear in behalf of the board.

Mr. LEWIS. Thank you, Mr. Saylor.

Mr. ROGERS of Texas. The record will so reflect, Mr. Lewis.

(The complete statement of Mr. Lewis follows:)

STATEMENT OF ROBERT K. LEWIS, PRESIDENT, TRI-COUNTY WATER CONSERVANCY DISTRICT, STATE OF COLORADO

Mr. Chairman and gentlemen of the committee, my name is Robert K. Lewis and I am a rancher and landowner and reside in Ouray County, Colorado. For the past 25 years, I have run either sheep or cattle operations in Ouray County and adjacent areas.

I have been officially designated by the Board of Directors of the Tri-County Water Conservancy District to appear before you on behalf of the Board and the people of the District. I have served as President of the Tri-County Water Conservancy District since it was formed in September of 1957. The District

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was organized pursuant to the laws of the State of Colorado upon petition of the people in the District. The purpose in forming the District was to create an official sponsoring, contractual and operating entity for this area's participating projects of the Colorado River Storage Project and specifically the Dallas Creek Federal Reclamation Project which is today proposed to be authorized under H.R. 4671. Our District has endorsed H.R. 4671 and my appearance here today is in support of that Bill including all of the Colorado projects included therein, but especially in support of the Dallas Creek Project.

The Dallas Creek Project area is in southwestern Colorado, approximately 80 miles from Colorado's western and southern borders. It encompasses the major portions of three of Colorado's southwestern counties, Ouray, Montrose and Delta. The Uncompahgre River cuts northward through the project area in its course from its headwaters in the high San Juan mountains to its confluence with the Gunnison River at a point near Delta. The Gunnison River is in turn a tributary of the Colorado River. Nearly all of the Dallas Creek Project area is in the drainage basin of the Uncompahgre River. The Uncompahgre is joined by numerous tributaries in the vicinity of the project. The main ones are Dallas Creek, which joins the river from the southwest and Cow and Dry Creeks joining from the southeast.

We are extremely pleased with the report on the Dallas Creek Project by the Bureau of Reclamation concerning its feasibility and feel that they are to be commended for the fine work that they have done in bringing the years of study and field work together in such a detailed and clear report. Our Board members have reviewed the report carefully and have taken the report to the people in the form of public meetings in the service area of the District. Almost without exception, the people have expressed their feelings that the Dallas Creek Project is the most important future development of the area and I cannot emphasize enough its major economic importance to them. They have strongly given their approval and endorsement and I would like to say at this point that the District is anxiously awaiting the authorization of this project and I am directed to tell you that the District is ready, wholeheartedly willing and able to enter into a properly negotiated contract for the repayment of allocated project costs immediately upon the authorization of the project.

As I have indicated to you, I am very familiar with the project area and its needs. I own property under the project as proposed and I will receive both supplemental water and water for full service irrigation. In addition, at my home ranch, which is on the Uncompahgre River near the Montrose-Ouray County line, I will be a beneficiary of the Municipal and Industrial water to be provided for the Uncompahgre Valley through the Dallas Creek Project. I can tell you that this will be a blessing as I must now haul water in tanks to my home for our domestic use. I will enlarge more on this at a later point in my statement.

The Dallas Creek Project area is largely an agricultural area with the production of livestock, chiefly beef cattle and sheep, as the main enterprise. The irrigated farm lands are used for the production of pasture, hay and barley with the aftermath being utilized as winter clean-up pastures for livestock. There is a relatively small acreage devoted to sugar beets and other cash crops. The surrounding lands are used mainly for spring, summer and fall grazing of cattle and sheep. There is a small acreage of non-irrigated farm land that is dry-farmed. This land has been used mostly for the production of wheat. However, this type of farming has proven to be uneconomical due to lack of rainfall, and is therefore of little economic importance. This land will be under the Dallas Creek Project and would be placed under irrigation, in which case the production of wheat would be eliminated and the production of feed and forage type crops would take its place.

Our Dallas Creek Project area has two severe problems at the present time and therefore divides itself into two problem areas. The southern area principally in Ouray County suffers severe mid-and late-season irrigation shortages. The northern area, consisting mainly of Montrose and Delta Counties, is in very dire need of additional municipal and industrial water, not only for the towns and cities which have outgrown or are outgrowing their present domestic water supplies, but for the farmers and ranchers who have in the most part always been without a safe and adequate domestic water supply.

In the irrigation service area of the Dallas Creek Project, approximately 17,000 acres are presently irrigated. However, water supplies are inadequate for full productivity. Most of the lands have adequate water in the spring, but as I have

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intimated before, suffer severe mid- and late-season shortages. No storage is presently available for regulation of the abundant spring and water supplies. The lack of full productivity brought about by the erratic water supply for the area has tended to make the economy of the farmers and of the related service industries unstable. There is an urgent need for additional and dependable irrigation supplies to improve and stabilize the economy of the area. At the present time, late season water shortages on irrigated lands commonly result in crop failures. Dry-land farming, as I have indicated, is practiced to some extent but results are quite uncertain. Large acreages of land were once cleared for dry-farming at considerable expense to the owners but now lie idle due to crop failures from insufficient rainfall. Adding to the economic instability of the farmers and ranchers, grazing privileges on public lands have been decreased in recent years; this has added to the need for more farm grown feed.

In the northern service area of the Dallas Creek Project, additional municipal and industrial water is needed to meet existing and anticipated needs. A few of the rural residents have wells or have constructed pipelines to convey their water from springs or nearby communities. Most of them, as I do, have to haul their water in tanks from nearby communities and store it in cisterns. Many times, the cisterns are not properly built and maintained and present a continual health hazard. Less than 5,000 acre feet of water in piped systems is estimated to be presently available to the Project's municipal and industrial service area. Residents are continually plagued with water shortages and limitations on use must be imposed. There is absolutely no reserve provided for future growth. The larger communities, Olathe, Montrose and Delta, have regulatory reservoirs, treatment facilities, and piped water systems. However, these communities have outgrown their available water supply and are looking at the Dallas Creek Project and the Tri-County Water Conservancy District for an additional supply of Municipal and Industrial Water. A significant population increase is forecast in the years ahead for this area, particularly in the vicinity of the community trade centers. This increase is expected as a result of the continuously growing popularity of the area for vacationers. The impact of the Curecanti unit of the Colorado River Storage Project, which is just 40 miles to the east of the Dallas Creek Project area, is beginning to be felt at this time. The first reservoir of the unit is now being filled and will become a major scenic, boating and fishing attraction in 1966. The Bostwick Park Project, just 20 miles to the east, is scheduled for construction activities this year. This also will attract visitors as well as add to the population increase of the area. The Tri-County Water Conservancy District has worked diligently to see that sufficient municipal and industrial water was included in project plans and has provided the Bureau of Reclamation a statement of intent to use and pay for, with interest, the municipal and industrial water to be made available in Dallas Creek. The District has resolutions from the major municipalities in which they have stated their intention of purchasing necessary municipal and industrial water supplies from Dallas Creek when available.

Another important aspect of this service area of the project is that it will provide some relief for the very high operation costs of providing water for livestock in the winter. This relief will accrue to the old established Uncompahgre Project, operated by the Uncompahgre Valley Water Users Association, which is one of the older Reclamation Projects. This project furnishes irrigation water to the northern area of the Dallas Creek Project area, and they have provided farms and ranches in those areas where natural streams, springs or wells are not available, with winter stock water. This service is provided despite the very high cost of maintaining canals and irrigation structures. With the installation of an area wide domestic water system, some of this winter operation could be eliminated.

In closing, I would like to state that it is the feeling of our Board of Directors who are the representatives of the area and the people of the Dallas Creek Project area, that we believe that the Dallas Creek Project is a good project, that it is feasible from both an economic and engineering standpoint, and that it will benefit not only those of us who will see it come into being, but will benefit generations beyond. Our opinions are not those of qualified experts, but are opinions based upon our observations as residents of the area and users of the water and land resources.

It has been a distinct pleasure for me to appear before you today as a representative of the Dallas Creek Project area and I want to thank you for your courtesy and consideration in listening to the views that I have expressed. I believe that

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the Dallas Creek Project should be authorized and that it will be a credit to our and.

Thank you.

Mr. ROGERS of Texas. Now, Mr. Hughes?

Mr. HUGHES. Mr. Chairman and members of the committee, my name is John A. Hughes, an attorney from Montrose, Colo. I am appearing here on behalf of the district and at the direction of the board of directors of the district, principally to communicate to the committee that all of the boards of the district are vitally interested in this project and will support the project from a standpoint of municipal and industrial water.

In that connection, Mr. Chairman, I have resolutions from the town of Olathe, the city of Montrose, and the Chamber of Commerce of Delta, which I would like to offer to be included as part of the record.

Mr. ROGERS of Texas. Without objection, your statement will be included in the record, Mr. Hughes, in full, as though it had been read.

(The complete statement of Mr. Hughes follows:)

STATEMENT OF JOHN A. HUGHES, MONTROSE, COLO.

Mr. Chairman and members of the committee, my name is John A. Hughes. I was born in Montrose, Colorado, May 10, 1922, and have lived there all my life except for attending the University of Colorado and three years spent on active duty with the United States Navy during World War II. I have practiced law in the City of Montrose, Colorado, since 1948. I was attorney for the City of Montrose, Colorado, from 1950 through 1954 and have been attorney for the Tri-County Water Conservancy District since it was organized and have represented the Uncompahgre Valley Water Users Association since 1948. I am a member of the Board of Directors of the Colorado River Water Conservation District.

I am appearing here in support of all of the Colorado projects included in H.R. 4671 and particularly in support of the Dallas Creek Project.

We cannot impress upon you too strongly that the development of our arid western areas are dependent entirely upon the storage of our water.

I would like to address myself particularly to the domestic water supply in the Uncompahgre Valley which will be served by the Dallas Creek Project.

Eighty years ago the Uncompahgre Valley was still occupied by the Indians. Its economic development commenced in the early 1880's. This development was limited by its supply of water, which was solely from the Uncompahgre River. The beautiful San Juan Mountains to the south of the Valley feed the Uncompahgre River. These mountains are favored each winter with a large snow pack.

However, the early March and April winds and warm spring weather cause this snow pack to run off in a very short period of time. The Uncompahgre River peaks at approximately 1600 c.f.s. in late May or early June. By the first of July the flow of the Uncompahgre River is reduced to a few hundred cubic feet of water per second of time, which reduced flow continues through the remainder of the year.

Immediately following the enactment of the Federal Reclamation Act in 1902 the Uncompahgre Valley Project was constructed. The purpose of this Project was to divert water from the Gunnison River to the Uncompahgre Valley in order to provide a more stable supply of irrigation water. This Project permitted an additional 1,000 cubic feet of water per second of time to be introduced into the Uncompahgre Valley and permitted the economic development of the Valley to be many times more than it would otherwise have been. It also provided the cities with domestic water when this supply was available.

While the Uncompahgre Valley Project made water available during the irrigation season for the development of irrigation in Montrose and Delta Counties, it was available only during the months of April through November of each year. The six mile Gunnison Tunnel could not be operated from November to April because of severe icing conditions and because it was necessary during the non-irrigation season to repair and maintain this Tunnel.

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People and livestock however have to have water every day. Not only during the irrigation season. The people presently residing within the Uncompahgre Valley Project simply do not have an adequate twelve month supply of domestic water. Families who were attracted to the Uncompahgre Valley as a result of the construction of the Uncompahgre Valley Project and established homes in the Uncompahgre Valley are without any source of central station domestic water supply. They have had to build cisterns on their farms and to put a 150 gallon tank in the back of their pickup and drive to a municipality every few days to replenish their source of domestic water supply.

The municipalities in the Uncompahgre Valley have struggled to the best of their financial ability to provide a water supply system for their residents. The electors of these areas have never failed to approve any bond issue for the development of their water system. Their basic deficiency, however, is that there is no adequate storage of water in the winter time. When the winter storms and freezing conditions prevail the rivers and streams stop running. It is a most difficult task, and from a practical standpoint an impossible one, to supply the systems with a water supply during the winter without storage reservoirs. The cost of constructing such reservoirs by each city is beyond its financial ability.

The domestic water supply system of the Uncompahgre Valley is at the present time as follows:

1. The farms and ranches of the Uncompahgre Valley simply do not have any central station domestic water supply.
2. The Towns and Cities do not have an adequate supply of safe and dependable water.

The construction of the Dallas Creek Project will permit the cities and the farmers to combine their domestic water requirements and financial abilities to develop a supply of domestic water that will be adequate to serve all of their needs. It will permit the development of one system, which will serve the needs of all the cities and ranches in the Valley. The Tri-County Water Conservancy District has recognized this need and has obtained an advance planning loan of $50,000.00 to conduct an engineering study to develop a system based on the Dallas Creek Project which would provide a central station water supply of safe, adequate and dependable water to all of the ranches and cities in our area. This study is presently underway and is expected to be completed in March, 1967.

The Uncompahgre Valley Water Users Association strongly supports the domestic water supply of this project. It is vitally interested in developing better living conditions for its members.

The construction of this project will permit it to close down canals and laterals in the winter time, which are operated to supply water for livestock in the winter time. This practice causes substantial damage to its system. The water freezes and the ice conditions damage headgates and other structures.

The Dallas Creek Project is the answer to the prayers of the men, women and children of the Uncompahgre Valley. It will provide safe, adequate and dependable central station water to all of the farms, ranches and cities in the Uncompahgre Valley. Without the Dallas Creek Project the economic development of the Uncompahgre Valley has reached its zenith. With the Dallas Creek Project the Uncompahgre Valley has only commenced to grow. Its future development is limited only by its supply of domestic water. It will provide not only needed economic benefits and long awaited comforts to the farmers, ranchers and city dwellers in the Uncompahgre Valley, it will also make possible the development of industry in the area.

I think it is a well recognized fact that the present economic development in the United States must be decentralized if the United States is to continue and preserve its economic development. The present centralization of industry in the United States makes it a vulnerable target in the event of war. From the sociological standpoint decentralization is also necessary if the people of the United States are going to be able to enjoy life to its fullest extent.

The development of a municipal supply of water in the Dallas Creek Project will enable the Uncompahgre Valley to provide a home for industry. It will permit the decentralization of industry from the overcrowded cities to an area of hunting and fishing where the industrial workers and their families can enjoy the God-given benefits of our Western Colorado and live a more complete and enjoyable life than they can in the crowded tenements of the large cities.

We respectfully invite the rest of the United States of America to visit our wonderful land and enjoy its natural scenic attractions. The municipal and industrial water provided by the Dallas Creek Project will enhance and multiply the opportunity for the rest of our nation to do so.

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We respectfully urge you to authorize the Dallas Creek Project.
Thank you.

Mr. ROGERS of Texas. The resolutions will be received and inserted in the record if appropriate. If not, they will be placed in the file, with the proper reference being made in the record.

(The resolutions follow:)

RESOLUTION

Whereas the Town of Olathe, Colorado, is the only source of supply of domestic water to the approximately 750 residents living in and adjacent to said municipality, and

Whereas the Town of Olathe, Colorado, also furnishes domestic water to farmers and ranchers in its surrounding area, which water is delivered within the Town of Olathe and hauled in tanks to the homes of the surrounding farmers and ranchers; and

Whereas the Town of Olathe presently has municipal and industrial water facilities provided through a regulatory reservoir and piped water system, however such facilities are pressed to meet existing needs, are in some cases obsolete and in need of replacement, and are not sufficient to take care of anticipated population growth; and

Whereas such growth is accentuated by greatly increased recreational attractions of the area with the development of the Curicanti Unit of the Colorado River Storage Project, and local industrial development will be stimulated by electric power available from the Curicanti Unit and other units of the storage project, and agricultural development will be stimulated with the local participating projects of the Colorado River Storage Project, including Dallas Creek itself when authorized; and

Whereas the United States Bureau of Reclamation has conducted a feasibility study on the Dallas Creek Project and as a part of said project has included 15,000 acre feet of industrial and municipal water; and

Whereas the feasibility studies of this source of supply of water indicate that it would provide an economical and reasonable source of supply of water throughout the Uncompahgre Valley: Now, therefore, be it

Resolved by the Town Council of the Town of Olathe, Colorado, as follows:

1. The Town of Olathe, Colorado, does hereby endorse wholeheartedly the Dallas Creek Project and urges the Congress of the United States to authorize said project as a participating project of the Colorado River Storage Project.

2. That the Town of Olathe, Colorado, is vitally interested in the development of M & I water as a feature of the Dallas Creek Project and subject to negotiation and execution of the necessary contractual relationship intends to purchase municipal and industrial water which will be stored in the Dallas Creek Project.

CERTIFICATE

I, Mayda L. Owens, Town Clerk of the Town of Olathe, Colorado, do hereby certify that the above and foregoing is a true and correct copy of a resolution adopted by the Town Council of the Town of Olathe, Colorado, at a special meeting held on April 28, 1966.

[SEAL] (Signed) MAYDA L. OWENS, *Town Clerk.*

APRIL 28, 1966.

RESOLUTION

Whereas the City of Montrose, Colorado, is the sole source of supply of central station domestic water to the approximately 7,500 residents living in and adjacent to said municipality; and

Whereas the City of Montrose, Colorado, also furnishes domestic water to farmers and ranchers in its surrounding area, which water is delivered within the City of Montrose and hauled in tanks to the homes of the surrounding farmers and ranchers; and

Whereas the sole source of supply of water to the City of Montrose during the months of November to April is from the Cerro Reservoir, which has a limited supply of water of approximately 650 acre feet; and

Whereas it is not economically feasible to increase the capacity of said reservoir to any substantial extent; and

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Whereas the construction of the Curicanti Project has caused a substantial increase in population of the area served with domestic water by the City of Montrose; and

Whereas in previous years the City of Montrose could rely upon the opening of the Gunnison Tunnel, a feature of the Uncompahgre Valley Project owned by the United States of America and operated by The Uncompahgre Valley Water Users Association constructed in 1905; and

Whereas due to age and deterioration of the Gunnison Tunnel it has become necessary to conduct rehabilitation and repair work therein during the months of November through April for the next several years; and

Whereas as a result of these factors the City of Montrose, Colorado, faces a most serious and critical water supply situation; and

Whereas the United States Bureau of Reclamation has conducted a feasibility study on the Dallas Creek Project and as a part of said Project has included 15,000 acre feet of industrial and municipal water; and

Whereas the feasibility studies of this source of supply of water indicate that it would provide an economical and reasonable source of supply of water for the City of Montrose, Colorado; and

Whereas feasibility studies were conducted by the Bureau of Reclamation for alternative sources of supply and the alternative sources of supply were found to be of substantially higher cost: Now, therefore, be it

Resolved by the City Council of the City of Montrose, Colorado, as follows:

1. That the City of Montrose, Colorado, does hereby endorse wholeheartedly the Dallas Creek Project and urges the Congress of the United States to authorize said Project as a participating project of the Colorado River Storage Project.

2. That the City of Montrose, Colorado, is vitally interested in the development of industrial water as a feature of the Dallas Creek Project and subject to the negotiation and execution of the necessary contractual relationship, intends to purchase municipal and industrial water which will be stored in the Dallas Creek Project.

Passed this 5th day of May, 1966.

DON L. JOHNSON, *Mayor.*

Attest:
[SEAL]

HARRIETT BARNES, *City Clerk.*

RESOLUTION

Whereas the City of Delta, Colorado, is the sole source of supply of central station domestic water to the approximately 7,500 residents living in and adjacent to said municipality; and

Whereas the United States Bureau of Reclamation has conducted a feasibility study on the Dallas Creek Project and as a part of said project has included 15,000 acre feet of industrial and municipal water; and

Whereas the feasibility studies of this source of supply of water indicate that it would provide an economical and reasonable source of supply of water throughout the Uncompahgre Valley; and

Whereas municipal and industrial water is needed to meet existing and anticipated needs of local communities and to provide a safe and convenient supply for surrounding rural areas; and

Whereas the City of Delta at present has an adequate supply of municipal and industrial water, the need for additional water in the years ahead is an important matter and must not be overlooked due to anticipated population growth; and

Whereas such growth is accentuated by greatly increased recreational attractions of the area with completion of the Curicanti unit of the Colorado River Storage Project, local industrial development stimulated by electric power from the Curicanti unit and other units of the storage project, and agricultural development with the local participating projects of the Colorado River Storage Project including Dallas Creek itself when authorized: Now, therefore, be it

Resolved by the Chamber of Commerce of Delta, Colorado, as follows:

1. That the Chamber of Commerce of Delta, Colorado, does hereby endorse wholeheartedly the Dallas Creek Project and urges the Congress of the United States to authorize said project as a participating project of the Colorado River Storage Project.

2. That the Chamber of Commerce of Delta, Colorado, is vitally interested in the development of M & I water as a feature of the Dallas Creek Project and

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subject to future need and subject to negotiation and execution of the necessary contractual relationship supports the purchase by the City of Delta municipal and industrial water which will be stored in the Dallas Creek Project; and be it

Resolved further, That copies of this resolution be forwarded to the Committee on Interior and Insular Affairs of the House of Representatives of the United States Congress, to the Colorado Water Conservation Board and to the Board of Directors of the Tri-County Water Conservation District.

We do hereby certify that the foregoing is a true and accurate copy of a resolution adopted by the Board of Directors of the Delta Chamber of Commerce, Delta, Colorado, at a special meeting held at 7:30 a.m. on May 5, 1966.

FRANK S. EASTMAN,
President, Delta Chamber of Commerce.

Attest:
THOMAS GIBSON, *Secretary.*

Mr. ROGERS. Mr. Aspinall?

Mr. ASPINALL. Does Mr. Field have a statement?

Mr. ROGERS of Texas. I intended to ask that, Mr. Field. Do you have a statement?

Mr. FIELD. I have no statement.

Mr. ASPINALL. I have no questions. These men represent one of the real beautiful areas of western Colorado, an area which has great potentiality, and a water-hungry area as far as good water for the city is concerned.

I would like to say, also, that Mr. Hughes is the son of Judge Hughes, who has appeared before this committee on many occasions and who just recently resigned his position as Chairman of the National Advisory Board to the Bureau of Land Management.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Lewis, the Dallas Creek project, according to a letter submitted by the Secretary of the Interior under the date of May 3, 1966, to the Speaker of the House of Representatives, indicates that this project can stand on its own feet and come within all of the requirements of reclamation law as now written. If the committee decides to include this project in the bill and eliminates the provisions for the study of the importation of water to another bill, would you support the legislation?

Mr. LEWIS. No, sir; I would not. I cannot, however, speak for my entire Board.

Mr. SAYLOR. Mr. Hughes?

Mr. HUGHES. Mr. Saylor, I feel that we have been working on this problem since 1952 in the Colorado River Basin. There have been so many misunderstandings, and these things have caused tremendous waste of our resources, tremendous lack of development in a timely fashion of our natural resources and opportunities for our people. I think what the bill is asking is a reasonable thing to ask, and I think that we would support the rest of the Colorado Basin States in this respect. We feel that it is a reasonable one and that it is something that should be honored.

Mr. SAYLOR. I am very glad to know that you think it is reasonable, because so far, there has not been anybody come forward and tell us what it is going to cost to import water. There is no telling.

In other words, this is the greatest blank check that anybody has ever been asked to sign.

It seems to me that when you have projects which have been investigated by the Bureau and been approved, and they could pass in a

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separate bill, that you seem to be supporting the State of Colorado blindly in your water board, in the position that you take.

Mr. HUGHES. Sir, if I may answer the question, I think this is the purpose of the study, to find out what it would cost to import water. This is what we are interested in, because we all know that we are short of water.

It is true, we could develop these few projects, but we have other projects in Colorado that are just as deserving of the support of the people. We do not feel that just because our projects were favored with having been investigated first that we should tell the rest of the people in our State that there is no more water, no more way to get water, this is the end for you.

Mr. SAYLOR. Neither do I. I do not think anybody has come along here and said we are opposed to the importation of water. But I do not think this should be included in this bill.

You say this thing has been considered since 1922. In 1922, they thought there were 15 million acre-feet of water, plus.

Mr. HUGHES. I did not mean to imply that, Mr. Saylor.

Mr. SAYLOR. This importation of water is a matter which has come up since the decision of the Supreme Court in the case of *Arizona* v. *California*.

Mr. HUGHES. That is correct.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. I just want to welcome the very fine gentlemen from a lovely section of Colorado and pledge them my support.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. No questions.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. No questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. No questions.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. No questions.

Mr. ROGERS of Texas. The next witness is Mr. Tillmon Reed, vice president, San Miguel Water Conservancy District, accompanied by the Honorable D. Lew Williams, former Colorado State senator.

Mr. ASPINALL. I wish to acknowledge not only the presence of Mr. Reed, but the presence of a former colleague of mine in the State senate, Lew Williams, of Norwood, one of the oldest agricultural communities in western Colorado, a livestock man and one of the few independent successful uranium operators.

Lew, it is nice to have you with us.

Mr. WILLIAMS. Thank you, Wayne.

STATEMENTS OF TILLMON REED, VICE PRESIDENT, SAN MIGUEL WATER CONSERVANCY DISTRICT, AND HON. D. LEW WILLIAMS, FORMER COLORADO STATE SENATOR

Mr. REED. Mr. Chairman, I am Tillmon Reed. I would like to have Mr. Williams' statement inserted into the record previous to mine, and mine immediately following.

Mr. ROGERS of Texas. Without objection, then, Senator Williams' statement will be inserted in the record, to be followed by yours, Mr. Reed.

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(The statements of Mr. Williams and Mr. Tillmon Reed follow:)

STATEMENT OF D. LEW WILLIAMS, RANCHER, OF NORWOOD, COLO.

Mr. Chairman and gentlemen of the committee, my name is D. Lew Williams. y father came to this area in 1888. I was born near Norwood, Colorado, March 1901 and have spent my entire life in this area. I have been a rancher all of y life and I am also actively engaged in mining operations.

I am a member of the South West Water Conservation District Board and a rmer member of the Colorado Water Conservation Board, former County ›mmissioner and former State Senator. While in the State Senate I sponsored gislation, with the help of then State Senator Wayne Aspinall, to create the ›uth West Water Conservation District.

I have been working on various programs, to get water from the San Miguel iver on to the land around Norwood, Colorado, since 1933 and I was instru-ental in getting investigative work started on the San Miguel Project by Judge :one, the first director of the Colorado Water Conservation Board.

I also served four years as Water Commissioner for District 60, the district the San Miguel River and all its tributaries. As Water Commissioner, I lministered the water rights according to the priority order, which is estab-ished by District Court decree.

We have a good water run in May and part of June while the early runoff on, but the streams are low in July, August and September when water is eded to finish the crops. The answer is reservoir storage to catch the early noff for late season use. The San Miguel Irrigation Project is the only chance r the area to get storage enough to insure a sound agricultural economy. In y opinion, the Project is sound and every landowner under the Project is ready id willing to comply with the Bureau of Reclamation Requirements.

The main storage for the Project will be the Saltado Reservoir, located on e San Miguel River, about fifteen miles down river from the town of Telluride, e county seat of San Miguel County. Telluride is a famous mining camp of e early days of gold and silver mining, and is one of the most beautiful spots the entire world. It is situated at an elevation of 9,000 feet, bordered on three des by mountains rising to 14,000 feet and there is a good oiled road leading to Telluride. It is fast becoming a favorite spot for summer visitors and tists.

These mountains are the head waters of the San Miguel River. The town of orwood is located thirty-five miles west of Telluride, at an elevation of 7,000 et. Norwood is a livestock and farming town and several breeders of pure-ed Hereford and Angus cattle have ranches in this area. Some of the finest irebred sheep ranches in the nation are also located here. The entire Project ea is ranching country, with many excellent commercial herds of cattle and eep.

Another town in the San Miguel Basin is Naturita, twenty miles west of Nor-ood, with an elevation of 5,300 feet. Naturita is an uranium and vanadium wn and some of the finest potential irrigated land under the Project is located uth and west of town. Nucla is a farming and livestock center located five iles north of Naturita. Uravan, a mining town, is located fifteen miles north-est of Naturita and the largest uranium-vanadium mill in Colorado is located Uravan.

These towns are all in need of a good water supply and the Project is the only urce for additional water. The uranium-vanadium mining employs many of e ranchers part time, making it possible for many of them to hold on until e get a firm supply of water.

In the Project area, there are deposits of coal, gypsum, phosphate, magnesium, uxite, lithium, and salt. These natural resources will require so much water at they probably cannot all be developed at the same time. The area is served good oiled roads, a large R.E.A. electric plant, and a large natural gas pipe-ie goes through the area. The ultimate development of these resources is nged to the securing of an adequate water supply. With the construction of e proposed Dolores and San Miguel Projects, all natural stream flows of the olores River drainage will be controlled and developed for the ultimate use of ople, agriculture, municipal usages and industry.

We have everything but water to make a prosperous country. I have tried to ve the committee a picture of our Project and our problem, which is shortage water and wish to express our hopes for a favorable decision from the com-ittee. I thank you for allowing me to appear before you gentlemen.

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STATEMENT OF TILLMON REED, RANCHER, OF NORWOOD, COLO.

Mr. Chairman and gentlemen of the committee, my name is Tillmon Reed. I am a rancher, and with my wife and family, reside six miles southeast of the town of Norwood, Colorado.

For the past ten years, I have been president of the San Miguel Basin Soil Conservation District which consists of one and one-fourth million acres. At the first annual meeting of the dirtrict in March 1956 I appointed a committee to study ways in which the district could further the San Miguel Irrigation Project. It became apparent that a logical first step would be organize a water conservancy district.

I have been vice-president of the San Miguel Water Conservancy District since its formation in 1957. This district, which encompasses 337,600 acres, was formed without any opposition. To the best of our knowledge, this has never been accomplished in another district in the United States.

This Project has the whole-hearted support of the people who supply us with goods and services. Over the ten year period of district activity, and also extending back, as Mr. Williams stated, for approximately thirty years the people of the entire San Miguel Basin have all worked very hard to secure this Project.

The income from our ranch and that of my neighbors is derived from the sale of the livestock products of beef, lamb, and wool. The amount we are able to sell year by year is dependent upon the amount of feed and pasture we are able to produce, which in turn is dependent upon the runoff of some side tributary streams of the San Miguel River. This runoff varies from year to year and at times is very short. Except for a small acreage of land located along the main San Miguel River, the irrigated land of the Project area is located on mesas at elevations of several hundred feet above the river. The great need of our area is a reliable all-season supply of irrigation water.

As previously stated, the raising of livestock is the major enterprise of the Project area. Our prinicipal irrigated crops are livestock roughages, consisting of alfalfa and grass hay, and irrigated pastures. The cattle and sheep, previously mentioned by Mr. Williams, are largely grazed during the summer months on the lands of the nearby higher country, most of which is private-owned grazing land, but some livestock is grazed on National Forest and BLM lands.

Most of the production from this livestock enterprise is shipped out for processing. Some weaner calves and lambs are shipped to other towns of Western Colorado for feeding, but most of our products are shipped to Denver and other large city markets, both east and west. The increase in crop production we foresee, resulting from the use of the Project water, is an increase in production of the common livestock feeds. We may be able to finish livestock in this area and not have to sell everything at time of weaning. Since we have very little production of the common surplus crops, we see no way that this Project can add to a national accumulation.

About fifteen years ago, the growing of malting barley was introduced into the community and a receiving station established at Norwood. In the peak years of 1956 and 1957, an acreage of about 1,000 acres produced in excess of 2,000,000 pounds. However, in view of the fluctuating water supply, it was extremely difficult to grow a barley which would meet the malting standards of the company and in 1964 the receiving station was closed. In this manner, the only cash crop available to the area, was lost. I feel certain, that with a dependable water supply, this could be restored to a real good crop for the people of the community.

Over the years, we have continually added to, and improved our irrigation system by the construction of reservoirs for the storage of water, and canal betterments for the improvements in the efficiency of the diversion and the use of our limited supply of water. This work has been accomplished largely by the borrowing of money and the repayment of the same, over a period of years.

Since the channel of the San Miguel River, our only source of unused water, is very deeply entrenched, requiring large scale construction for its use as a source of water, we have reached the limit of our private development and are now requesting federal assistance for additional development. Engineering study work has been completed by the Bureau of Reclamation, which will permit the delivery of this water to the farmable lands of the area. We are now asking your assistance in the construction of this large scale project.

Once the water is available to the land, it will broaden the tax base of all governments—school, local, county, state, and federal. In my opinion this is

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the great American tradition, the passing on to the next generation, something better than the preceding generations were able to provide.

As to our own family, we have a girl, 14; a boy, 12; and another boy, 9 months. Whether or not they follow my profession, my goal is to give them assistance, both moral and financial, in whatever profession they show sincere interest. I feel that it would be great if they would have the chance to follow their chosen field right in their own home town; and this project will sure add to that possibility.

In closing, I would like to say, it has been a real pleasure and an honor to be able to make the trip to this city and appear before your committee.

Mr. WILLIAMS. Mr. Chairman, I have a letter from the town of Nucla concerning their intention to try to get additional water, and also one from the town of Norwood.

I might add that when we organized the district, the town of Naturita was left out. We did not think they would want in. But they petitioned to get in; we have that much of a municipal water handling.

Mr. ROGERS of Texas. Senator, are you representing the Southwest District Conservation Board at the present time in these hearings?

Mr. WILLIAMS. I am on the southwestern board, and I am testifying for the San Miguel project.

Mr. ROGERS of Texas. Yes, sir. Are you representing anyone else; any other organization?

What I want to have the record show is every group that you represent.

Mr. WILLIAMS. I am a member of the southwestern board, formerly of the State board.

Mr. ROGERS of Texas. And Mr. Reed, you are the vice president of the San Miguel Water Conservancy District, and are you representing anyone else besides that district?

Mr. REED. I am representing the San Miguel Water Conservancy District. I am also president of the San Miguel Basin Soil Conservation District, and I have here copies of resolutions from the San Miguel Basin Soil Conservation District and a copy of a resolution from the Association of the Gunnison and Dolores Rivers Soil Conservation Districts, of which I am vice president. I would like to have those inserted in the record with my statement.

Mr. ROGERS of Texas. Without objection, the statements will be included in the order listed by the Chair, the same as if read in full, and the resolutions will be received, and if appropriate, they will be inserted in the record at the place requested. If not appropriate, they will be received for the file and referred to in the record.

(The letter and resolutions follow:)

TOWN OF NUCLA,
Nucla, Colo., May 6, 1966.

Subject: Municipal and industrial water supply resulting from proposed San Miguel Basin project.

SAN MIGUEL WATER CONSERVATION DISTRICT,
Norwood, Colo.

GENTLEMEN: This is to advise you that there is a definite need for an adequate Municipal and domestic water supply in Nucla, Colorado, and the surrounding area.

It is our opinion that the proposed San Miguel Project is the only means of securing adequate water for our present and future needs.

We, the people of Nucla and the surrounding area urge you to give this project your careful consideration.

Sincerely,

VICTOR B. BROWN, *Mayor of Nucla.*

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TOWN OF NORWOOD,
OFFICE OF CLERK,
Norwood, Colo.

A RESOLUTION

Whereas the Town of Norwood has continually improved their water system; and

Whereas the Town of Norwood has experienced well planned growth; and

Whereas the Town of Norwood wishes to plan ahead for the needs of the people; be it therefore

Resolved, That the Town Board of Norwood, Mayor and Councilmen in regular session, May 4, 1966, do hereby resolve that they plan to be ready, willing, and able, to contract for adequate municipal water from the San Miguel Irrigation Project when this project becomes a reality, and be it further resolved that a copy of this resolution be sent to the San Miguel Conservancy District Board of Directors.

KENNETH L. HALEY,
Mayor.
MELVIN SAUNDERS,
EDWARD T. RANDALL,
JAMES O. ODLE,
THOMAS W. HILL,
JOSEPH L. HANNIGAN,
Councilmen.

RESOLUTION

Whereas the San Miguel Basin Soil Conservation District, is vitally interested in the conservation of the land, water, and natural resources of the entire area; and

Whereas, the San Miguel Project, when constructed, will be of great importance to the entire state as well as the area; and

Whereas a far-sighted approach to the Colorado's water development has been drawn in H.R. 4671, a bill being introduced to Congress: Therefore be it

Resolved, That the San Miguel Basin Soil Conservation District does unanimously support the authorization of the San Miguel Project, and the entire concept of water development as outlined in H.R. 4671.

TILLMON REED, *President.*

RESOLUTION

Whereas the Association of the Gunnison and Dolores Rivers Soil Conservation Districts, serving the interests of the farmers and the ranchers throughout the watershed, is vitally interested in conserving and putting to beneficial use the waters resources of the watershed; and

Whereas the United States Bureau of Reclamation has conducted studies and completed feasibility reports on five Colorado Projects; and

Whereas these five projects will be of great benefit to the entire state of Colorado by increasing the tax base of school, local, county, state and federal government, and will provide water for irrigation, industrial and recreational development of Colorado: Therefore be it

Resolved, That the Association of the Gunnison and Dolores Rivers wholeheartedly endorse H.R. 4671, which authorizes these five projects of the Colorado River Storage Projects.

MARTIN MCINTIRE,
President.
(By Tillmon Reed, Vice President).

Mr. ROGERS of Texas. Mr. Aspinall?

Mr. ASPINALL. I have no questions. I wish to commend the witnesses for coordinating their statements and accommodating the committee at this late hour.

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Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. Mr. Williams, I have noticed you in the room since these hearings have started. I ask you the same question I have asked the rest of these people. If the San Miguel project is included in this bill and a provision for the study of the importation of water is deferred to a later date, put into another bill, would you support the legislation?

Mr. WILLIAMS. I would not. I think it is very important to have this study. Colorado is furnishing three-fourths of the water which goes down that river. If we get that study and it shows that there is water, we can get some of our water back.

Mr. SAYLOR. Mr. Williams, I do not want you to go out of here thinking I am opposed to this study. I think the study should be made. I do not think it should be made as part of this bill, the price Arizona is having to pay to get the central Arizona project approved, the price that Colorado should have to pay to get these projects which have been included in this present draft.

Mr. Reed, what is your answer to that question?

Mr. REED. I could not support the legislation. I think the legislation, or the bill as written now, is a long-range answer to the problems of the Colorado River Basin as a whole. I am happy to see that they are in union.

Mr. SAYLOR. Let me put to you a $64 question. If this committee, in its wisdom, decided to take this bill and divide it and to say that the central Arizona project and the projects of Colorado and New Mexico should be authorized, and report that bill to the floor, would the people who live in the communities where you reside and represent send telegrams to the Honorable Wayne N. Aspinall to vote against the legislation?

Mr. REED. I do not know what the people of the community are doing. You asked me my opinion a while ago, and I, as one member here, cannot speak for the whole board as to what they will do. But I feel that this is a far-reaching plan. I have worked on this study of the San Miguel project for most of my adult life. I, for one, would like to see it built, very much.

But this is a stand that the Governor has taken, and I would not take it upon myself to try to change that stand at this point.

Mr. SAYLOR. I just want to tell you that I have not seen the report on the San Miguel project, because it was only submitted to the Speaker on the 3d of May. But I do have in a letter dated April 30 from the Bureau of the Budget, the cost-benefit ratio is less than 1 to 1. For this reason, this project might not get a favorable report from the Department of the Interior. I have not seen it.

That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. I would just like to commend these gentlemen and say it is nice to see you again, Senator, and Mr. Reed.

I have read your statements. They make a valuable contribution to our record.

I want to congratulate you, Mr. Reed. You have a brand new baby boy since I saw you last.

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Mr. REED. Thank you.
Mr. ROGERS of Texas. Mr. Tunney?
Mr. TUNNEY. I have no questions.
Mr. ROGERS of Texas. Mr. Reinecke?
Mr. REINECKE. No questions.
Mr. ROGERS of Texas. Mr. Foley?
Mr. FOLEY. No questions.
Mr. REED. I would like the record to show the presence in this room of Dan Noble, the treasurer of our board, and Sam Hazlem, secretary of the San Miguel Water Conservancy District.
Mr. ROGERS of Texas. Could you furnish the reporter those names?
Mr. REED. Yes. And also Mr. Charles Conklin, the board's attorney.
Mr. ASPINALL. Former Speaker of the House of Representatives of Colorado.
Mr. WILLIAMS. The engineer for the board, Clifford Jex, is here.
Mr. ROGERS of Texas. Let them each identify themselves so the reporter will have the names correctly.
Mr. NOBLE. I am Dan Noble, treasurer and director of the San Miguel Water Conservancy District.
Mr. HAZLEM. Sam Hazlem. I am secretary of the Water Conservancy District.
Mr. REED. And Charles Conklin of Delto, attorney for the District. And Clifford Jex.
Mr. ROGERS of Texas. Very well, gentlemen.
Mr. REED. I would like to say thanks to the members of the committee. We enjoyed having you you the last time, and if you come by, I am sure we can find a steak and a trout again.
Mr. ROGERS of Texas. Thank you, Mr. Reed and Senator Williams. It is nice to have you both up before the committee.
The Chair will entertain a unanimous consent request of the gentleman from Arizona, Mr. Udall.
Mr. UDALL. I ask unanimous consent that Mr. George Rocha, chairman of the Hualapai Tribe, be heard at this time, that his statement take not less than 5 minutes, and that the questioning be limited to 5 minutes.
Mr. ROGERS of Texas. Is there objection?
(No response.)
Mr. ROGERS of Texas. The Chair hears none.
You will be recognized, Mr. Rocha. Come forward.
Mr. UDALL. While they are coming forward, could I identify Mr. Royal Marks with him, the attorney for the Hualapai Tribe, and also Mr. Arthur Lazarus, Jr., who is another attorney for that tribe.
Mr. ROGERS of Texas. Mr. Rocha, you may proceed.

STATEMENT OF GEORGE ROCHA, CHAIRMAN, HUALAPAI TRIBE OF ARIZONA; ACCOMPANIED BY ROYAL MARKS, AND ARTHUR LAZARUS, JR., ATTORNEYS

Mr. ROCHA. Mr. Chairman, in behalf of the Hualapai Tribe, I would like to thank the Chairman for giving me the opportunity to appear before you. I would also like to thank the three representatives from

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Arizona for their inclusion of the Hualapai Tribe in their amendment to H.R. 4671.

I have eliminated some of my statement so that the time element here——

Mr. ROGERS of Texas. Mr. Rocha, if you would like, your entire statement that I have before me will be included in the record the same as if read in full. If you will summarize it the committee will be indebted to you.

Mr. ROCHA. At the beginning of my statement, let me make clear what I and other representatives of the Hualapai Tribe have been saying for years—if proper consideration is given to and payments made for ownership of the dam site, the development of the Colorado River at Bridge Canyon for power and recreational purposes is the only hope that we Hualapais have of bringing a decent standard of living to our reservation. In short, Bridge Canyon Dam is one of the assets we possess which can provide my people a real chance to raise themselves out of the continued poverty. Rather than oppose the project, therefore, we ask nothing more than an assurance in the authorizing legislation of reasonable compensation for the use of tribal lands in connection with the project and, of course, a fair share of its benefits.

If the Federal Government does not plan to build a dam at Bridge Canyon, then I asked, and still ask that the tribe be allowed to do so under license from the Federal Power Commission.

The bills before this committee, however, include authority for the construction by the Federal Bureau of Reclamation of a high dam at Bridge Canyon and, according to my understanding, electric power revenues from that source generally are believed to be a necessary part of the proposed Colorado River development. Assuming that this particular project remains in the legislation, I wish to place in the record on behalf of my people a statement as to what the Hualapai Tribe would consider fair treatment for the taking of its lands.

When I last appeared before this committee, I testified in some detail about why the rights of the Hualapais in the site of the proposed Bridge Canyon Dam are clear and undisputed, and about how the tribe had entered into an agreement with the Arizona Power Authority calling for substantial payments over a 50-year period in the event the authority was licensed to build a low dam at Bridge Canyon. Without repeating this entire discussion, which I would like to incorporate into my remarks today by reference, let me just restate my conclusion that:

> * * * even apart from its contract with the Arizona Power Authority, the Hualapai Tribe should be paid a fixed and definite compensation for the use of its property in connection with the Bridge Canyon Dam at the same time as, rather than after, that public work is authorized. In other words, we Hualapais should not be forced, like the Sioux and the Senecas in recent years, to petition Congress for gratuities after the damage is done.

According to my information, Congressman Udall intends to sponsor an amendment to his own bill, H.R. 4671, in the form which I am submitting with this statement, which would do exactly what the Hualapai Tribe has requested.

Mr. Chairman, with your permission, I would like to include this amendment as part of the record.

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Mr. ROGERS of Texas. Without objection, this amendment as proposed will be received for the record.

(The amendment referred to follows:)

PROPOSED AMENDMENT TO H.R. 4671 (COMMITTEE PRINT No. 19)

In Title III, Section 302: (1) delete "Bridge Canyon" on page 33, line 8, and insert "Hualapai (formerly known as Bridge Canyon)"; and (2) delete "Bridge Canyon" on page 33, lines 11 and 20, and on page 34, line 1, and insert "Hualapai" in lieu thereof.

After Title III, Section 302, on page 34, insert a new Section 303 as follows:

"SEC. 303. (a) From funds appropriated to the Department of the Interior, Bureau of Reclamation, for the project, there shall be transferred in the Treasury of the United States to the credit of the Hualapai Tribe of Arizona the sum of $16,398,000, which shall draw interest on the principal at the rate of 4 per centum per annum until expended, as payment of just compensation for the taking by the United States of such easements, rights-of-way and other interests in land within the Hualapai Indian Reservation, consisting of not more than 25,000 acres, as the Secretary shall designate are necessary for the construction, operation and maintenance of the Hualapai unit. The designation by the Secretary shall constitute a taking by the United States of the lands or interests therein so designated. The funds so paid may be expended, invested or re-invested pursuant to plans, programs and agreements duly adopted or entered into by the Hualapai Tribe, subject to the approval of the Secretary in accordance with the tribal constitution and charter.

"(b) As part of the construction and operation of the Hualapai unit, the Secretary shall: (1) construct a paved road, having a minimum width of twenty-eight feet, from Peach Springs, Arizona, through and along Peach Springs Canyon within the Hualapai Indian Reservation, to provide all-weather access to the Hualapai Reservoir; and (2) make available to the Hualapai Tribe up to 25,000 kilowatts and up to 100,000,000 kilowatt hours annually of power from the Hualapai unit at the lowest rate established by the Secretary for the sale of firm power from said unit by preferential customers: *Provided*, That the Tribe may resell such power only to users within the Hualapai Reservation: *Provided further*, That the Hualapai Tribal Council shall notify the Secretary in writing of the reasonable power requirements of the Tribe up to the maximum herein specified, for each three-year period in advance beginning with the date upon which power from the Hualapai unit becomes available for sale. Power not so reserved may be disposed of by the Secretary for the benefit of the development fund.

"(c) Except as to such lands which the Secretary determines are required for the Hualapai Dam and Reservoir site and the construction and operating camp site and townsite, all minerals of any kind whatsoever, including oil and gas but excluding sand and gravel and other building and construction materials, within the areas acquired by the United States pursuant to this section are hereby reserved to the Hualapai Tribe: *Provided*, That no permit, license, lease or other document covering the exploration for or the extraction of such minerals shall be granted by the Tribe nor shall the Tribe conduct such operations for its own account, except under such conditions and with such stipulations as are necessary to protect the interests of the United States in the construction, operation, and maintenance of the Hualapai unit.

"(d) The Hualapai Tribe shall have the exclusive right to develop the recreation potential of, and shall have the exclusive right to control access to, the reservoir shoreline adjacent to the reservation, subject to conditions established by the Secretary for use of the reservoir to protect the operation of the project. Any recreation development established by the Tribe shall be consistent with the Secretary's rules and regulations to protect the over-all recreation development of the project. The Tribe and the members thereof shall have non-exclusive personal rights to hunt and fish on the reservoir without charge, but shall have no right to exclude others from the reservoir except as to those who seek to gain access through the Hualapai Reservation, nor the right to require payments to the Tribe except for the use of tribal lands or facilities. The use by the public of the water areas of the project shall be pursuant to such rules and regulations as the Secretary may prescribe.

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"Except as limited by the foregoing, the Hualapai Tribe shall have the right o use and occupy the taking area of the Hualapai unit within the Hualapai Reservation for all purposes not inconsistent with the construction, operation nd maintenance of the project and townsite, including, but not limited to, the ight to lease such lands for farming, grazing and business purposes to members r non-members of the Tribe and the power to dispose of all minerals as pro- ided in paragraph (c) hereof.

"(e) Upon a determination by the Secretary that all or part of the lands cquired by the United States pursuant to paragraph (a) of this section no onger are necessary for purposes of the project, all right, title, and interests n such lands shall thereupon vest in the Hualapai Tribe.

"(f) No part of any expenditures made by the United States, and no reser- ration by or restoration to the Hualapai Tribe of any interests in land, under ny of the provisions of this section shall be charged by the United States as an offset or counter-claim against any claim of the Hualapai Tribe against the United States other than claims arising out of the acquisition of land for the project; provided, however, that the payment of monies and other benefits as set forth herein shall constitute full compensation for the rights transferred.

"(g) All funds authorized by this section to be paid or transferred to the Hualapai Tribe, and any per capita distribution derived therefrom, shall be exempt from all forms of State and Federal income taxes.

"(h) No payments shall be made or benefits conferred as set forth in this sec- tion until the provisions hereof have been accepted by the Hualapai Tribe through resolution duly adopted by its tribal council. In the event such resolu- tion is not adopted within six months from the effective date of this Act, and litigation thereafter is instituted regarding the acquisition of tribal lands for the project or compensation therefor, the amounts of the payments provided herein and the other benefits set out shall not be regarded as evidencing value or as recognizing any right of the tribe to compensation."

After new Section 303, renumber all subsequent sections in Title III.

Mr. ROCHA. Instead of leaving our compensation unfixed and uncertain, this amendment, if approved by Congress, would require the United States to grant my tribe in connection with the Bridge Canyon Dam almost exactly the same benefits we were promised by the Arizona Power Authority. Briefly summarized, the proposed amendment provides as follows:

(1) Bridge Canyon Dam would be renamed Hualapai Dam.

Again, Mr. Chairman, I would like to present an agreement that was adopted by the Hualapai Tribe, the agreement with the power authority in the naming of the Hualapai Dam.

Mr. ROGERS of Texas. Without objection, it will be received for the record.

(The agreement referred to follows:)

[Excerpt from Agreement for Bridge Canyon Development by and between the Hualapai Indians and the Arizona Power Authority]

NAME OF DAM

29. The Authority, in response to the Tribe's request, agrees to name the proposed dam "Hualapai Dam" (p. 16).

Mr. ROCHA. (2) The tribe would retain control over the south shoreline of the reservoir behind the dam within the Hualapai Reservation.

(3) As part of the project, the Bureau of Reclamation would construct an access road to the reservoir down Peach Springs Draw.

(4) The tribe would have a right to purchase power at a preferential rate.

(5) The Government would pay the tribe $16,398,000 for the use of its property.

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(6) The tribe would reserve mineral rights in its lands, and would be granted certain other benefits, such as freedom from Federal and State income taxes, that are usually included in legislation involving the taking of Indian trust lands.

If H.R. 4671 is amended to include these provisions, then the objections of the tribe will have been met, and I can state that the Hualapais wholeheartedly endorse the bill, as so amended, and urge that it be approved by this committee.

I would like to express the hope that Congressman Udall's amendment will be supported by the administration. I am not a lawyer, but the attorneys for the Hualapai Tribe tell me that, if the Federal Power Commission now were considering a license for construction of the Bridge Canyon Dam, the Secretary of the Interior would be required by law—sections 797(e) and 803(e) of title 1t, United States Code—to decide how much, in his opinion, should be paid for the use of Indian lands and under what conditions reservation lands could be used. I think the Secretary can and should be able to make the same kind of report to Congress and if so, I know of no reason why he could not, as he did in a letter dated February 12, 1966—again, Mr. Chairman, with your permission, I would like to submit this letter for the record.

Mr. ROGERS of Texas. Without objection, the letter will be received for the record.

(The letter referred to follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., February 12, 1966.

Mr. GEORGE ROCHA,
Chairman, Hualapai Tribal Council,
Peach Springs, Ariz.

DEAR MR. ROCHA: I can fully appreciate the desire of your Tribal Council and your attorneys to have any authorization by Congress of a Bridge Canyon Dam include a definite decision as to compensation to be paid the Indians for use of their property and other rights. If this could be done, the tribe would avoid having to work alone in getting a subsequent bill through Congress authorizing compensation for its property rights or to go through a condemnation suit.

Although this Deartment's Pacific Southwest Water Plan contemplated the construction of Bridge Canyon Dam, we concurred in the recommendation of the Bureau of the Budget that authorization as subsequently proposed in S. 1658 and H.R. 4671 be deferred pending a reevaluation. This was the position of our Department for the Administration in making our formal reports on the bills and in our testimony before the committees.

It is possible that as a result of discussions that have been taking place among the states that a new bill will be introduced to authorize the construction of a Lower Colorado River Basin Project and that we may be asked to report on such a bill and to testify. Should this occur, we will be happy to re-examine our previous position of not recommending to the Congress a determination of the character and amount of compensation to be paid the Hualapai Indians in connection with authorization of a Bridge Canyon Dam. It might be that sufficient information on the requirements for a dam would be available to determine the extent of Indian rights that would need to be acquired for its construction and operation. In that event, we would want to consider carefully the capitalized value of what the Arizona Power Authority agreed to pay the tribe in its contract as a possible measure of consideration that should be paid by the Federal Government.

Should there be an occasion to re-examine our position on this matter, we would want to discuss it further with your tribal attorneys who have been much concerned with this matter.

Sincerely yours,

(S) STEWART L. UDALL,
Secretary of the Interior.

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Mr. ROCHA. The Department—

would want to consider carefully the capitalized value of what the Arizona Power Authority agreed to pay the tribe in its contract as a possible measure of consideration that should be paid by the Federal Government.

Finally, I would like to mention the fact that many conservation groups are opposing the construction of Bridge Canyon Dam because of its effect upon the Colorado River and Grand Canyon. I can understand why these conservationists are so concerned for, after all, we Indians occupied this country for thousands of years in the natural state which they are trying to preserve. We did not see a need for a change then; we do now. When it comes to a clear-cut choice between opening up new opportunities for my people and saving the wilderness for a select few, the Hualapai Tribe has only one way to go, and that is toward the end of advancing our people.

Mr. ROGERS of Texas. Thank you, Mr. Rocha.

Mr. Aspinall?

Mr. ROCHA. Mr. Chairman, I also would like to include a resolution adopted at our regular meeting, May 7, 1966.

Mr. ROGERS of Texas. Of the tribe?

Mr. ROCHA. Of the tribe.

Mr. ROGERS of Texas. Without objection, it will be received in the record.

(The resolution referred to follows:)

RESOLUTION No. 12-66

Of the governing body of the Hualapai Tribe of the Hualapai Reservation (a federally chartered Indian corporation), Peach Springs, Ariz.

Whereas additional hearings have been scheduled before the House Interior Subcommittee in Washington, D.C., starting May 9, 1966 in connection with the Pacific Southwest Water Plan and the Central Arizona Project which bill vitally affects the interest of the Hualapai Tribe in connection with Bridge Canyon Dam (Hualapai Dam); and

Whereas the Arizona Congressional delegation and others vitally interested in passage of the Central Arizona Project have requested the Chairman, George Rocha, to appear before the Congressional Committee for the purpose of testifying on behalf of the said bill and presenting the views of the Hualapai Tribe; and

Whereas the statement to be made by George Rocha concerning the proposed Lower Colorado River Basin Project has been presented to the Tribal Council; and

Whereas there is attached to said statement the proposed amendments to H.R. 4671, which would provide for fixed and definite compensation to the Hualapai Tribe for the use of its property: Now, therefore, be it

Resolved by the Hualapai Tribal Council in meeting assembled this 7th day of May 1966, That it endorses the statement presented by the Chairman, George Rocha, as well as the proposed amendments to H.R. 4671 attached thereto and authorizes Chairman, George Rocha, to testify on behalf of the Hualapai Tribe before the House Interior Subcommittee concerning the pending legislation affecting Bridge Canyon Dam (Hualapai Dam); and be it further

Resolved, That the Tribal Attorneys, Royal D. Marks, Arthur Lazarus, Jr., are authorized to make such changes in the proposed amendments to H.R. 4671 as may be necessary after conferences with the Arizona Congressional Delegation and the legal advisors of the Arizona Interstate Stream Commission.

CERTIFICATION

I, the undersigned as Secretary of the Hualapai Tribal Council, hereby certify that the Tribal Council of the Hualapai Tribe is composed of nine (9) members of whom six (6) constituting a quorum were present at a Regular Meeting

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thereof this 7th day of May, 1966; and that the foregoing resolution was duly adopted by the affirmative vote of six (6) members, pursuant to the authority of Article VI, Section 1, (a), of the Amended Constitution and Bylaws of the Hualapai Tribe approved October 22, 1955.

[CORPORATE SEAL] EVALENA HAMIDREEK,
Secretary, Hualapai Tribal Council.

Mr. ROGERS of Texas. Mr. Aspinall?

Mr. ASPINALL. Thank you very much, Mr. Rocha.

It has been a very fine statement in the interest of your people. I can understand why you would take this opportunity, if possible, to help your people financially and economically and socially, by whatever means.

That is all.

Mr. ROGERS of Texas. Mr. Saylor?

Mr. SAYLOR. I would like to commend you on your statement, Mr. Rocha, and ask you whether or not, on page 4 of your statement, the amount of money, namely, $16,398,000, is the same amount that the Arizona Power Authority offered to pay you, pay the tribe, for the damsite?

Mr. ROCHA. With your permission, Mr. Saylor, I would like to refer this question to Mr. Lazarus.

Mr. LAZARUS. Congressman Saylor, The Arizona Power Authority promised to make certain payments to the Hualapai Tribe over the length of the license, which is 50 years. What we did was capitalize those payments at 4 percent interest. The capitalized value of the payments over the 50-year period, naturally, discounted, came to this amount, $16,398,000. So it is a lump-sum payment today which is the equivalent of the payments that the Arizona Power Authority promised over a period of years.

Mr. SAYLOR. Yes, but there is one substantial difference. At the end of 50 years, when the license expired, the Indians would own the dam. If the Federal Government built it, all the Indians have is $16 million now.

True, maybe Mr. Rocha might not be living, but the tribe will still be here 50 years from now and his children and grandchildren should have that advantage.

Mr. Rocha, how many members are there of your tribe?

Mr. ROCHA. Nine hundred ninety-five. This money would help us develop our reservation because of the poverty situation that exists on the reservation nowadays.

Mr. SAYLOR. I am not objecting to your getting this amount. I am wondering whether or not this is enough.

Mr. ROCHA. It is never enough.

Mr. SAYLOR. I am not trying to cut you down; I am trying to give you a little more.

Mr. ROCHA. Thank you.

Mr. SAYLOR. Mr. Haley and I claim full responsibility for having gotten the Senecas a few dollars more. We have no hesitance if this goes through, in seeing the Hualapais get full compensation.

Mr. LAZARUS. On the record, I would like to say you and Mr. Haley are entitled to full credit for that.

Mr. SAYLOR. Thank you.

That is all.

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Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Handling it this way avoids the Seneca problem. The money will be authorized if the bill passes. There will be no problem, as we had in the Seneca case.

Mr. LAZARUS. As Mr. Rocha said, the Hualapai hoped to avoid the problem we have in the Seneca situation. For the Hualapai, they asked that the compensation be fixed in the authorizing legislation so that they do not have to come back at a later date and be in the position of begging for money when they feel they are entitled to it as a matter of right, and had a contract with the Arizona Power Authority that would have paid them if Congress had not presented the licensing by the Federal Power Commission on the river.

Mr. UDALL. This amount is based on outside advice and independent appraisal of the Hualapai's contract?

Mr. LAZARUS. That is correct.

Mr. UDALL. On that point, you people intend, George, to have this dam built whether the Federal Government builds it or whether—if this bill does not pass, you would still want the Federal Power Commission to license it for someone to build?

Mr. ROCHA. That is right.

Mr. UDALL. It is the main asset your tribe has?

Mr. ROCHA. That is right.

Mr. UDALL. To name this the Hualapai Dam is not something I pointed out. The tribe was asking 6 years ago that this be named this if the dam were built?

Mr. ROCHA. That is right.

Mr. UDALL. I want to say the amendment as drafted is satisfactory to me, and I would sponsor it.

Mr. ROCHA. Thank you.

Mr. BURTON of Utah. Does this $16 million-plus buy the damsite, or does it buy the damsite and 25,000 acres of land?

Mr. ROCHA. May I refer that question to Mr. Marks?

Mr. MARKS. It would pay for the flowage easements and the land that would be taken, up to 25,000 acres.

Mr. BURTON of Utah. In other words, this amount covers the whole ball of wax? We are not going to have another appropriation later?

Mr. MARKS. That is right, with the other fringe benefits they have.

Mr. BURTON of Utah. It includes the easements for the reservoir, the reservoir floor, the land they have around it, and access to it?

Mr. MARKS. For townsite and so on.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. Just one question.

I would first like to say it was an excellent statement. I certainly appreciate your being here to give it.

Of this $16 million-plus, how much will actually go to the tribe and how much will go for attorney's fees and other payments incidental to the pursuit of this claim by the Indians?

Mr. ROCHA. It would all go to the tribe.

Mr. TUNNEY. It all goes to the tribe?

Mr. ROCHA. Yes, sir.

Mr. TUNNEY. That is all I have.

Mr. ROGERS of Texas. Mr. Reinecke?

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Mr. REINECKE. Thank you.

The road which is stipulated in this amendment, is this the same road which would be built for dam construction purposes, or is this an additional road?

Mr. MARKS. This would be the road used, constructed for construction purposes. Then there would be the road, which is part of the amendment, from Peach Springs, which is the only access down to Peach Springs Draw, which is where the access to the reservoir would be. That is a different road, though.

Mr. REINECKE. How much roadway will be constructed and at what cost, if you happen to know that, other than the road required to construct the dam?

Mr. MARKS. They gave some estimations, I believe, they figure it would be a four-lane, high-speed highway down there because of the millions of visitors that there would be, and there were some estimates given at around $10 to $20 million.

Mr. REINECKE. That is for the construction of this?

Mr. MARKS. That is for the construction of the road from Peach Springs to Peach Springs Draw. So far as the construction costs of the roads for the dam, I do not know what those would be. That would be part of the construction costs of the dam.

Mr. REINECKE. What I am trying to determine here is will this amendment require us to spend another $20 million in addition to the road required for construction of the dam?

Mr. LAZARUS. I think the answer to the question depends upon the type of road that is constructed. In the proposed amendment, there is a provision for two-lane highway, 28 feet wide, I believe. And such a highway was exactly what was promised to the tribe by the Arizona Power Authority.

Now, I do not know exactly what they estimated the cost to be, and that, of course, was 6 years ago when costs were a little less. But it was, according to my recollection, only in the $1 to $2 million bracket.

There has been some discussion more recently of building not the minimum two-lane road required under the amendment, but a four-lane road, which the—which naturally would be a much more expensive proposition. But the road authorized under the legislation, or the amendment that we are suggesting that the committee adopt, would be the two-lane road, which would not be so expensive.

Mr. REINECKE. I am still not clear. Is this road separate from the road which will have to be built in order to build the dam?

Mr. LAZARUS. Yes.

Mr. REINECKE. Is the recreational facility not located near the dam?

Mr. MARKS. No; it is quite a distance.

Mr. REINECKE. Oh, I am sorry. I did not understand.

Mr. LAZARUS. As I understand it, the character of the canyon is such that they will not be—there will not be recreation access at the dam. You will have to go back to another side canyon in order to get your recreation access. That is Peach Springs Canyon.

Mr. REINECKE. There is one further statement here at the bottom of page 3. It said that the tribe shall have no right to exclude others from the reservoir except those who seek to gain access to the Hualapai Reservation. Did not these roads go through the Hualapai Reservation?

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Mr. LAZARUS. Yes, sir.

Mr. REINECKE. So the tribe will have complete control over who has access to the reservoir?

Mr. LAZARUS. Except for those who come down the river on boats. We will not be able to prevent people from coming down the river. We will not be able to prevent people from coming from the other side.

Mr. MARKS. If I understand your question, Mr. Reinecke, the road that would be built with public funds, I do not think they could restrict traffic on that road.

Mr. BURTON of Utah. Could they charge fees?

Mr. MARKS. No; not on a road that is built wtih public funds. But fees could be charged at the recreational areas for the docking and facilities like that.

Mr. REINECKE. It says except as to those who seek to gain access to the Hualapai Reservation. So if the road goes through the reservation, apparently the tribe has right to restrict access.

Mr. ROGERS of Texas. Would the gentleman yield?

Mr. REINECKE. Certainly.

Mr. ROGERS of Texas. You are presuming, are you not, Mr. Marks, that the road would be public property, it would be dedicated to public use?

Mr. MARKS. Yes.

Mr. REINECKE. Then you would not object to a modification of the amendment to so state; is that right?

Mr. MARKS. I do not think the tribe would, no. Not at all.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. Has the tribe or has the individual members that might be allotted lands sold any land?

Mr. MARKS. This is all tribal land. There is no allotted land.

Mr. FOLEY. Has any tribal land been sold or exchanged?

Mr. MARKS. No.

Mr. LAZARUS. It is prohibited by law.

Mr. FOLEY. Legislation by the Congress authorizing sales is not prohibited in the case of this tribe?

Mr. LAZARUS. No.

Mr. FOLEY. What do the surrounding private lands sell for?

Mr. MARKS. There is a townsite there at Truxton. They are selling lots there for several hundred dollars, or a thousand dollars or better a lot. So that would come out to——

Mr. FOLEY. I am not talking about the residential property, I am talking about farming.

Mr. MARKS. This was farming land. Well, farming land or grazing land. I do not know what the going price would be at this time up there. I really do not.

Mr. FOLEY. You cannot give me any figure at all?

Mr. MARKS. A rough estimate would be around, and this is a rough estimate, would be—and I am referring to some other reservation lands—would be at least $100 or better an acre.

Mr. FOLEY. How many acres are involved in the dam site itself?

Mr. MARKS. In the dam site? The acreage which has been requested is up to 25,000 acres. This is what was in, just about the acreage that was in the Arizona Power Authority. This included, of course, lands

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for transmission, construction roads and townsite. The townsite would be a townsite, I presume, something like what Boulder City is today. So it would take considerable acreage.

Mr. FOLEY. Something in excess of $400 an acre; $450 an acre for the easements?

Mr. MARKS. Well, I do not know. We have never figured that out. I did not understand your question on that.

Mr. FOLEY. Well, just doing some quick arithmetic, which I have not even attempted except in my head, the payment of $16,398,000——

Mr. UDALL. Will my friend yield on that?

Mr. FOLEY. Yes.

Mr. UDALL. The important thing is a damsite has a unique value, going into millions of dollars. They have taken this from the Hualapai to build the dam. This is how we get the $16 million figure.

Mr. MARKS. May I answer it this way? Mr. Dibble—we had one of the top engineers on the Yellow Tail Dam—Dibble & Dibble were engineers and our advisers. This is the advice we received as to the flowage easements. That is were a great amount of the value came from, not from these lands or the construction of the townsite. Most of the value is in the flowage easements.

Mr. FOLEY. The actual inundation of the lands?

Mr. MARKS. No, the flowage easements, power site values.

Mr. FOLEY. In addition to that, then, sir, is there going to be provision for a preferential sale of electricity?

Mr. UDALL. Yes.

Mr. FOLEY. Where will the electricity be marketed?

Mr. MARKS. Within the reservation. In the amendment, it is limited within the reservation.

Mr. FOLEY. Then you reserve mineral rights and the like on the land?

Mr. MARKS. Yes.

Mr. FOLEY. I asked these questions because—I am not critical of the amendments. But on the other hand, I did not think we ought to leave the impression, Mr. Chairman, that the tribe was being put upon. I will venture to say that in condemnation, the tribe would find substantially smaller results in condemnation than this amendment provides.

I do not object, as I say, to the generosity proposed in the amendment, but I do not think that the good offices of the gentleman from Arizona should be minimized in offering what I do consider to be a generous settlement.

Mr. ROGERS of Texas. Is that all, Mr. Foley?

Mr. FOLEY. Yes.

Mr. ROGERS of Texas. Thank you very much, gentlemen, for your contribution in the record.

The Chair desires to recognize the gentlemen from Utah, Mr. Burton.

Mr. BURTON of Utah. Mr. Chairman, I have a unanimous-consent request, which is, that following the colloquy in the record between Mr. Jay Bingham and myself, I be allowed to insert the following: We have accompanying Mr. Bingham and attending all sessions of the hearing on this subject this week Mr. Lynn Ludlow, manager of the

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Central Utah Conservancy District; Mr. Wayne Wilson, Utah Water nd Power Board members, and Washington county commissioner. Ve have Mr. Lawrence Siddoway, manager of the Uintah Water Conervancy District and also the Central Utah Water Board.

We have Mr. Dallin W. Jensen, assistant attorney general.

Mr. ROGERS of Texas. Without objection, the unanimous-consent equest of the gentleman from Utah will be honored.

Mr. PAULEK. Mr. Chairman, could I have inserted at the end of my eport the names of three more people who attended these hearings ith me: Mr. Frank Maynes, attorney; Mr. Bob K. Taylor, vice presient; and Marguerite Paulek, secretary-treasurer of the La Plate Vater Conservancy District.

Mr. ROGERS of Texas. Without objection, those names will be rected in the record.

Is there any further business to come before the committee at this ime?

(No response.)

Mr. ROGERS of Texas. If not, the subcommittee will be adjourned ntil 9:45 tomorrow morning.

(Whereupon, at 5:35 o'clock p.m., the subcommitte adjourned to econvene on Thursday, May 12, 1966, at 9 o'clock a.m.)

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LOWER COLORADO RIVER BASIN PROJECT

THURSDAY, MAY 12, 1966

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 9:53 a.m in room 1324, Longworth House Office Building, Hon. Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS of Texas (presiding). The Subcommittee on Irrigation and Reclamation will come to order for the further consideration of pending business.

The first witness scheduled this morning is Mr. Joe G. Moore, Jr., executive director, Texas Water Development Board, accompanied by Mr. G. H. Nelson, chairman of the Water for the Future Committee of Lubbock, Tex.; Mills Cox, chairman of the board; and Marvin Shurbet, vice chairman.

Mr. Moore, will you come to the witness table and the Chair will recognize you.

STATEMENT BY JOE G. MOORE, JR., EXECUTIVE DIRECTOR, TEXAS WATER DEVELOPMENT BOARD; ACCOMPANIED BY G. H. NELSON, CHAIRMAN, "WATER FOR THE FUTURE" COMMITTEE, MILLS COX, CHAIRMAN OF THE BOARD, AND MARVIN SHURBET, VICE CHAIRMAN

Mr. MOORE. Mr. Chairman, members of the committee, my name is Joe G. Moore, Jr. I am executive director of the Texas Water Development Board, and am appearing on behalf of that board. We are pleased to have this opportunity to appear before your committee.

With me here today are Mr. Mills Cox, chairman of the board, and Mr. Marvin Shurbet, vice chairman, as well as Mr. G. H. Nelson, chairman of the Water for the Future Committee, West Texas Water Institute. Mr. Nelson will also present a statement.

Mr. ROGERS of Texas. Mr. Moore, if you desire, these associates of yours may come up here and sit with you at the table. Mr. Shurbet, Mr. Cox, and Mr. Nelson.

You may proceed.

Mr. MOORE. Mr. Shurbet farms some 1,000 acres in Floyd County in the high plains of West Texas, potentially one of the most critically water-deficient areas in the United States.

The State legislature has given the Texas Water Development Board the primary responsibility at the State level for the protection,

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conservation, development, and utilization of the State's water resources. In furtherance of this responsibility the board is now completing the Texas Water Plan, a master plan to guide water resource development and utilization throughout the State for all purposes, until 2020. As a part of the Texas Water Plan, a program for coordinated action by Federal, State, and local agencies to meet the State's water needs over the next 25 years will be proposed. It is anticipated that the State will greatly expand its program of financial participation in Federal and local projects, including not only water development facilities but also the regional systems for the collection, treatment, and disposal of municipal sewage and industrial wastes which will be necessary to maintain water quality at proper levels. It is also being proposed that the State of Texas, through the Texas Water Development Board, enter actively into the financing, operation, management, and repayment of the complex system of facilities which will be necessary to conserve the surplus waters of east Texas and move them to areas of need in central, south, and west Texas.

The studies for the Texas Water Plan have shown conclusively that there is not sufficient surplus water in east Texas in excess of higher priority needs to make it feasible to transport water from those sources for irrigation in west Texas. Therefore, we must look elsewhere for water to supply the irrigation requirements of that portion of Texas lying generally west of 99° W. longitude.

Thus, the State of Texas strongly supports the concept of regional planning for the control, protection, development, redistribution, and utilization of the Nation's water resources as expressed in H.R. 4671. As will be set forth in some detail below, the future water needs of west Texas are so large and so urgent that, if the State is to continue to grow economically, water must be brought in from outside sources, such as the Missouri River, Mississippi River, or, possibly, the Columbia River, within 15 years, or ultimately, sources farther to the north. Studies by our consulting engineers, Leeds, Hill, & Jewett, Inc., of San Francisco, have shown that surplus water resources are available and that it would be physically feasible to import substantial quantities of water to meet these demands. Therefore, we urge that a regional plan which provides supplemental water supplies for west Texas, be formulated by the Secretary of the Interior concurrently and coordinated with the regional planning studies to be undertaken pursuant to H.R. 4671. In the alternative, we respectfully request that H.R. 4671 be amended by adding a new title at the end, the West Texas Water Supply Act of 1966, which will authorize and direct the Secretary of the Interior to formulate such a regional plan. Our suggested wording for such an amendment is attached hereto (attachment A).

The studies of future irrigated agricultural development in Texas for the Texas water plan have been made by the Water Resources Institute, Agriculture Experiment Station-Agricultural Extension Service, of Texas A. & M. University, and by Texas Technological College, as well as by the 2020 Water Study Committee for the High Plains of Texas. Much of the following discussion is based on the results of these studies. I would like to submit the following pertinent reports for the committee's files:

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(1) Importance of Irrigation Water to the Economy of the Texas High Plains.
(2) High Plains Water—1970–2020.
(3) Agricultural Resources Related to Water Development in Texas.

The major irrigation areas of Texas are shown on plate 1 attached hereto. For purposes of this statement, we are concerned with the high plains, north-central Texas, trans-Pecos and Rio Grande (above Falcon) areas, herein termed "west Texas." In all these areas, the local developable-water resources are far less than the potential irrigation demand, and, as previously stated, there are not sufficient surplus water resources available elsewhere in Texas to make it feasible to attempt to supply these demands from such other sources.

Some 5.7 million acres in west Texas were irrigated in 1964. Texas A. & M. University concluded that sufficient market demand will exist to justify expansion of this irrigated acreage to 8.6 million acres in 1980 and to 10.7 million acres in 2020 provided sufficient irrigation water can be made available at about the same cost relative to the other costs of production as the irrigators are now paying.

The diversion requirement for supplemental water with full irrigation of these projected acreages in the entire west Texas area would amount to some 5.2 million acre-feet per year for 1980 and in the order of 15 million acre-feet per year for 2020, over and above the amounts available with full exploitation of local sources. Water in large amounts must be imported from out-of-State sources if Texas agriculture is to maintain its position as one of the State's leading industries.

In the high plains area alone, which contains about one-third of the potentially irrigable lands of Texas, it is estimated that the 5.1 million acres irrigated in 1964 would increase to at least 7.1 million in 1980 and to 8.6 million acres in 2020, again if sufficient water at reasonable cost can be imported. If not, the irrigated acreage is expected to decrease to 2.2 million acres in 2020, accompanied by an expansion of dry farming, but with a net overall economic loss of substantial magnitude. The supplemental water diversion requirement for full irrigation of these future acreages might amount to 3.1 million acre-feet per year for 1980 and 12 million acre-feet per year for 2020, even with maximum utilization of all available local water sources.

Mr. Nelson will present additional information as to the present and future economic importance of irrigation in the high plains, locally, to the State and to the Nation. He will also point out the severe economic detriment that would result if an adequate supply of irrigation water were not made available to continue and expand irrigated agriculture there and, as a consequence, large areas were forced to retrogress to dryland farming. He will also tell you of the efforts being made there to make the most efficient use of the limited local water resources.

The values of possible future irrigated acreages quoted above are based on the assumption that irrigation elsewhere in Texas will continue to expand. Should this not be the case, the potential for increase in west Texas would be greater, if an adequate water supply were provided.

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Further details as to present and future irrigation in these west Texas areas are given in attachment B.

In considering the need for importation of water to west Texas, one other facet is significant. The accumulated deficiency in the amounts of water due Texas in the Rio Grande under the Rio Grande Compact now comes to about 1 million acre-feet. There is little likelihood that this deficiency can be made up by the State of Colorado; rather, it is expected to increase. A significant possibility of making up this deficiency and meeting this obligation is through a regional importation system, possibly the regional plan to be formulated and implemented pursuant to the H.R. 4671, the Colorado River Basin Project Act.

It is obvious that Texas could not "go it alone" to import water; the cost would be far too great. Any importation plan for west Texas, to be feasible, must be part of some larger regional plan for conservation and redistribution of water resources. It is entirely possible that other States or areas would benefit from certain regional plans. For instance, we have been informed by the State of Kansas, water resources board, that there may be a need in that State for 4 to 5 million acre-feet of additional water annually.

Gentlemen, we know something of the problems of proposing the redistribution of surface water. Texas spent approximately $2 million in formulating the Texas Water Plan. We propose to move to 3 to 3½ million acre-feet of water from east Texas and redistribute it along the 800-mile system extending all the way to Brownsville. This project will cost approximately $1¼ billion. The State will be prepared to finance a major portion of this proposed redistribution of Texas water.

In summary, the future economic well-being and growth of west Texas will be very largely dependent upon the availability of adequate irrigation water supplies, which can only be provided by importation from sources outside the State of Texas.

We urgently request that this committee amend H.R. 4671 to authorize and direct the Secretary of the Interior to investigate the feasibility of a regional plan to provide this urgently needed water supply and to report thereon.

Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Now, Mr. Moore, did you desire that the language of the proposed amendment that you have submitted be included as a part of your statement?

Mr. MOORE. It is attached, yes. This was merely a suggestion.

Mr. ROGERS of Texas. Without objection, it will be included as a part of the statement together with the map that you have attached thereto.

(The documents referred to follow:)

PROPOSED AMENDMENT TO H.R. 4671, SUBMITTED BY TEXAS WATER DEVELOPMENT BOARD

Add a new title at the end of the Bill to read:

TITLE ——. WEST TEXAS WATER SUPPLY ACT OF 1966

SECTION 1. This Title may be cited as the "West Texas Water Supply Act of 1966".

SEC. 2. The Secretary of the Interior is authorized and directed to investigate *the feasibility of* a regional water resources development plan to supply the

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supplemental water requirements, at least through the year 2030, of all, or such portions as the Secretary may find feasible, of that area of the State of Texas lying generally west of 99° west longitude including the Rio Grande Basin, for municipal, industrial, irrigation and other purposes, by importation from sources outside the State of Texas.

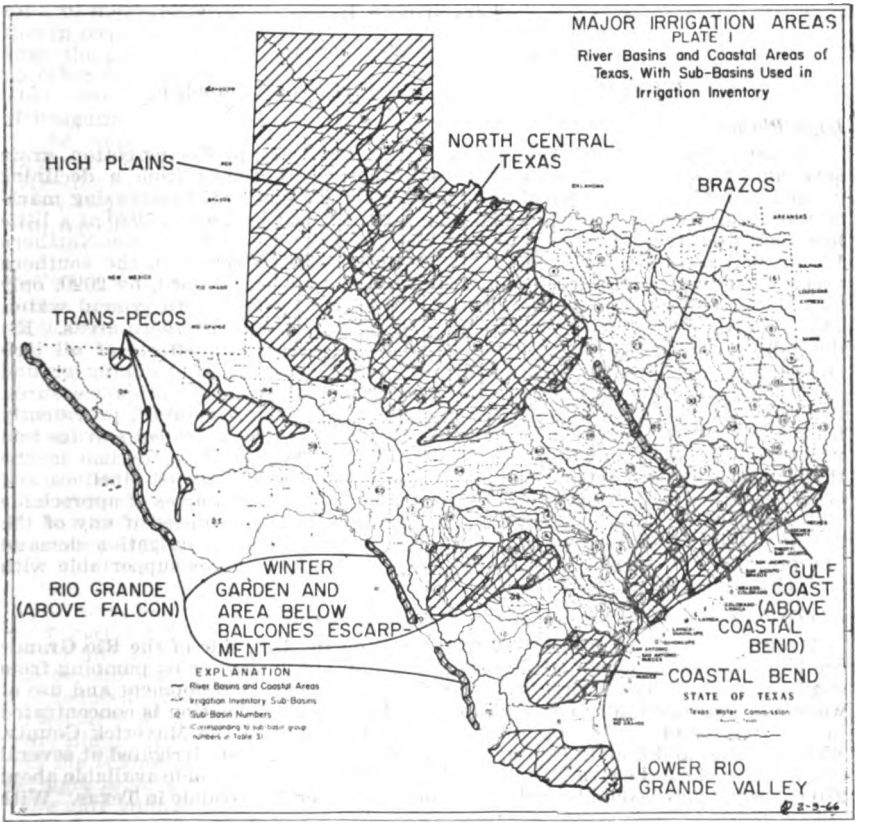
SEC. 3. If the Secretary finds such importation to be feasible, he shall prepare a definite regional development plan.

SEC. 4. Areas outside the State of Texas which could be feasibly served by such importation works shall be included in the regional plan.

SEC. 5. The Secretary shall coordinate the investigations conducted pursuant to this Act with those being made under the provisions of the Colorado River Basin Project Act, and, if the Secretary finds it to be feasible, the two studies shall be merged and a single regional plan formulated embracing the areas covered by the Colorado River Basin Project Act and those encompassed by this Act.

SEC. 6. All requirements, present or future, for the water within any State lying wholly or in part within the drainage area of any river basin from which water is exported by works planned pursuant to this Act shall have a priority of right in perpetuity to the reasonable beneficial use of the waters of that river basin, for all purposes, as against the uses of the water delivered by means of such exportation works, unless otherwise provided by interstate agreement.

SEC. 7. In planning works to import water into West Texas or other areas from sources outside the natural drainage systems of those areas, the Secretary shall make provision for adequate and equitable protection of the interests of the States and areas of origin to the end that water supplies may be available for use therein adequate to satisfy their ultimate requirements at prices to users not adversely affected by the exportation of water.



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SEC. 8. In formulating this regional plan 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), except as otherwise provided herein.

SEC. 9. The Secretary shall coordinate the studies conducted pursuant to this Act with the investigations and plans of the Texas Water Development Board and of similar agencies in any other states involved, with those of the International Boundary and Water Commission, and with those of local agencies in the areas that may be served by the importation works.

SEC. 10. (a) On or before December 31, 1970, the Secretary shall submit a proposed report and findings on said plan to the affected States and to Federal agencies as required by law.

(b) Not later than one year after receipt of the comments of State and Federal agencies on such report and findings, the Secretary shall transmit his report and findings to the President and to the Congress. All comments received by the Secretary under the procedure specified in subparagraph (a) shall be included therein. The letter of transmittal and its attachments shall be printed as a House or Senate Document.

SEC. 11. There are thereby authorized to be appropriated such sums as are required to carry out the purposes of this Act.

Mr. ROGERS of Texas. Now, there is another item I see attached to your statement called Irrigation in West Texas, as attachment B. Do you desire that to be included also as a part of your statement?

Mr. MOORE. Yes, Mr. Chairman.

Mr. ROGERS of Texas. Without objection, it is so ordered.

(The document referred to follows:)

ATTACHMENT B

IRRIGATION IN WEST TEXAS

(Without Supplemental Source of Water Supply)

High Plains

All the water supply for the present 5.1 million acres, producing cotton, grain sorghum, wheat, vegetables, and a few other crops, comes from a declining ground water supply in underlying Ogallala formations. Still increasing markedly in total acreage, irrigation can expect to peak out by around 1980 at a little less than 6 million acres. Up to that time, acreage expansion in the Northern Plains will proceed at a greater rate than acreage reduction in the southern areas. Gradual acreage reduction, overall, will then ensue until, by 2020, only about 2.2 million acres can be expected to be supportable with ground water. This acreage will be largely in the more recently developed northern areas. Reductions could be faster and more severe than this unless efforts of all irrigators are concentrated on attaining highly efficient use of declining ground water by instituting all effective and economical water conservation measures, including measures to utilize most effectively the natural rainfall, providently most abundant during the crop growing season. Greatest practical salvage and use will need to be made of runoff water caught from time to time in the thousands of playas dotting the High Plains. Extensive use of pipelines and other water saving devices will need to be made. No other sources of appreciable water supply are locally available. Importation will be required if any of the acreage reductions from the 8.6 million acres of potential irrigation demand (according to the Texas A&M study) to the 2.2 million acres supportable with ground water in 2020 is to be prevented.

Rio Grande Alluvium, New Mexico to Falcon Reservoir

About 126 thousand acres of alluvial lands on the U.S. side of the Rio Grande are being irrigated, either by direct diversion of streamflow or by pumping from shallow alluvial wells. Erratic streamflow has spurred development and use of wells when streamflow is not available for diversion. Irrigation is concentrated in the vicinity of and downstream from El Paso and in the Maverick County, Webb County, and Zapata County areas. Small acreages are irrigated at several other points along the river. If dependable water to serve is made available about 270 thousand acres could be irrigated along the upper Rio Grande in Texas. With

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increasing municipal and industrial return flows from the El Paso area and better streamflow regulation below Amistad Reservoir, a larger, more dependable water supply should be available. Continuation of the present level of irrigation is probable along the Rio Grande above Amistad Reservoir. Irrigation between Amistad and Falcon Reservoirs can be increased. To do so, however, will make it desirable to replace Rio Grande streamflow, thus used, with additional importation of water to the Lower Rio Grande Valley. Additional acreage (10 to 15 thousand acres) can be added to project irrigation in the Eagle Pass area and project irrigation can be developed in the Laredo vicinity for 60 to 65 thousand acres. Present project water delivery systems can adequately continue to serve project irrigation in the major project-type irrigation areas. Increased direct diversion to individual fields and farms and pumping from alluvial wells can be expected, also, below Amistad Reservoir (10 to 20 thousand acres).

Trans-Pecos Areas

Most of the irrigation is West Texas is in Reeves and Pecos Counties. There is also a concentrated area (Dell City) in Hudspeth County served entirely from ground water, and smaller ground water areas near Van Horn and Marfa. Most of the Reeves-Pecos County area also is irrigated with ground water but there is some surface water used in conjunction with the Red Bluff project and in the Balmorhea area (Toyah Creek). Springflow is the actual source of water for the Balmorhea irrigation, however. Rehabilitation of the Red Bluff project should provide a sound basis for continuance of irrigation of about 22 thousand acres, using about 70 thousand acre-feet of poor quality surface water from Pecos River flow out of New Mexico. Ground water supply in this area is rapidly declining, however, with correspondingly accelerated problems of quality deterioration. By 2020 most ground water in this area will be too poor in quality for irrigation. Also, reasonable anticipated recharge would support only about 65 thousand of the 236 thousand acres presently irrigated with ground water. Likewise, reduction in irrigated acreage in the other ground-water-supplied areas can be expected from the present 42 thousand acres to only about 13 thousand acres. There are no other in-basin surface water supplies to be developed for irrigation purposes. Therefore, there are prospects in 2020 for a total of only about 50 thousand acres of irrigation from in-basin supplies. According to the A&M studies, if water can be made available in the Trans-Pecos area, (allowing for exclusion of the portion occupied by the Rio Grande alluvium above Falcon) the potential 2020 irrigation requirement would be about 380 thousand acres. Importation of surface waters for 330 thousand acres (nearly 1½ million acre-feet, total diversion requirement) would be required if this potential requirement were to be served. An economical source of supply is unknown at this time.

North Central Texas

This area embraces most of the Rolling Plains land resource area east of the High Plains, the North Central Prairies (Reddish Prairies) and intertwining strips of Cross Timbers. It stretches from the San Saba River north to the Red River and from Caprock on the west nearly to the Blackland on the east. There are large acreages of irrigable lands in this broad area but very limited supplies of water. If water were physically and economically available to do so, around 1.8 million acres of the potential 16.8 million acre 2020 demand for irrigation, as determined in the A & M irrigation need studies, could develop in North Central Texas. More than 400 thousand acres are now irrigated in this area, supplied in large measure from ground water. Most ground water supplies are limited and the quality of some is quite poor. Relatively small amounts of irrigation are being supplied by diversion from the Brazos, Leon, Colorado, Concho, San Saba and other streams in the area. There is a small acreage, also, irrigated in Wichita County from surface waters released from Lake Kemp and in the Pecan Bayou area below Lake Brownwood from irrigation storage in that reservoir. Other major surface water irrigation is situated along the Concho near San Angelo and at the lower end of the San Saba River. It is probable that by 2020 ground water in the North Central Texas area will support only a drastically reduced acreage—not over about 100 thousand acres. Most of this reduction is associated with the uncertain and fluctuating ground water supply of the Seymour, Blaine or other alluvial deposits in the northern part of the area. Water from the Blaine in particular, is saline and of doubtful quality for continued use over long periods.

The only additional in-basin surface-water supplies for irrigation appear to be (1) in full use of Lake Kemp yield for irrigation (114 thousand acre-feet to ir-

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rigate a maximum of 42 thousand acres); (2) supply (30 thousand acre-feet) for a San Saba project of 15 thousand acres; and (3) use of San Angelo return flows (20 thousand acre-feet), principally to supply 10 thousand acres in the Lipan Flat area. Other direct diversion surface water to individual fields and farms (serving around 25 thousand acres) can be expected to continue. Thus, there are expected to be in 2020 local and in-basin surface waters and ground water sufficient to irrigate a total of about 190 thousand acres. Importation of surface water would be required to serve any of the remaining 1.6 million acres of potential 2020 irrigation requirement in these areas. To serve the full amount would require importation and diversion of around 4¼ million acre-feet, an economical source for which is presently unknown.

Mr. ROGERS of Texas. I think the Chair will now recognize Judge Nelson for his statement so that the question-and-answer period can be conducted at the same time in an effort to move along a little faster.

Judge, the Chair now recognizes you.

Mr. NELSON. Mr. Chairman.

Mr. ROGERS of Texas. I don't believe I have a copy of your statement.

Mr. NELSON. Mr. Chairman, I left numbers of copies with your office yesterday afternoon.

Mr. ROGERS of Texas. Yes; I didn't have one here on the committee table.

Mr. NELSON. I would like for you to have one.

Mr. ROGERS of Texas. You may proceed. The statement has now been furnished the members.

Mr. NELSON. Mr. Chairman, gentlemen of the committee, my name is G. H. Nelson. I am an attorney with offices in the South Coast Life Building, Lubbock, Tex.

I appear here as chairman of the "Water for the Future Committee" created by the West Texas Water Institute at Texas Technological College in Lubbock, Tex. As you have heard, there are present here today these other gentlemen. I prepared this statement prior to the time I knew they might appear.

We appear here to present testimony for the purpose of securing an amendment to H.R. 4671, now pending before your committee. We are seeking an amendment to this bill whereby a portion of the arid section of western Texas may be specifically included in the bill, in all segments of the bill, and particularly, to amend title VI, section 601(a), subsection (2), to authorize the appointment of a representative from the area of the State of Texas upon whose behalf this testimony is offered.

May I digress, Mr. Chairman, to say I don't purport to tell the committee how to amend their bill. If I can get my problem over, I take it the committee can look after that properly.

May I say, too, that Mr. Moore's statement and mine were prepared when we were not together, and so if there is some divergency in spots, you will understand.

The area of the State of Texas in question is generally west of the 99th meridian and north of the 31st parallel. Thus, Abilene on the east, San Angelo on the south, El Paso on the west, and the complete Panhandle of Texas is encompassed. The area might be better described as that portion of the State of Texas for which no water is presently anticipated under the Texas water master plan now being prepared under the direction of the Texas Water Development Board,

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for irrigation purposes, as has been set out in the statement just preceding.

Mr. Moore has verified the fact, I think, that no water is presently anticipated under the Texas plan for the area for which we speak. The primary source of water for municipal, industrial, and irrigation use is from an underground supply generally known as the Ogallala Basin. It is a fact beyond dispute that we are a water deficient segment of our State and Nation.

W. L. Broadhurst, now with the U.S. Geological Survey, and formerly a consultant hydrologist for the High Plains Underground Water Conservation District, who, by the way, are also represented here today, the same being the largest portion of the area here under study, testified in the *United States* v. *Shurbet* case that, in his opinion, the underground water in the area was definitely being exhausted, and that testimony can be found in the transcript on page 566.

Mr. William G. Guyton, formerly with the United Geological Survey and one of the leading hydrologists in the Southwest, testified in the same case that the water in the Ogallala formation is in the process of being exhausted and will be exhausted. That is likewise taken from the transcript, page 729.

Mr. A. Nicholson, Jr., and Mr. Alfred Clebach, Jr., both New Mexico State engineers, prepared a report for the U.S. Department of the Interior for Lea County, N. Mex., which area is adjacent to the south plains are of Texas and which area is underlain by the Ogallala formation, he said:

> In arid regions such as southern Lea County, where recharge is very low, large volumes of water may be available in storage in the aquifers, because it had been accumulating for many centuries. This abundance of water leads to the general impression that there is an inexhaustible supply of water available. The fact is, however, that water removed from storage in great quantities in such areas normally is replaced only very slowly and is lost as far as the present and immediately succeeding generations are concerned.

That is from the transcript, pages 280 and 283.

It has been determined by those making a study of the Texas water problems as a whole, and now preparing the Texas master plan for water, that the area for which we seek relief, will, in the foreseeable future, revert to a dryland system of agriculture, resulting in a diminishing economy.

Dr. Herbert Grubbs, economist and professor of economics at Texas Technological College, Lubbock, Tex., made a report to the Texas Water Development Board, which shows that by the year 2020 the irrigatable acres, because of the depletion of water, will be reduced from the present approximately 5 million acres to approximately 2 million acres, and that at such date the decline will be even greater per year.

Dr. C. E. Jacobs, formerly with the U.S. Geological Survey and one of the leading geologists and hydrologists we believe in the world today, testified under oath in the above referred to *Shurbet* case, in Federal court at Lubbock, Tex., that if the maximum rate of pumpage were continued at its present rate, the Ogallala ground-water reservoir would be totally exhausted by the year 2003. And by that, of course, he meant the economic use of it.

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So far as is presently known, there is no source of supply to take the place of the diminishing Ogallala except from some source outside of the State of Texas. Here again, we refer to the proposed Texas master plan which has heretofore been shown to the Texas delegation in the U.S. Congress.

Upon the authority of the Ralph M. Parsons Co., a world-renown engineering firm with offices in Los Angeles, Calif., and upon the authority of Harvey O. Banks, of San Francisco, Calif., another outstanding engineer, who has been employed by the State of Texas as consultant in the preparation of the Texas master water plan, it is our conviction that the most feasible source of supply of water for our area is from the Northwest, out of the Colorado Basin, or from such basin supplemented by the Columbia Basin, or by and through both such basins supplemented by surplus surface waters from Canada and Alaska.

Upon the authority of the Water Atlas of the United States, prepared by Water Information Center, Inc., Point Washington, Long Island, N.Y., there is within three regions of the West and Northwest, generally classified by them as the Pacific Northwest, the Great Basin and the Colorado Basin, embodying generally the States of Oregon, Washington, Idaho, Utah, Arizona, and the western portions of Colorado and New Mexico, 182 billion gallons daily average runoff. Now, with permission of the chairman, in order to give a better sequence I would like to move to the first paragraph on page 6 of my statement and then come back here.

Mr. ROGERS of Texas. Yes.

Mr. NELSON. The area we represent has the largest readymade, free-storage facility in the world, in which surplus water may be stored in the aquifer known as the Ogallala, from which our depleting supply is now being withdrawn. Further engineering and study is now and will continue to be made concerning the feasibility of this procedure. This is no small item when one considers that water could be stored in this facility at a time and season when surplus waters are least needed by other users along any projected route between our area and its original source; there to await, without evaporation, further cost of transportation or fear of pollution, the time of our need. The adverse effect upon our economy through the loss of the present production and potential is one that cannot be easily borne by the Nation. We believe the production from this area, to its fullest capacity, is an absolute must for the supply of food and fiber for the exploding masses of the future.

Then, Mr. Chairman, I move back to my paragraph on page 5.

Within the area we represent there are now more than 50,000 wells south of the Canadian River producing irrigation waters for the production primarily of cotton, grain sorghum, wheat, sugarbeets, soy beans, vegetables, castor beans, and irrigated pastures.

The sweet waters being produced from these wells are being used to produce food and fiber upon more than 10 million acres of land. There in order that the committee may understand the difference in what has been said by Mr. Moore, he spoke generally in the 5 million acres having reference primarily to the High Plains, whereas the area here I mention covers the full area as outlined in my original statement on page 1.

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This we feel like we must maintain.

If water could be made available, these acres could be doubled, because the area we represent, we believe, is the largest one contiguous body of fertile proven, agricultural, irrigatable land lying within the Temperate Zone in the world. There have been fewer problems in placing the area in question under the plow, and there will be fewer problems in the future in subjecting this territory to an intensive agriculture than any other known area for the reason that there are no trees to cut—and there are no rocks to haul—and there are no mountains to level.

Then to the bottom of page 6, beginning there.

The argument has been presented that it is not economically feasible to provide a source of water such as might be anticipated under the study that is to be made. This we do not know. This fact is yet to be determined. This is the problem to be solved. Various engineering firms have spent much time and large sums of money, some of whose work we have with us, to show the feasibility of the proposal being made in H.R. 4671. They believe there is surplus water, and that it is feasible, economically and otherwise, to distribute water from surplus water areas of our Nation to water-deficient areas seeking to be embodied in this study. Yes. We are concerned about the cost. We are concerned about the cost of war. We are concerned about the cost of any other governmental activity. We are concerned about what the cost will be to this Nation if the area we represent is neglected in its potential.

Last year there was produced in this area approximately 2½ million bales of cotton out of the approximately 14½ million in the Nation, approximately 60 million bushels of wheat; approximately 186 million bushels of grain sorghum. There went to the oil mills approximately 2 million tons of cottonseed. There went to market approximately 2 million head of cattle; 2 million sheep; and an abundance of hogs, poultry, and other farm products. According to the Texas Crop & Livestock Reporting Service, last year we sent to the Arizona and California feedlots alone 45 million bushels of grain sorghum out of this area. Incidentally, the largest cottonseed oil mill in the world is in Lubbock, Tex. Also, 80 percent of the national production of castor beans is within this area. These are just some of the major items produced in this area. This production is only a fraction of the full potential to be realized with adequate water and unrestricted production.

It has been said, concerning our proposal, that we are seeking water for industrial use and that we should, instead, consider permitting industry to move to the water rather than moving water to the industry. This is not our purpose. We do not seek water for our area primarily for industrial use. We seek water primarily for agricultural use to take the place of our diminishing supply, and to maintain and increase production for the future. Municipal supply, of course, is mandatory in such an area. Great segments of our country are becoming industrialized. Industrial expansion is being promoted on every hand, even in the central and eastern sections of our State. This is good. We wish our western neighbors well in their industrial expansion program. We wish them well as they cover their fertile

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acres with vast industrial installations. We simply remind them that someone must produce food and fiber if their workers are to be stable employees and if their children are to grow into healthy citizens. Some of our sister States to the west now surpass Texas in their agriculture production, but they cannot long be self-supporting, if, Mr. Chairman, we are to believe the figures for increased population for the future.

With the aid of our sister States to the west we can solve our mutual problems.

We petition your deepest thought and consideration of the problem we present now confronting more than 2 million people within the area for whom the petition is presented.

Mr. ROGERS of Texas. Thank you, Judge Nelson.

Before we start the question and answer period, the Chair wants to present the gentleman from Texas, Mr. Mahon, here present. Judge Nelson is one of his constituents.

Mr. MAHON. Thank you, Mr. Chairman. I just came to hear the presentation and I am privileged, indeed, to hear it.

I have no statement to make, other than the one I have already made. The committee has already given me ample time.

Thank you.

Mr. ROGERS of Texas. Mr. Haley?

Mr. HALEY. Mr. Chairman, I just want to say to the presiding officer here, any time you lose the chairman of the Appropriation Committee, you are getting in deep water out there in Texas. [Laughter.] He is a very important man here.

Mr. SAYLOR. Mr. Haley, he used his own glasses and now he puts my trifocals on and he has no trouble talking.

Mr. ROGERS of Texas. Mr. Moore, I want to ask you just one or two questions so that the record will be complete here. You referred to the Texas water plan and I think you will recognize that Texas, as a State, of course, is very proud of being a State and everyone from Texas is very proud of being a Texan.

The thing that has disturbed me is that my district in the western part of the State, and a substantial part of Mr. Mahon's district, were left out of the Texas water plan. I wonder if you can tell us why.

Mr. MOORE. Well, Mr. Chairman, I wouldn't say that west Texas was left out. The potential——

Mr. ROGERS of Texas. You didn't give us any water. Let us put it that way.

Mr. MOORE. The potentially developable water in the eastern half of the State we estimate to be somewhere in the range of 6 million, at most, 6 million acre-feet, under today's system of calculating water supply. Some of this water will be required to meet the potential requirements in the basins in which the water will flow. It is possible to move water west, and to the High Plains. It would have to be moved from the southeastern tip of the State, however, all the way to west Texas, all the way to the High Plains, to provide any quantity at all.

Mr. ROGERS of Texas. How much of a lift would that require?

Mr. MOORE. It requires a 3,000-foot lift from the nearest point of excess in the State. This would be the South River Basin line northeast of Dallas-Fort Worth. We estimate that it would cost under

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today's piping system $168 an acre-foot to move water 300 miles and lift it 3,000 feet.

Mr. ROGERS of Texas. $168 an acre-foot?

Mr. MOORE. This is correct.

Mr. ROGERS of Texas. Now, Mr. Moore, this is the thing that sort of fascinates me. Let me ask you one further question about this.

You say that the potential production of east Texas is 6 million acre-feet?

Mr. MOORE. Based on today's technology.

Mr. ROGERS of Texas. Is that east of the 99th meridian?

Mr. MOORE. It would be further east than that. This would be east of the Dallas-Fort Worth area, is where the excess lies. The excess lies in the Lower Red River Basin below Texoma. The Sulphur River Basin, Sulphur Creek, Sabine, and Nature's River.

Mr. ROGERS of Texas. Does that include all of the water around the Dallas-Forth Worth area, the Texarkana area, and all of that east Texas in a flow-down to the gulf.

Mr. MOORE. Yes. Actually, we would project a shortage for the Dallas-Fort Worth area in the Trinity River Basin in the year 2020.

Mr. ROGERS of Texas. This is the thing I can't understand. Where are they going to get the water to float the boats up and down the Trinity Canal or Trinity River? Is that included in your Texas water plan?

Mr. MOORE. Well, actually, the navigation of the Trinity could be achieved on the projected return flows from the Dallas-Fort Worth metropolitan center.

Mr. ROGERS of Texas. On the return flow.

Mr. MOORE. The sewage and waste disposal going down the Trinity River.

Mr. ROGERS of Texas. And that is the water that is going to be used to maintain the navigational requirements of the Trinity?

Mr. MOORE. This is correct. We project a return flow from Dallas-Fort Worth at 750,000 acre-feet.

Mr. ROGERS of Texas. Who made this projection, Mr. Moore, about the 6 million acre-feet? Was that made by Leeds & Co.?

Mr. MOORE. No, sir; this was made on the basis of such reports as are available, done by the water planners in the State and by the staff of the Texas Water Development Board.

Mr. ROGERS of Texas. Well, the reason I am asking these questions is simply to let the record show that I wasn't very well pleased by that Texas water plan when it left us out. I just don't like to feel like a disinherited orphan. We in the panhandle of Texas, have so often found ourselves in that position. We have had to work pretty hard up in that country to get our water. I think we have done very well with the Canadian River Dam but it is a supplemental source and our ground water, as Judge Nelson has pointed out, has done a terrific job in raising all of these crops that are so important and, of course, we have a research program going on out there now on the ground water recharge, which is, of course, in keeping with what Judge Nelson was talking about.

I think that we made some excellent headway in this thing, but I just feel that the western part of the State, even though we are 3,000

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to 4,500 feet above sea level, that we ought to be included in any Texas plan.

Now, as I have stated a number of times, any regional development or anything having to do with water, so far as I am concerned, as long as I am in Congress, I am going to offer an amendment to see that Texas, and especially our section, is included in this, but by doing this, I don't want any misunderstanding. I don't want the State of Texas to feel that they have been relieved of their obligation to our section of the State because we don't intend to get out and join Oklahoma or New Mexico or any place else. We are just as proud of being Texans out there as they are down around the Alamo, and over at Goliad and Sullivan City. But I do feel that there ought to be some reconsideration given this because if you are talking about a situation involving $168 an acre-foot to bring that from East Texas, 300 miles, I am just wondering what the cost would be from the Columbia Basin down where you have something close to, we will say, around 1,800 miles and the lift of 3,000 feet, probably three times.

I just think that we ought to be realistic and I think the whole record ought to be complete on what we are doing here because we have got a terrific problem to solve and we are not going to solve it unless we are realistic.

Mr. MOORE. Mr. Chairman, let me say with regard to the economics of the water distribution that the economics have improved somewhat in volume, that is, if there were available just 300 miles from the High Plains of west Texas, the water which could serve, not only the present irrigation but the potential irrigation on the High Plains, the economics of the water distribution would be improved somewhat by moving larger volumes.

With regard to the High Plains itself, certainly, the Texas Water Plan will propose that State funds be used to do what can be done to recharge the Ogallala sand, either by a system of recharged wells or by a system of playa lake modification, the plan will certainly propose the expenditure of State funds to assist in water conservation research measures, for the general west Texas area, stretching from El Paso to San Angelo and north.

The Texas Water Development Board has explored the possibility of desalination as a source of water. Here, again, the costs present problems.

We do believe that the State should participate wherever possible in providing desalinated water as a source for municipal and industrial purposes. When you get to the volumes that are required for irrigation, of course, the costs in terms of volume do get to be substantial.

Mr. ROGERS of Texas. Well, now did you get all of your information, Mr. Moore, or most of it, from the Leeds firm, the engineering firm?

Mr. MOORE. No, sir. You mean, with regard to out-of-State importation?

Mr. ROGERS of Texas. Yes, sir.

Mr. MOORE. We contracted with Leeds, Hill & Jewett in November of 1965 for a study of the potential sources outside the State for surface water, because our studies up to that point indicated the possibility that there would not be sufficient water that could be economically transported to the High Plains for irrigation purposes.

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Mr. ROGERS of Texas. Well, now, did they make any study of importing water from the East into the east Texas area and releasing some of that water for the high plains?

Mr. MOORE. No, sir; we have not done studies of importation directly to the east. We did ask that they consider sources to the north.

Mr. ROGERS of Texas. Well, now, most of their studies, though, were to the west, were they not?

Mr. MOORE. Yes.

Mr. ROGERS of Texas. And north.

Mr. MOORE. West and northwest.

Mr. ROGERS of Texas. The main thing I want to do, Mr. Moore, is to let the record be very complete on this, that we are going to continue, and I am sure Mr. Mahon will join with me, we are going to continue to do everything we can to get as much water as cheaply as we can to west Texas. And anytime there is a Federal plan, we are going to try to get in on it. If there is a regional plan, we are going to try to get in on it. But we ain't going to be kicked out of Texas, either. You may kick us out but it would be by force and we will be knocking on the door every day.

Mr. MOORE. We wouldn't propose to do that.

Mr. ROGERS of Texas. Mr. Haley.

Mr. HALEY. Thank you, Mr. Chairman.

May I inquire, are we under the 5-minute rule?

Mr. ROGERS of Texas. Yes, we are. Did I over-extend my time? I yield such time as I used too much of, back. [Laughter.]

Mr. HALEY. Mr. Chairman, I could use about 15 or 20 minutes but I guess—Judge Nelson, on your statement on page 5, I note you say that you will put this water to use for irrigation, primarily, for cotton, grain sorghum, wheat, sugar beets, soybeans, vegetables, castor beans, and irrigated castors.

A good many of these items that you mention here, Judge, are already in surplus in this country of ours, are they not?

Mr. NELSON. So far as I know, Mr. Haley, cotton is.

Mr. HALEY. What about wheat?

Mr. NELSON. I believe that, as far as I know, wheat is not in surplus and I judge that partially upon the basis of the President's announcement only recently that it would be increased 15 percent in allotments for the next year.

Mr. HALEY. Well, of course, Judge, if we are going to feed the world, which apparently we are going to do, send our Vice President around once or twice more, we will need much more than you are going to produce in Texas or any other place.

Mr. NELSON. I think that is right.

Mr. HALEY. Yes, sir.

Judge Nelson, do you know how many—approximately how many acres of land are lying idle east of the Mississippi River?

Mr. NELSON. No, sir. I am not acquainted with that total figure. I think that could be ascertained, as a matter of record, from the Agriculture Department under the soil bank program for the past years.

Mr. HALEY. I am informed it is around 50 million acres. I may be wrong. Of course, that land wouldn't need any water.

Mr. NELSON. May I say to you in connection with that program, and particularly as it pertains to the cotton, during recent years cot-

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ton production has become highly competitive and even more so now, and there are large areas of our country that have heretofore been producing cotton that have had to yield to other areas because of the cost factor in it. And that has greatly moved the cotton to the high plains of Texas from even the eastern part of our own State.

You can see from the total production of about 4½ million bales in Texas, we produce over half of it on the high plains. And it is because the production has decreased insect-wise, soil depleted, or the valleys covered with water, or grown to timber or other things in the East, And we understand that there is a surplus of cotton now, but I do think that we have to look to the long-range future of producing food and fiber for our increased population, and by the time we get this water which, if we can make it coincide with our depletion program, that population will have come upon the scene and we will need these products. That is our concept.

Mr. HALEY. Of course, if we continue to furnish cheap water, and so forth, to Arizona and other parts of the country, you are going to be out of the cotton business anyway.

I yield back the balance of my time.

I reserve the balance of my time.

Mr. ROGERS of Texas. The gentleman reserves the balance of his time, which is 1 minute.

Mr. Saylor.

Mr. SAYLOR. Mr. Moore, I have read very carefully your entire statement and I have noticed you state on page 6 that obviously Texas could not go it alone to import water. The cost would be far too great, indicating, then, that you have found that there are other areas that you need for west Texas and ask to be part of a larger regional plan. You go on to say you are informed that the State of Kansas needs 4 or 5 million acre-feet annually.

Have you discussed with any of the other States immediately north of you; namely, Oklahoma, Nebraska, as to their needs?

Mr. MOORE. No, sir; we have not. This may be in the report that we have asked Leeds, Hill & Jewett to do. We are covered—Texas has a compact on the rivers that border the State. We have a compact on the Rio Grande with the States of New Mexico and Colorado, and compact with Oklahoma as it affects the Canadian River.

There has just recently been signed a draft of a proposed Red River compact with the States of Oklahoma, Arkansas, Louisiana, and Texas. This draft is being circulated for consideration.

Insofar as the rivers that pass Texas, oh, there is also a compact on the Sabine River with the State of Louisiana.

Insofar as the rivers that surround Texas or the tributaries of those rivers, we have negotiated compacts with the immediately adjoining States pertaining to the diversion of waters in those rivers that are boundaries to the State.

Mr. SAYLOR. I am rather fascinated with that section of your statement which says you are looking to the Colorado River for a source of supply. I can only tell you after being on this committee since 1949, that the Colorado River is the most overworked river that I have ever heard tell of, and everybody that appears here tells us how short they are of water, and the latest estimates we had yesterday were that they

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not only don't have enough to take care of their own needs, but they need a minimum of 8½ acre-feet to take care of things that they need in that 7-State basin.

Now, if this is true, you have just got to look farther away than Colorado for a source of supply.

Mr. MOORE. Mr. Saylor, we would not look to the Colorado as a source of supply. We are looking to the Columbia as a potential source of supply.

Mr. SAYLOR. Well, I notice you are a lot closer to the Great Lakes than you are to the Columbia. You had better start looking at Lake Michigan and the Mississippi, and the Missouri. And the reason I suggest this, apparently you people have read the report of the Bureau of the Budget in which they say this bill shouldn't have anything added to it, this bill should be broken up. Even with regard to Kansas, it should be broken up.

Mr. SKUBITZ. That is right.

Mr. SAYLOR. It should be broken up so that the water problem, which is a national problem, can be studied as an entire problem, including the State of Texas.

I just want to say that I went to the northern part of Texas, the panhandle, that the chairman of the committee and our good friend, Mr. Mahon, represent, and I find it is probably closer to Pennsylvania than it is to Austin, their own capital. We will treat you a lot better than they are treating you down there. Maybe it is because of the party you belong to, that you are all in one bundle down there.

Mr. SKUBITZ. Will my colleague yield?

Mr. SAYLOR. Yes.

Mr. SKUBITZ. Are you inviting Mr. Rogers to come into the State of Pennsylvania and run against you?

Mr. SAYLOR. Well, not to run against me—I will find him a district.

Mr. Nelson, your statement, on page 4, states that Mr. Jacobs says that your water in the Ogallala Reservoir will be totally exhausted by the year 2003. I gathered from a supplemental comment you made at that point, what you meant was that the water that could be recovered at a reasonable cost would be exhausted, is that right?

Mr. NELSON. Yes, sir. I think that is what he meant, though he may not have so said. In other words, the economic feasibility will be exhausted.

Mr. SAYLOR. Now, can you tell this committee what the price is per acre-foot you contemplate that groundwater can be delivered at and used in the State of Texas?

Mr. NELSON. No, sir. I cannot. But I must say to the committee, there are many engineering problems confronted with this matter that I can't answer. I think the finest statement that I have heard today on the matter is the statement that you have just made, that it is a national problem, and that it must be solved. As to how that is to be done and a the earliest possible time is the matter that should be undertaken here, and the chairman's statement of yesterday that it is unfortunate that we can't all live on a creek bank, but everybody has to have a drink, you couple that with your statement that this is a national problem, and you are getting right to the meat of the coconut.

Now, where we get the water from and how much the cost may be, those are questions that must be determined, but we must have the

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water or become a food-deficient nation in the future. That is my position.

Mr. SAYLOR. Mr. Moore, will you submit for the committee the figures you have given or the authority for the figures you have given to transport water 300 miles and raise it 3,000 feet, that would cost $168 an acre-foot?

Mr. MOORE. Yes, sir. In fact, we would like at some point, when the Texas water plan is completed, and we anticipate its completion and release sometime during the month of May, we will make copies of that report available because these details will be dealt with in that report.

Mr. SAYLOR. On page 2 of your supplemental statement which you have asked to be added to the present bill as a proposed amendment to section 8, you limit the Secretary of the Interior to the Federal reclamation laws and the amendments which you are offering. In view of the fact that this is a national problem, why should we limit the Secretary of the Interior to an act of 1902 covering only the 17 Western States?

Mr. MOORE. Mr. Saylor, our intent is to secure irrigation water and this limitation was intended in that sense. The pricing of irrigation water, as you well know, is different from the pricing for municipal-industrial water, and our concern was that the pricing of irrigation be as contemplated in the reclamation laws.

Mr. SAYLOR. I am perfectly willing to have that but I am one of those who think that the 17 Western States have had a good thing just too long and that the 50 States should share in this program.

Mr. ROGERS of Texas. The time of the gentleman has expired.

[Laughter.]

Mr. ROGERS of Texas. Mr. Johnson.

Mr. JOHNSON. Thank you, Mr. Chairman. There are just one or two questions I would like to ask you.

What is your average cost of water that you are using today, Mr. Nelson?

Mr. NELSON. I am informed by Mr. Shurbet, who is an actual farmer and in farming, that it is about $15 per acre-foot for irrigation.

Mr. JOHNSON. Is that about as much as your farmers can pay and yet be competitive with their crops?

Mr. NELSON. Yes, sir; it is. And in order to be competitive in that way, we must be highly mechanical in our production of crops, in both planting, cultivating, harvesting, and processing, in order to be competitive then and make any money.

Mr. JOHNSON. Well, then, that is about as much as you can afford to pay for water.

Mr. NELSON. At the present price we are getting for our products and the present cost of machinery, fertilizer, other supplies, and ingredients that go into the production.

Mr. JOHNSON. The engineering concerns that have made your study, preliminary studies, have given you no figure as to what an acre-foot of water would cost you?

Mr. NELSON. No, sir. They have——

Mr. JOHNSON. From outside sources?

Mr. MOORE. From out-of-State sources? No, sir; they have not.

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In our planning for irrigation water within the State of Texas, and you must understand this extends over a 55-year period to the year 2020, we have regarded $25 an acre-foot as the outside cost which could be projected in terms of providing irrigation water. But the irrigators in Texas would say that is too high.

Mr. JOHNSON. I yield back——

Mr. NELSON. Mr. Johnson, if I may further answer your question, we may, through future means, scientific knowledge, reduce our cost of production of these crops somewhat and bring about a reduction in cost of delivering water for irrigation of our land. This is the future. But I can just speak for the present.

Mr. JOHNSON. Yes, sir. Well, every State is considering that at the present time. Our own State of California is going into that in a big way and we are trying to produce water at a cost where we can stay competitive and still carry on a very heavy agriculture.

Mr. Chairman, I yield back the balance of my time and yield to the gentleman from Arizona.

Mr. ROGERS from Texas. You have a minute and a half left.

Mr. Hosmer.

Mr. HOSMER. I reserve my time.

Mr. ROGERS from Texas. Mr. Udall.

Mr. UDALL. Just a couple of questions. Governor Connally, in a letter which I inserted in the Record on Tuesday, stated at the bottom of page 3 that the study can be accomplished by amendments to this bill or by a separate bill. I agree that a study should be made in your area and is important. We ought to find out where the sources are and what can be done. If there is legislation to provide you with a complete and thorough study for west Texas, if it gets underway within a reasonable time, you wouldn't care whether this were in this particular bill or whether it were a separate bill, as long as the job is done.

Mr. MOORE. Well, Mr. Udall, let me say that we intend to pursue any course that will assure water, not only for the west Texas area but for the entire State, and certainly——

Mr. UDALL. I understand.

Mr. MOORE (continuing). Certainly, we do not intend to—we would not be in a position to say that it is this or nothing, because we must as a matter of interest of our own economy and our people, pursue whatever sources appear to be feasible.

Mr. UDALL. The reason I bring this up is that we started out in my original bill with a project for central Arizona. We had to make peace with California and the bill was enlarged to do some things that California wanted. We then found that to do these things we perhaps should spread this to the upper basin. We added them. We now find that in order to prehaps get a shot at the bill, we have got to make a lot of provisions for the Northwest.

What I am afraid of is that this great pioneering effort of a whole region cooperating on a study, may go down, which would eventually prejudice your people, too, I would think, if we add Texas and Kansas and the Dakotas and some other States as we go along. That is the only reason I asked the question about a separate bill because your area in west Texas is important and I want to see a complete study made at the earliest possible time.

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Now, another question. We in the Colorado Basin have traditionally used the resources of this whole area; namely, the very choice damsites, to set up a fund in the upper basin and a fund in the lower basin to pay for these projects. We have a bill before us now which provides for a huge development fund that would not only produce the immediate projects that are needed in both basins, but would set up most of the money that it appears we will need for a substantial import program.

Does the State of Texas or do the west Texas people have such a resource, have the potential for setting up a development fund of that kind?

Mr. MOORE. Since 1957 there has been under the jurisdiction of the Texas Water Development Board an authorized fund of $200 million, from which the six members of the board can make commitment to water development. This does not require legislative appropriations.

There will be a constitutional amendment on the ballot in November of this year in Texas to increase that fund to $400 million.

The projects we are anticipating within the State over the next 55 years would cost an additional billion and a quarter.

Governor Connally is already talking about securing authorization for this fund for an additional billion dollars to provide development. We certainly would anticipate that the State of Texas would pay its proportionate share of any proposed development for the importation of water just as we propose to finance within the State the water development facilities for meeting our needs within the State of Texas.

Mr. UDALL. I understand this. I appreciate your comments.

Now, finally, I want to say one thing as a predicate for a question. There is great alarm in the Pacific Northwest. Here we are talking in terms of $8 million, and then our west Texas friends come in and say maybe they would like to have another $16 or $20 million themselves, and I can see the alarm up there. But it appears to me, and I wanted you to comment on this, that the Northwest probably ought to relax on this because here you are closer to the Mississippi and the Missouri with the Rocky Mountains in between.

We are talking in terms—and this is all very rough, this is what the study will go into—of lifting it out of the mouth of the Columbia if that is the chosen source, up 3,000 or 4,000 feet, down through Oregon and Nevada to Lake Mead, and then down to Parker at about 400 feet above sea level, and then up to 1,000 feet and over to Phoenix, and on up to Tucson at about 2,500 feet at the small end of the aqueduct.

We are then three whole mountain ranges away from the Rio Grande with another series of lifts up to 4,000 and down to 1,500 or 2,000 feet before you ever get into the Rio Grande, and then you are 200 or 300 miles away from this area we are talking about with at least two other mountain ranges in between.

Now, you have said that to move water from east Texas without any—just a simple lift from 300 to 3,000 feet would cost $168 an acre-foot. Can you visualize any conceivable potential way that you could get on the tail end of our aqueduct and do all these lifts I have talked about and get any cheaper than that?

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Mr. MOORE. Let me comment first on the general question of movement of water from areas of excess to areas of deficiency. I grew up in the river basin from which we propose to move 2 million acre-feet in Texas. I know something of the alarm that can be expressed by those who have available surface water supplies.

With regard to the economics to the distribution, I go back again to an earlier statement that I made. The economics is simplified in terms of volume, if volume is available.

Mr. UDALL. I understand that.

Mr. MOORE. We certainly—and it is possible that there might be other routes than the routes you have outlined here for importation of water to the High Plains.

Mr. UDALL. That is why I asked the question. Of course, this is why you want a study, to determine——

Mr. MOORE. That is correct. But I will, in all honesty, say that certainly if it did not prove feasible or economical to move water to the high plains from areas in the Northwest, then we certainly would want a study of the feasibility of moving water from whatever sources might be available, the Missouri, or the Mississippi.

Mr. UDALL. You have several options.

Mr. MOORE. Yes.

Mr. UDALL. If I were an engineer, and I will conclude on this note, and there were two potential options, one across the plains to the biggest river of the country, the Mississippi, and the other one across the Rocky Mountains, I would think that my most likely route would be going East, but again, I want you to have your study.

Mr. MOORE. Yes.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The gentleman from Kansas.

Mr. SKUBITZ. I reserve any questions.

Mr. ROGERS of Texas. Mr. Tunney?

Mr. TUNNEY. I yield my time to the gentleman from Arizona.

Mr. UDALL. I have concluded, Mr. Chairman. I thank my friend.

Mr. TUNNEY. I reserve my time, then, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. Mr. Chairman, I would just like to point out to the gentleman from Arizona who was worrying about Texas and Kansas and everybody else coming into this action, you had better watch Maryland. Maryland walked in this morning. (Pointing to Representative Morton, of Maryland.) I yield my time to the gentleman from Pennsylvania.

Mr. SAYLOR. Mr. Chairman, I just want to comment on the price—at the price of $168 an acre-foot, the 2½ million acre-feet which will be imported to satisfy the Mexican treaty obligation, comes to $420 million a year and in 50 years ends up to be $21 billion. That is a nice price tag to add on to the national debt.

Mr. HALEY. That is a good round figure.

Mr. SAYLOR. A good round figure.

Mr. ROGERS of Texas. Is that all you had?

Mr. SAYLOR. That is all at this point.

Mr. ROGERS of Texas. Mr. Foley.

Mr. FOLEY. Mr. Chairman, I wish the gentleman from Pennsylvania would go further and compute how much it would cost to move

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the 10 million acre-feet, or so, that we are talking about for the Colorado and the 19 million acre-feet we are talking about for the State of Texas, and the 4½ million acre-feet for the State of Kansas, and the amount of the millions of acre-feet for Oklahoma and Nebraska and Maryland, and any other States that are now looking so warmly toward the Northwest for an inexhaustible supply of water.

Mr. SAYLOR. Will my colleague yield?

Mr. FOLEY. Yes.

Mr. SAYLOR. When the Bureau gets here and tells us what it is going to cost, I will be glad to do the multiplication.

Mr. FOLEY. I know there isn't going to be enough water in the entire Columbia to resolve all these needs, and I am not sure there is ever going to be enough money in the U.S. Treasury. I think it brings us, however, to the question that has been largely ignored in these hearings and that is the question of the cost of water.

May I ask the gentleman, do you feel that farmers in the State of Texas are entitled to subsidies for irrigation running in the nature of 10 times the cost that they pay? Do you think this is an entitlement that farmers in Texas have? To have the people of the United States bring water down to them at $168 or $268 or $300 an acre, and you pay $15 an acre for it?

Mr. MOORE. No, sir. We would not anticipate that the farmers in the State of Texas would be entitled to any different treatment than farmers anywhere else in the Nation.

Mr. FOLEY. As a matter of fact, wouldn't you agree that if our purpose is to develop and produce food and fiber, that it really doesn't make any difference where those agricultural products are produced? There isn't—in other words, there isn't any reason why they should be produced in California rather than Texas, or in Arizona rather than in Texas, or in Texas rather than Kansas, is there?

Mr. MOORE. No. sir; but the fact that you do have the production in Texas that has been economically possible there indicates that there is sufficient economic advantage for their production there to sustain the production we do have, and certainly, I think it is not quite the same as moving into virgin territory as it is to sustain something that already exists.

Mr. FOLEY. The gentleman from Florida has already raised the question about whether we really need to expand the acreages for cotton and wheat production. Cotton production, as you know, has been—acreage has been cut back continuously the last 10 or 15 years.

Let me ask you this question. Would it seem to be more logical to move the water 1,500 or 1,800 miles at these staggering costs, to produce wheat in the State of Texas or any other State in the South, or to develop acreages at the source of the water within a radius of, let us say, 100 miles, that could produce wheat?

Mr. MOORE. I should think that the economic choices would determine where it is developed and if it is economically feasible to develop it closer at hand, certainly this is where it will be developed. The competition, it seems to me, will determine where the development occurs. It is just as within the State of Texas, if——

Mr. FOLEY. In other words, where you could most economically produce these crops, they should be produced, is that right?

Mr. MOORE. I should think so, yes.

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Mr. FOLEY. And where you could most economically develop the land to produce them.

Mr. MOORE. I think this is the way it will develop despite what you do, that the economics will control.

Mr. FOLEY. The economics should control these matters and the various States should not be preferred over other States.

Mr. MOORE. Of course, we don't know on this point, and this is, as I understand it—the proposal here is to study what the costs would be. At this point, as I understand it, the purpose of the study is to determine the costs in terms of the cost of water.

Mr. FOLEY. One final question. Up to last year, November of last year, when this study was made that you described looking toward the West and North, isn't it true that all of the studies which have been conducted by the State of Texas of importation of water were studies of the Missouri? And the Missouri River Basin?

Mr. MOORE. The Missouri River has been mentioned as a source of water as long ago as the late 1930's and the 1940's.

Mr. FOLEY. What suddenly directed your attention to the Columbia River?

Mr. MOORE. We have had, as would be natural, we have employed for our guidance consultants who know something about water sources outside of the State of Texas, with the specific purpose of seeking out——

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. HALEY. Mr. Chairman, may I yield to the gentleman my 1 minute?

Mr. BURTON of Utah. Mr. Chairman, I would like to yield my remaining few minutes to the gentleman from Washington.

Mr. FOLEY. Thank you. I appreciate it.

Mr. ROGERS of Texas. Mr. Foley, you are recognized for 4 minutes additional.

Mr. FOLEY. Up until last year you weren't looking to the Columbia. Suddenly, last year you are looking to the Columbia. What happened over the period of years to take you this long to discover the Columbia River? You have water experts in Texas.

Mr. MOORE. Well, there has been discussed the possibility of regional and national redistributions of water, certainly, in much more detail in recent years than they have been discussed heretofore. It is just like within the State of Texas itself, we have had several major planning efforts and in each one of these—each successive planning effort explores possibilities that were not explored in a preceding planning effort.

The possibility of transbasin diversion of water within Texas when first mentioned was regarded as an impossibility, and yet we have explored this possibility so far as water supply within the States is concerned.

Mr. FOLEY. Don't misunderstand me. I wouldn't imply for a moment that the State of Texas doesn't have a right to be concerned about its water as any other State has, and to seek possible means of curbing its water conditions.

But I just wanted to ask if it wasn't true that these hearings and the discussions were the primary stimulus for the State of Texas to look toward the Columbia River.

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Mr. MOORE. Certainly.

Mr. FOLEY. And that up to this time all of your consideration has been of the Missouri Basin generally.

Mr. MOORE. Correct.

Mr. FOLEY. Now, in view of that, wouldn't you think that it would be more logical if we looked at this problem of water supply in all these areas of the country from the standpoint of the national viewpoint?

Mr. MOORE. I think the actions of the Congress in the water legislation in recent years indicate definitely that they would be looked at on a national level. The Water Resources Planning Act of last year certainly contemplates larger and larger segments to be considered in terms of water supply.

Mr. FOLEY. We don't really know very much about the cost of moving water, do we?

Mr. MOORE. No, sir, except in terms of short distances, and from relatively limited supplies.

Mr. FOLEY. We can't even make good judgments, can we, about the relative costs of augmenting water by weather modification or desalination or importation.

Mr. MOORE. That is correct.

Mr. FOLEY. And we cannot, then, logically, it would seem to me—and I ask you whether you agree with this—make an advance determination that water should come by importation rather than desalination or weather modification or that it should come from one particular region of the country rather than another, can we?

Mr. MOORE. No, sir, and so far as we are concerned, we have explored as many of these possibilities as we have been able to—desalinization. We have even explored—we have a section of our staff which is concerned with weather modification as a source of water.

Mr. FOLEY. But don't we need the broad——

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Wyatt?

Mr. WYATT. Yes. I will ask Mr. Nelson, are you aware, sir, that the States in the Northwest are conducting a water study at the present time that will not be completed until 1970, and the Federal Government is engaged in a $5 million water study in the same area in the Columbia River Basin, that will not be completed until 1970?

Mr. NELSON. I am familiar with a portion, I believe, of what you say, through acquaintance with some of the individuals in what is known as the 11 States Western Council, and at whose meeting—whose meeting we attended in Phoenix, and we made application to become a member of the 11 States Western Council in order that we might know more about what was going on, but our friends haven't seen fit to let us pitch our tent.

Mr. WYATT. The Western Water Council, is that right?

Mr. NELSON. Yes. 11 Western States Water Council, and that is about the extent of what they are doing—what they are doing generally is about the extent of my knowledge in that respect.

Mr. WYATT. Well, of course, you should know, sir, that certainly we in the West, because of the nature of the study going on, we certainly are not in a position to say that we, in fact, do have surplus

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water at the present time. Now, I was interested in the testimony of you gentlemen concerning the costs of raising the water and transporting it for this relatively short distance and relatively short height. Are you aware of the fact that there are very serious doubts as to the feasibility of raising water from the main stem of the Columbia River itself just a few hundred feet and just perhaps even 100 miles, as to the feasibility of doing this all by itself, let alone the huge rise and huge distance that would be involved to go to the Colorado River?

Generally, are you aware of this fact?

Mr. NELSON. The best testimony that I know, that I have available to me, is from the Parsons Engineering which I have studied very carefully, which, of course, embodies a great portion of the whole Northwest as they come in from Canada and Alaska into the Columbia and other basins. I am familiar with that. I have their maps and charts with me, and their costs, as they lay it out, on what the total cost would be of such a project, and how it would be paid and the lifts. I am familiar with those.

And, of course, their answer so that is that the area through which would come the generation of power, you could within a short period of years, be paying back $4 billion a year from generation of the power and it is anticipated that great revenues would come from the use of this water by anybody who used it on its way, and I think they feel through these studies that because of the ability to generate power as it flows this way, which if we brought the water from the East, according to the water board, we would have to pump it up all the way. And there is no probability or possibility of generation of power, to generate income from it.

Mr. WYATT. I just have one other question, if I may. Are you familiar with the details of a bill that is pending before the other body to create the National Water Commission?

Mr. NELSON. Yes, sir. I know there is such a bill. I know the Chairman of that committee, I believe, from Utah.

Mr. WYATT. It is Senator Jackson's committee.

Mr. NELSON. Well, I know there is such a bill pending.

Mr. WYATT. Well, now, in view of your interest and your acknowledgment of the national scope of our water problem, I assume you would support the creation of the National Water Commission as such.

Mr. NELSON. I would say to you, please, sir, that we are not opposed to study of water from what source it can be gained to be used nationally for the maintenance of the economy of the Nation.

Mr. WYATT. Thank you. I would like to reserve the balance of my time.

Mr. NELSON. Mr. Chairman——

Mr. ROGERS of Texas. The time of the gentleman has expired.

You may answer the question.

Mr. NELSON. Mr. Chairman, I would like, in answer to Mr. Foley's—one matter that he raised, with reference to the production of these crops at the place where it would be most feasible, new land, may I inject this thought in the committee hearing, and that is that we already have a highly developed economy. We have cities, we have 2 million people living in this particular area. We have multiplied hundreds of millions of bonds outstanding, that have already been

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created, debts that are based on the irrigation economy, and my primary purpose here, we may not increase our prosperity, but we can't afford to let the already developed economy fall into oblivion, if we can help it, in preference to finding other undeveloped areas upon which to put the water.

Mr. ROGERS of Texas. I think your statement covered that point very well, too, Judge.

Mr. White.

Mr. Tunney.

Mr. TUNNEY. Mr. Chairman, I have to go to another committee to vote but I would like to yield the balance of my time to Mr. Foley.

Mr. ROGERS of Texas. Mr. White has been recognized at this time.

Mr. TUNNEY. When my time comes.

Mr. ROGERS of Texas. How much time did you have?

Mr. TUNNEY. I have 5 minutes.

Mr. ROGERS of Texas. Mr. White.

Mr. WHITE of Texas. Mr. Moore, as a matter of fact, a number of questions that have been directed to you in detail would be resolved by a study as you have proposed in your amendment, isn't that correct?

Mr. MOORE. Yes, this is correct.

Mr. WHITE of Texas. You are not asking for water now. You are merely asking for a study to see whether it is feasible or not.

Mr. MOORE. That is correct.

Mr. WHITE of Texas. Now, I might ask also, in the question of whether it should be perpetuated as an irrigated area, don't other factors enter into it, too, like weather and geographic location, that make a difference whether you can grow a crop at this point or some other point in the Nation?

Mr. MOORE. Adaptability of the soils certainly makes a difference. We have the same problem in the State in terms of expanding irrigated acreage elsewhere in that the climate in this west Texas area is different from the climates and soils in other areas within the State.

Mr. WHITE of Texas. And doesn't an assured source of water enable us to divert our crops from surplus crops into other crops in order to feed the Nation?

Mr. MOORE. This generally has been the trend within the States.

Mr. WHITE of Texas. Now, Mr. Moore, I would like to make one statement. There have been quite a few statements made about west Texas and they centered on the Panhandle. I want to, for the record, say my district in west Texas happens to be larger than all of the New England States put together and I believe covers more acreage than the Panhandle itself, and we have rainfall approximately of 8 inches or 9 inches a year.

Now, we are getting pretty desperate for water, but I am not only talking in terms of irrigation water. I am talking about municipal and industrial water.

Now, sir, in your Texas plan, and in your appearance today, you are talking in terms of irrigation water, aren't you, sir?

Mr. MOORE. This is correct.

Mr. WHITE of Texas. Now, for the record, is it not possible and even feasible insofar as cities and municipalities needing water, to transport that water from east Texas or other areas in Texas to west Texas for municipal and industrial uses, not irrigation?

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Mr. MOORE. Let me say, sir, that in the projection of meeting water requirements of the areas in the entire west Texas area, we have projected the municipal and industrial water requirements and the available sources of supply and municipal and industrial water requirements can be met according to our projections from existing sources or proposed to be developed sources of supply in the west Texas area.

Now, it is true that the economics of water are such that you could transport water for municipal and industrial purposes because of the volume and cost differential, that is, the price that the user will pay, you could transport water into the west Texas area for municipal and industrial purposes.

Mr. WHITE of Texas. And your appearance here today is only on the irrigation water, so they won't be confused with these other feasibilities.

Mr. MOORE. This is correct. In fact, one of the major potential sources of municipal-industrial water in the area you represent is the use of brackish groundwater, desalted, for municipal and industrial purposes.

Mr. ROGERS of Texas. Would the gentleman yield to me at that particular point?

Mr. Moore, the Texas water plan took into consideration municipal and industrial water in east Texas.

Mr. MOORE. Correct.

Mr. ROGERS of Texas. The Dallas and Fort Worth area. Why didn't you take in the west Texas?

Mr. MOORE. We did take in for west Texas——

Mr. ROGERS of Texas. I thought you said you were talking about irrigation water in west Texas.

Mr. MOORE. We are talking here today about the needs for water for irrigation in west Texas. We have met the municipal and industrial water requirements in west Texas.

Mr. ROGERS of Texas. Sure, by using all the water for that purpose.

Mr. WHITE of Texas. And Mr. Moore, I would hope by way of a statement that your Commission will take another look at the possibility of including west Texas in your municipal and industrial water plan because we feel perhaps we were not totally considered in this respect.

Mr. MOORE. On municipal and industrial water?

Mr. WHITE of Texas. Yes.

Mr. MOORE. The water is provided for municipal-industrial purposes in the west Texas area.

Mr. WHITE of Texas. I mean, for transportation.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Reinecke.

Mr. REINECKE. Thank you, Mr. Chairman.

I am interested also in this $168 figure, Mr. Moore. Could you give us an idea of how large a project this was; that is, how many million acre-feet?

Mr. MOORE. I am not exactly sure of the volume. The total volume that would be available at the nearest point of excess is about 2½ million acre-feet.

Mr. REINECKE. So that, would this $168 figure—is this amortized as construction costs and delivery costs and pumping costs?

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Mr. MOORE. This is the total cost figure.

Mr. REINECKE. And something like 2½ million acre-feet or less, depending on the point of discharge.

Mr. MOORE. That is correct. This merely gets it to the—we almost have to get into geography but this merely gets it to the top of cap rock, we call it, in Texas, merely gets it onto the High Plains. This does not include retail distribution costs.

Mr. REINECKE. I understand that. This is, you might say, the wholesale, but this is approximately 300 miles.

Mr. MOORE. That is correct.

Mr. REINECKE. Mr. Chairman, I would like to make one observation. I have never been one to say that desalination was going to give us anything for agricultural water for the near future, but the high costs of water that we are bandying around here today, I think makes the reverse osmosis process look somewhat feasible. All we had to do in that case was pump against the principal energy barrier of 1500 p.s.i., which is equal to about 3500 feet of pumping head; we seem to be doing that several times during one leg of import under the present hearings, and I think maybe we ought to take another shot at desalting before we get serious about running these $20 billion projects back and forth across the country.

Mr. WHITE of Texas. Would the gentleman yield?

Mr. REINECKE. I yield to Mr. Hosmer, first.

Mr. HOSMER. In that connection, I think we must recall that you have to have something to put in the machine and that generally confines it to a sea coast location.

Mr. REINECKE. I understand that.

Mr. ROGERS of Texas. Mr. White?

Mr. WHITE of Texas. Mr. Moore, would it be possible for you to provide the west Texas Members of the Congress a breakdown on how you arrived at this $168 per acre-foot of water delivered under your plans to west Texas?

Mr. MOORE. Yes.

Mr. ROGERS of Texas. As I understand it, you are going to furnish that information to us on that.

Mr. MOORE. Yes. This is correct.

Mr. ROGERS of Texas. The findings of the engineers, Mr. White.

Mr. WHITE of Texas. Thank you.

Mr. ROGERS of Texas. Is that all you had, Mr. Reinecke?

Mr. REINECKE. Yes. I yield back the balance of my time to Mr. Foley.

Mr. ROGERS of Texas. Mr. Foley.

Mr. FOLEY. Thank you, Mr. Chairman.

Gentlemen, you have been very patient with the questions the committee has asked and have made a real contribution to the record of these hearings. I would like to ask you two questions on behalf of Mr. Tunney which he would like to have in the record. These are his questions.

Why does Texas wish to come under this bill rather than under a separate bill to determine feasibility for east and west Texas, Texas' long-range needs, and means of realizing those needs?

Mr. NELSON. Mr. Foley, the best answer I could give to that is that misery loves company, and this hazardous journey we are on, we need *some fearless help.*

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Mr. FOLEY. The second question Mr. Tunney would like to ask is, If Texas is not in the Colorado River Basin, why should it be included in this bill? Again, Mr. Tunney's question.

Mr. MOORE. It would be difficult to say that Texas is necessarily in the Mississippi River Basin or the Missouri River Basin or any other basin where there might be an excess. With the exception of the Red River and its tributaries, which flow ultimately into the Mississippi River, the other rivers of Texas between the Red River and the Rio Grande originate either within the State or in the State of New Mexico, and there is very little contribution to the flow of Texas rivers from the State of New Mexico. So that, if Texas is to be limited to those basins in which its geography happens to lie, there is no real chance for importation of water.

I would say this, that in terms of long range, 75 to 100 years from now, we would hope that such distribution as we propose within a State would make it feasible that when the time comes or the necessity arises for the importation of water from the east, that such a distribution system as the State will have by then financed and constructed would be available for the distribution of the water from those directions.

Mr. FOLEY. My own question now would be again, in view of the fact that all States have water problems, certainly all the States in the West and many, many States of the East, wouldn't it be more logical if we were to take up these important questions on a national scope rather than a regional scope?

Mr. MOORE. Yes. It seems to me, however, that your beginning is likely to move from a State attempting to resolve its own problems of water supply and then attempting to resolve its water supply problems with adjoining States and then, gradually to the regional and then to the National. I think anyone could appreciate some concern that in the allocation of water within various regions of the State, a State would feel some concern that it might be omitted from consideration in those allocations.

Mr. FOLEY. When we come to Federal studies and the Federal involvement in it, we are at a national level automatically, and we should then—isn't it more logical to assume we should have a national study, let the States do their own studies, let the regions cooperate with their own regional studies, and when it comes to Federal studies, have those studies national in scope?

Mr. MOORE. Of course, there is the requirement that in certain areas of water use, navigation, and flood control, for example, the Federal interest has already been demonstrated over the years and, certainly, in a State's development of its own water supply, however, it must give consideration to those Federal interests in its water planning as we have done in Texas, but I recognize the advantages that lie in the area of a national study of the water problem. Inevitably it very well will be an international questions so far as the United States is concerned.

Mr. FOLEY. And there is no——

Mr. ROGERS of Texas. Go ahead.

Mr. FOLEY. And there is no reason why Texas or any other State shouldn't be fully considered in its water needs when it comes to the responsibilities of the U.S. Congress.

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Mr. MOORE. This is correct.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Thank you, gentlemen, Mr. Moore and Judge Nelson.

Mr. MOORE. Thank you, Mr. Chairman and members of the committee.

Mr. NELSON. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. The Chair has a resolution from the West Texas Chamber of Commerce sent to the chairman of the full committee. Without objection it will be placed in the record at this point.

WEST TEXAS CHAMBER OF COMMERCE,
Abilene, Tex., May 4, 1966.

HON. WAYNE N. ASPINALL,
Member, Congress of the United States,
Washington, D.C.

DEAR CONGRESSMAN. West Texas needs your help. It is most important that Texas be included in H. R. 4671 which will authorize the Lower Colorado River Basin Project.

The expression of our Board of Directors is enclosed in the form of a resolution. We urge your favorable consideration.

Sincerely,

LOYAN H. WALKER.

RESOLUTION OF WEST TEXAS CHAMBER OF COMMERCE, ABILENE, TEX.

Whereas H.R. 4671 would authorize the Secretary of Interior to make a study of the movement of water into the Lower Colorado River Basin;

Whereas it would be to the benefit of West Texas to be included in any study involving the transferral of water from an area of surplus to an area of deficit: therefore, be it

Resolved, That the West Texas Chamber of Commerce urges the Texas Congressional Delegation to amend H.R. 4671 to include Texas in this plan and any other study concerning the movement of water into the southwest area.

BEEMAN FISHER,
President.

Attest:

JACK G. SPRINGER,
Executive Vice President.

Adopted at the 48th Annual Convention in session at Fort Worth, Texas, April 21-22-23, 1966.

Mr. ROGERS of Texas. Our next witness is Hon. Kenneth Holum, Assistant Secretary of the Interior for Water and Power, and he is accompanied by Mr. Floyd Dominy, Commissioner of the Bureau of Reclamation.

STATEMENT OF HON. KENNETH HOLUM, ASSISTANT SECRETARY OF THE INTERIOR FOR WATER AND POWER; ACCOMPANIED BY FLOYD E. DOMINY, COMMISSIONER OF THE BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR

Mr. ROGERS of Texas. Mr. Holum and Mr. Dominy, let the Chair welcome you to the subcommittee and the Chair will now recognize the Assistant Secretary of the Department of the Interior, the Hon. Kenneth Holum.

Mr. HOLUM. Thank you, Mr. Chairman and members of the committee. This committee has been pursuing with great diligence one of the most complicated, difficult, and urgent water supply problems

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in the country. You have asked us specifically to appear this morning to discuss titles V and VI of the bill that you have under consideration. Secretary Udall was before the committee in August of last year.

Commissioner Dominy and I are happy to be here this morning, and other representatives of the Bureau of Reclamation staff and representatives of the Department, to respond to that request and provide any additional information the committee might require.

In the interests of conserving your time we have made our presentations with respect to these two titles as brief and concise, and we hope as informative, as possible. I shall read my brief statement and then Commissioner Dominy has supplemental information, after which we shall be happy to answer your questions.

Last August Secretary Udall appeared before this committee to present the views of the administration on H.R. 4671 and companion bills. He stressed the urgency and importance of this legislation and the splendid spirit of cooperation among basin States and interests that had led to the agreements necessary to obtain widespread support for such legislation.

Since that time the urgency and need have increased. Cooperation has broadened and has led to further agreements relating to the desired scope and character of Colorado River Basin water development. The water problems of the Colorado River Basin continue to receive the highest priority attention of this administration.

As you know from previous testimony, the administration supports the objectives of H.R. 4671 but does not endorse the bill in all details. The administration supports authorization of the Marble Canyon Dam and Reservoir, the central Arizona unit, and the programs for water salvage and fish and wildlife.

It endorses the establishment of a Lower Colorado Basin development fund and concurs in the requirement for a long-range study to investigate alternative sources and various methods of augmenting Colorado River water supplies. It agrees with the provisions to establish a priority for California's 4.4 million acre-feet of basic Colorado River water entitlement and with most of the "housekeeping" provisions of the bill.

On the other hand, the administration recommends that authorization of Bridge Canyon Dam and reservoir be deferred pending further study by a national water commission. While agreeing in the requirement for a long-range study to determine the best means of augmenting the water supply of the Colorado River, the administration recommends that the study be conducted under the direction of a national water commission rather than carried out by the Secretary of the Interior, with the advice and assistance of a regional water commission as the bill provides.

In response to the committee's desire and because the administration's views as a whole were presented in the report and testimony last summer, our testimony today will not go over ground covered last year but will be directed specifically to the five new upper basin projects proposed for authorization and to section 601 relating to criteria for reservoir operations. Accordingly, my formal statement is limited to these aspects.

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Title V is a new addition to the bill which would amend the Colorado River Storage Project Act primarily to provide for the construction, operation, and maintenance of the Animas-La Plata project, Colorado-New Mexico, and the Dolores, Dallas Creek, West Divide, and San Miguel projects in Colorado. All five projects would be authorized as participating projects under the Colorado River Storage Project Act.

These projects are basically similar in their functions and objectives. They would permit both Colorado and New Mexico to develop practically all of their remaining assured consumptive use entitlements to waters of the Colorado River Basin. The projects would provide for the balanced development of water and related resources serving the needs of irrigation, municipal, and industrial water supply, flood control, recreation, and fish and wildlife.

The projects are located in the high benchland and mountain areas of western Colorado and northwestern New Mexico. Badly needed supplemental water for existing irrigation development, as well as water supplies for new irrigation expansion, would be provided.

Each project would make available substantial quantities of municipal and industrial water to meet growing municipal needs and to serve the potentialities for development of mineral resoures. The establishment of new areas for water-based recreation opportunity and fish and wildlife activity would be of significant importance.

Each of these projects would be of extreme importance to the economy of the particular area it would serve. It would not only stabilize economic activity in those cases where it is faltering, but would provide a stimulus for economic growth. An extensive portion of western Colorado and northwestern New Mexico would reap wide and permanent benefits.

The development of these five projects would, however, almost fully utilize the remaining portions of the assured entitlements of Colorado and New Mexico to Colorado Basin water. Their development could foreclose the development of other projects which may be urgently needed. The desirability of proceeding with all five of these projects should, in the opinion of the administration, be viewed in this perspective.

For the Animas-La Plata and Dolores projects, the unit costs of irrigation development are within defensible limits. The demands for municipal and industrial water are imminent and relatively well defined. There can be little question that the new water supplies to be developed will be promptly and economically put to highly beneficial uses. The Department of the Interior, therefore, supports immediate authorization of these two projects.

In respect to the Dallas Creek, West Divide, and San Miguel projects, however, the unit costs of irrigation are high. The principal opportunities for municipal and industrial water use for the West Divide and San Miguel projects lie in the development of mineral resources, primarily coal and oil shale. While the long-range potentials for these industrial purposes are impressive, the near future demands are uncertain. Furthermore, the long-range potentials could utilize the entire water supplies to be developed by the projects with

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the possibilities of greater overall economic benefit to the regions involved.

For these reasons, the Secretary, in reporting on these three projects, cautioned that decision on the timing of their construction should be considered carefully by both the Federal Government and the State of Colorado. The administration believes these factors so important that it favors deferring authorization of these projects at this time, pending the establishment of the National Water Commission and completion of its review of related water problems.

Section 601 of H.R. 4671, as contained in the recommended revision of Committee Print No. 19, directs the Secretary of the Interior to establish equitable criteria for the operation of the major reservoirs in the Colorado River system. It further sets certain guidelines to be observed. The language of section 601 was developed and adopted only after long and exhaustive negotiations between upper and lower basin interests. We endorse the objective of this section and find the guidelines to be reasonable and workable.

Commissioner Dominy has a more detailed statement both in respect to title V and to section 601. His statement will complete the formal presentation of the administration's views on these new additions to H.R. 4671 and companion bills.

Mr. ROGERS of Texas. Thank you, Mr. Holum.

Mr. Dominy.

STATEMENT OF MR. FLOYD DOMINY, COMMISSIONER, BUREAU OF RECLAMATION

Mr. DOMINY. During the hearings in August of 1965, before this committee, Secretary Udall and I testified at length on the many and varied aspects of H.R. 4671 and companion bills. Our views on these matters are a matter of record.

Since that time the Bureau of Reclamation has completed reports on five potential upper basin projects which were recently sent to the Congress by Secretary Udall. My formal testimony today will be limited to a brief discussion of these five projects and to comments on section 601, a new addition to H.R. 4671 related to criteria for operating the Federal reservoirs of the Colorado River system. A more detailed description of each of the potential projects is attached to my statement for inclusion in the record.

The Animas-La Plata project is in southwestern Colorado and northwestern Nex Mexico in the San Juan River Basin. The project would develop the flows of the Animas and La Plata River systems for irrigation, municipal and industrial use, recreation, and fish and wildlife enhancement.

Project water supplies would be provided to about 72,000 acres in Colorado and New Mexico, of which 46,500 acres, including about 7,500 acres of Indian lands, would receive full supplies and 25,600 acres would receive supplemental supplies. About 76,000 acre-feet annually of municipal and industrial water also would be supplied by the project. A portion of this municipal and industrial water would fulfill the present and future needs of Durango, Colo.; Farmington, N. Mex., and nearby communities.

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Substantial supplies would be made available for the development of coal-fired electric powerplants which will utilize the coal deposits on the southern Ute and Ute Mountain Indian Reservations. By exchange, the project would also make irrigation water available to augment supplies of the existing Florida project nearby.

The Animas-La Plata project would assist in the trend toward more intensive farming and the production of vegetables, fruit, and dairy products in the area. The availability of water would insure the development of the area's valuable coal deposits. The development would be of particular value to the Indian tribes through the provision of both industrial and agricultural economic ventures.

The total cost of the Animas-La Plata project is estimated to be $109,493,000, and the ratio of total project benefits to costs is 1.73 to 1 over a 100-year period of analysis. The ratio of direct benefits to cost is 1.11 to 1.

The Dolores project is just east of the Utah-Colorado State line in southwestern Colorado. The project would develop the flows of the Dolores River to provide irrigation water for about 61,000 acres, of which 28,700 would receive supplemental water supplies and 32,300 acres, including 1,500 acres of Indian land, would receive full water supplies.

The project would furnish 6,100 acre-feet annually of municipal and industrial water supply for the communities of Dove Creek and Cortez. Significant recreation, fish and wildlife enhancement, flood control, area redevelopment, and water quality control benefits would also be realized from the project development.

The Dolores project would stabilize the existing agricultural economy by providing supplemental water to irrigated lands now experiencing shortages and by expanding irrigation to good quality lands presently dry farmed and, therefore, producing only a part of their potential. The municipal and industrial water supply is urgently needed to meet current and future requirements of communities in the project area.

Development of the project would bring substantial employment benefits to Indians of the Southern Ute, Ute Mountain, and Navajo Reservations. The regulation provided by the project's McPhee Reservoir would improve the quality of water for municipal use at Cortez and Dove Creek and provide appreciable flood control benefits downstream along the Dolores River.

Opportunities for water-based recreation and for fish and wildlife enhancement would be afforded by the project in an area now nearly devoid of such opportunities.

The total cost of the Dolores project is estimated to be $46,643,000, and the ratio of total project benefits to cost is 1.96 to 1 over a 100-year period of analysis. The ratio of direct benefits to cost is 1.07 to 1.

The Dallas Creek project is in Delta, Montrose, and Ouray Counties in west-central Colorado. The project would develop the water of the Uncompahgre River and its tributaries to provide irrigation water for about 23,600 acres of land, of which 14,900 acres would receive full water supplies and 8,700 acres supplemental supplies, and 15,000 acre-feet annually would be supplied for municipal and industrial water supply for the communities of Olathe, Montrose, and Delta and the

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surrounding rural areas. Recreation, fish and wildlife enhancement, and flood control benefits would be provided by the project's reservoirs.

Rural living standards in the area are now depressed because of the limitations and uncertainties of the agricultural economy. The irrigation supplies of the Dallas Creek project are urgently needed to alleviate late-season water shortages which commonly result in crop failures, and to augment the irrigated acreage which supports the livestock industry of the area.

The municipal and industrial water supplies are needed to meet the existing and potential needs for adequate and safe supplies for local communities and surrounding rural areas. The city of Montrose is experiencing growth because of the location there of the new Colorado River storage project power operations center and the construction of the nearby Curecanti unit of the storage project. The expansion of tourism in the area is contributing to the growth of other communities.

The three project reservoirs would provide attractive recreation areas, and features for the conservation of fish and wildlife resources are also included in the plan. The proposed Ridgway Reservoir would be valuable for the control of snowmelt floods.

The total cost of the Dallas Creek project is estimated to be $37,687,000, and the ratio of total project benefits to costs is 1.89 to 1 over a 100-year period of analysis. The ratio of direct benefits to the cost is 1.17 to 1.

The West Divide project is in Garfield, Mesa, Pitkin, and Gunnison Counties in west-central Colorado. Project water would be obtained from a series of Colorado River tributaries, including the Crystal River. The project would provide 77,500 acre-feet annually of municipal and industrial water and irrigation water for about 40,000 acres, of which 19,000 acres would receive supplemental supplies. Recreation, fish and wildlife conservation, and flood control would also be important functions served by the project.

The project area lies along both sides of the Colorado River adjacent to the Roan Plateau which contains some of the world's richest oil shale deposits. Developmental oil shale activity is in progress near the project, and the area offers an attractive and convenient site for a municipal and industrial complex to develop this resource.

The West Divide project would provide the initially required water supplies for the industrial processes and the attendant community growth. Municipal water would also be supplied for the current recreation and suburban expansion near Glenwood Springs.

The dependable irrigation water supplied by the project would alleviate the problems of the unstable and often marginal farming operations in the area and provide an expanded and more prosperous base for the existing agricultural economy.

The project reservoirs would significantly improve recreation opportunities in the already popular White River National Forest. Benefits to fisheries and upland game hunting would be provided by the project, and the project's Placita Reservoir would reduce snowmelt flood damages on the Crystal River.

The total cost of the West Divide project is estimated to be $99,800,000, and the ratio of total project benefits to costs is 1.98 to 1 over a 100-year period of analysis. The ratio of direct benefits to the cost is 1.16 to 1.

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The San Miguel project is in Montrose and San Miguel Counties in southwestern Colorado. The project would develop the flows of the San Miguel River to irrigate about 38,900 acres of land, of which 26,400 acres would receive full irrigation supplies and 12,500 acres would receive supplemental supplies, and to provide 44,000 acre-feet annually of municipal and industrial water supplies. It would also provide flood control, recreation, and fish and wildlife enhancement benefits.

Mining is the chief source of income in the project area, with agriculture second in importance. Mining actively has fallen off in recent years and an expansion of the agricultural base is urgently needed to offset the depressing effect on the general economy of the area. The project development would create new settlement opportunities and increased employment on existing farms and in related service industries.

The project would also provide water supplies for potential industrial and associated municipal expansion in the area. Interest has been evidenced in the development of coal resources near Nucla for the expansion of existing thermal-electric generating facilities. Other potential industrial uses are for pulp mills to utilize nearby timber resources and the development of the area's potash reserves. A dependable water supply would be basic to the realization of any of these possibilities.

The growth of tourism in the area is creating a need for water-based recreation and fishing, which will be provided by the development. Damaging spring flows of the San Miguel River would also be reduced by the project.

The total cost of the San Miguel project is estimated to be $67,815,000, and the ratio of project benefits to costs is 1.52 to 1 over a 100-year period of analysis. The ratio of direct benefits to the cost is 0.89 to 1.

The costs allocated to municipal and industrial water supply for each of these five projects as a minimum would be repaid with interest by the water users. The cost associated with recreation and fish and wildlife enhancement would be shared by non-Federal public bodies, where applicable under the provisions of the Federal Water Project Recreation Act, and the necessary expressions of intent to participate in such costs have been obtained. The costs allocated to flood control would be nonreimbursable.

The irrigation water users would repay their annual operation and maintenance cost and that portion of the construction costs allocated to irrigation which are determined to be within their repayment capacity. We have determined that, considering all previously authorized projects, apportioned revenues from the Colorado River storage project will become available in amounts, and at the times required by the Colorado storage project authorization to provide the necessary assistance in repaying the remaining costs allocated to irrigation for each of the projects.

Our estimates of the depletions of the Colorado River's flows for these proposed projects indicate that the total depletions for them, taking into account all existing and committed uses, are within the assured amounts available for use by Colorado under its entitlement

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to upper basin water and, in the case of the Animas-La Plata project, by New Mexico.

I would like to comment briefly regarding certain aspects of section 501 of Committee Print No. 19 respecting the Animas-La Plata project and the four Colorado projects.

Subsection (b) of section 501 would prohibit construction of the Animas-La Plata project until the Governors of Colorado and New Mexico had certified "in a manner acceptable to the Secretary" that their States had agreed upon mutually satisfactory project operating principles and conditions.

The Animas-La Plata project involved both Colorado and New Mexico. Project operations should, of course, be conducted in such manner that the apportionments of Colorado River system water to each State made by the Upper Colorado River compact are respected. That objective would appear to be met, however, by other provisions in the proposed legislation. Section 604(a) of Committee Print 19 and section 502(b) of H.R. 4671, as originally introduced, both require the Secretary to comply with the provisions of the Upper Colorado River Basin compact.

In any event, we construe section 501(b) to require a three-way agreement among the two States and the Secretary upon operating principles and conditions as a prerequisite to the initiation of construction. Assuming that the project is authorized and remains subject to the requirement, in reviewing any operating principles and conditions as the States might agree upon, the Department would want to be satisfied before it could give its approval that the project objectives could be attained.

Section 501(d) of Committee Print No. 19 relates only to projects entirely within and for the benefit of the State of Colorado. That is to say, it would relate to the Dolores, Dallas Creek, San Miguel, and West Divide projects, if authorized, and to other participating projects under the Colorado River Storage Project Act solely within and for the benefit of the State of Colorado. It would do two things: First, it would require the Secretary to comply with the laws of Colorado relating to priority of appropriations, and with Federal and State court decrees entered pursuant to such laws, in the diversion and storage of water for these projects. Second, it would require the Secretary to comply with operating principles, if any, adopted by the Secretary and approved by the State of Colorado.

The first provision appears to us to mean that the diversion and storage of water for these projects would be junior to theretofore existing rights as established or adjudicated in accordance with Colorado law. That being the case, it does no more than reiterate what is required by section 8 of the Reclamation Act of June 17, 1902.

Since the Secretary is, by section 8 of the 1902 act, bound to respect prior uses established in accordance with State law, or to acquire such uses by the payment of just compensation, and since he is required to comply with the Upper Colorado River Basin compact, the purpose to be served by the reference in section 501(d) to operating principles is not clear.

These intrastate Colorado projects present no unique operating or water right problems. They would not involve interstate operations as

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would the Animas-La Plata project. Nor would they involve transbasin diversions as do the Fringpan-Arkansas and Colorado-Big Thompson projects as to both of which the Congress did impose a requirement for operation in compliance with operating principles. In the case of those two projects, however, the operating principles specified by Congress had been developed and were known in advance of the legislation. Finally, we observe that agreement upon operating principles would be required under section 501(d) only in those cases in which the Secretary concludes that such principles should be formulated.

Section 601 would direct the Secretary of the Interior, in consultation with the official representatives of each of the seven Colorado River Basin States and with affected contractual interests, to promulgate equitable criteria for the coordinated long-range operation of reservoirs constructed under the authority of the proposed act, the Colorado River Storage Project Act, and the Boulder Canyon Project Act. It sets forth the broad objective to be attained by such criteria and it outlines in broad terms guiding policies to be followed. That portion of section 601, beginning with the word "Provided" on line 22, page 54, through line 6, page 55, sets forth more specific and detailed provisions to be incorporated in the criteria.

Section 601(a) directing the Secretary to promulgate equitable criteria is clear. In promulgating equitable criteria for the coordinated operation of reservoirs, such criteria, as we interpret this subsection, will cover all aspects of reservoir operation, including water supply, power, flood control, and others, for which the reservoirs were constructed.

Under 601(a), the criteria would become effective upon enactment of the bill. To the extent that we can foresee, reservoir operations under section 601 would not be inconsistent with reservoir operations permitted under the Glen Canyon filling criteria promulgated by the Secretary of the Interior on July 19, 1962. Thus the filling criteria would continue until terminated at some later date. We anticipate there would be no change in the manner of determining deficiencies in Hoover generation during the remainder of the filling period, but that the matter of payments for such deficiencies would be governed by section 502 of the bill.

Section 601(b) contains at the outset a clear statement that the "criteria shall have as their objective the assurance, so far as practicable, to each basin, of the availability of water in sufficient quantities to supply the consumptive uses apportioned to the upper basin and the lower basin, respectively, by the Colorado River compact." The remainder of section 601(b) contains both broad guidelines and specific provisions to be followed in developing the criteria, some of which are quite technical in nature.

The reservoir operating criteria upon which our previous analyses of the Colorado River Basin project were based match quite closely the guidelines laid down in section 601. Nevertheless, we reran our basic hydrologic studies following the rules established in section 601. The resulting differences were so small that, considering the limits of overall accuracy of any study involving hydrologic projections, we did not feel justified in changing our basic hydrologic or economic studies.

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In addition, the differences were on the conservative side, in that they resulted in a slightly greater availability of usable water through a slight reduction in reservoir spills. Thus, we believe the criteria are reasonable and workable and will not give rise to unusual problems of reservoir operation.

Section 601(c) simply makes clear that section 7 of the Colorado River Storage Project Act shall be administered in accordance with the criteria. We can see no objection to this provision.

I offer for the record as an extension of these comments a more detailed and more techical analysis of section 601.

Thank you very much, Mr. Chairman.

Mr. ROGERS of Texas. Without objection, the additional information on the projects and the analysis of section 601 will be included as part of your statement, Mr. Dominy.

(The material above referred to, follows:)

ATTACHMENT 1

ANIMAS-LA PLATA PROJECT

The Animas-La Plata Project is a potential multipurpose participating project of the Colorado River Storage Project located in southwestern Colorado and northwestern New Mexico.

The Animas and La Plata Rivers originate in Colorado and flow southward in parallel courses to the San Juan River in New Mexico. The San Juan River is a tributary of the Colorado River. The Animas River, with a larger and higher drainage area than the La Plata River, has the greater flow. The limited areas of irrigable land in the Animas River Basin are already developed as far as practical, however, while large land areas in the La Plata River Basin are in need of water. Needs for additional water for municipal and industrial use are developing in both of the river basins.

PROJECT PLAN

The Animas-La Plata Project would provide storage regulation of Animas River flows, use of part of the water for municipal and industrial purposes in the Animas and San Juan River Basins, and a diversion of water to the La Plata River Basin for irrigation, municipal, and industrial use. Facilities are planned in the La Plata River Basin to further develop local water resources and distribute both the local and imported water supplies to places of use. By replacing some water now diverted from the Florida River for municipal use at Durango, Colorado, the project would increase the irrigation water supply and the irrigable area for the recently constructed Florida Reclamation project. Sport fishery and wildlife benefits would be provided at each of the five project reservoirs.

The Animas-La Plata Project would provide an average of 188,900 acre-feet of water annually for irrigation and 76,200 acre-feet for municipal and industrial use. An irrigable area of 93,850 acres would be served directly by the project, including 47,630 acres that would receive a full water supply and 46,220 acres that would receive supplemental water. A total of 72,120 acres (46,520 full service and 25,600 supplemental service) would be located in the Animas-La Plata Project area. The Florida River exchange would permit an expansion of the Florida Project area by 2,280 acres, including 1,110 acres of full irrigation service land and 1,170 acres of supplemental service land, and a small amount of additional water would be provided for the 19,450 acres in the basic Florida Project plan. About 7,520 acres of land in the Animas-La Plata Project area and 2,000 acres in Florida Project area are Indian-owned.

Municipal water and industrial water totaling 76,200 acre-feet provided by the Animas-La Plata Project would be used at a number of communities along the Animas and San Juan Rivers, including Durango, Colorado, and Aztec, Farmington, and other communities in New Mexico. Industrial water uses would include large coal-fueled powerplants that would utilize the extensive and easily mined coal deposits on lands in the Ute Mountain and Southern Ute Indian Reservations.

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PROJECT ADMINISTRATION

Two existing conservancy districts—the La Plata Water Conservancy District in Colorado and the La Plata Conservancy District in New Mexico—are expected to serve as administrative and contracting agencies for the Animas-La Plata Project with suitable arrangements with Indian interests. The boundaries of each district would be expanded to include all areas and communities that would be served by the project. The Florida Project would continue to be administered by the Florida Water Conservancy District. The potential Howardsville and Animas Mountain Reservoirs would be partly within the San Juan National Forest and it is recommended that the forest boundaries be extended to include the entire reservoirs. Recreational facilities at these reservoirs would then be provided and administered by the Forest Service. The State of Colorado has expressed a willingness to share the cost of and administer the recreational facilities at other project reservoirs in Colorado. It is probable that these functions will be assumed by the Indians for the Three Buttes and Ute Meadows Reservoirs which would be on Indian-owned land.

STREAM DEPLETION

The Animas-La Plata Project would deplete the flow of the Colorado River by an average of 146,400 acre-feet annually of which 112,300 acre-feet would be chargeable to Colorado and 34,000 acre-feet to New Mexico. These depletions are within the water allocations to the respective States under the Colorado River Basin and Upper Colorado River Basin Compacts, after allowance is made for present depletions and those of authorized reclamation projects and those projects presently under consideration for authorization.

SIZE OF FARM

Successful farms in single ownership on the Animas-La Plata Project would require different farm acreages, depending on the class of land and the growing season. In some instances a farm may require more than 160 acres. Special legislation would be required to permit delivery of project water to 160 acres in single ownership of Class 1 land or the equivalent, as determined by the Secretary, of land in lower classes.

COSTS AND REPAYMENT

Project construction costs are estimated at $109,493,000 on the basis of January 1966 prices. Operation, maintenance, and replacement costs are estimated at $320,000 annually on the basis of 1963–65 prices. The estimates include costs of recreational facilities at each of the project reservoirs. This includes about $870,000 of preauthorization investigation costs funded from contributions and from the Colorado River Development Fund.

Of the total project construction cost, $78,971,000 are allocated to irrigation, and $27,848,000 to municipal and industrial water and are reimbursable. Of the allocation of $2,674,000 to recreation and fish and wildlife enhancement, $264,000 will be repaid with interest by non-Federal public bodies as required by the Federal Water Project Recreation Act.

Irrigation water users would pay the annual operation, maintenance, and replacement cost of $235,000 allocated to irrigation. The construction costs of $78,971,000 allocated to irrigation would be repaid on an interest-free basis within 50 years following a suitable development period as follows: By the water users, $11,560,000, with $1,310,000 being deferred under the Leavitt Act of July 1, 1932; by ad valorem tax revenues, $7,737,000; by apportioned revenues from the Colorado River Storage Project, $59,029,000; and by prepayment of $645,000 of contributions and Colorado River Development Fund expenditures. Assuming prior repayment assistance commitments in Colorado (Paonia, Smith Fork, Florida, Silt, Bostwick Park, Fruitland Mesa, and Savery-Pot Hook Projects) and in New Mexico (Hammond and San Juan-Chama) which have all been authorized as praticipating projects, it has been determined that revenues would become available as needed in both States to complete repayment in 50 years.

Of the costs allocated ($27,848,000) to municipal and industrial water supply, $225,600 are associated with prepaid investigation costs financed from contri-

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butions and the Colorado River Development Fund. The municipal and industrial water users would repay the remaining costs ($27,623,000) with interest tentatively computed at a cost of 3.222 percent, as well as $1,898,000 in interest during construction within a 50-year period or with permissible deferments under the Water Supply Act of 1958, as amended, if desired by the water users. The water users would also pay all associated operation, maintenance, and replacement costs of $36,000.

One-half of the separable project costs for recreation and fish and wildlife enhancement facilities located outside the boundaries of the National Forest amounting to $265,500, including $1,500 of interest during construction, will be paid by the State of Colorado, the Southern Ute Tribe, and the Ute Mountain Tribe, according to the provisions of the Federal Water Project Recreation Act (P.L. 89–72). All of the associated operation, maintenance, and replacement costs would be paid by such non-Federal public bodies. A letter dated February 21, 1966, from the Governor of Colorado expressing the intent of the State to agree to administer and to share in the costs of the recreation and fish and wildlife enhancement facilities has been received. A similar letter dated March 14, 1966, from the General Council of the Ute Mountain Tribe has also been received. Such a letter has not yet been received from the Southern Ute Tribe, but if the Southern Ute Tribe does not desire to share in costs, the State of Colorado will be willing to accept this obligation.

ECONOMIC JUSTIFICATION

The benefits of the project are estimated to total $7,600,000 annually (irrigation, $5,541,000; municipal and industrial water supply, $1,840,000; fish and wildlife enhancement, $52,000; outdoor recreation, $132,000; and area redevelopment, $35,000). An economic evaluation of the potential development over a 100-year period of analysis, using 3⅛ percent interest, indicates that the total annual benefits of the project would exceed the average annual equivalent cost in the ratio of 1.73 to 1.00. The ratio of direct benefits to costs is evaluated to be 1.11 to 1.00.

ATTACHMENT 2

DOLORES PROJECT

The Dolores Project is a potential multiple-purpose development for use of water of the Dolores River in Dolores and Montezuma Counties of southwestern Colorado, just east of the Utah-Colorado State line. The project is planned primarily to provide new and supplemental irrigation of agricultural lands and to increase the municipal and industrial water supply primarily for the communities of Cortez and Dove Creek. Important benefits also would be realized for recreation, fish and wildlife conservation, flood control, water quality, and area redevelopment.

Additional irrigation supplies are urgently needed in the project area to stabilize and expand agricultural development. On lands now irrigated, water shortages occur almost every year. Annual shortages average nearly 20 percent of requirements, and in extreme drouth years shortages have been in excess of 60 percent. Lands for which no irrigation supplies are available are dry farmed but produce only a part of their full potential because of the farmers' dependence on rainfall for moisture. In years of adequate rainfall, yields are good and the farmers prosper; yet in years of drouth, which frequently occur, the lands produce barely enough to offset farming expenses. Other lands, particularly those on the Ute Mountain Indian Reservation, are barren or covered with sagebrush and are usable only for sparse grazing. As a result, livestock feeds must be imported from adjacent areas.

Communities in the project area, particularly Dove Creek and Cortez, anticipate a need for additional water for future growth. Dove Creek's present supply is costly because of high-head pumping involved in diverting water from the Dolores River, and any deevlopment of additional supplies without project development would be equally expensive. Without the Dolores Project it will be necessary for Cortez to acquire water which is currently used for irrigation and to construct storage facilities. Not only would such action be costly to the city but it would take valuable agricultural land out of production.

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PROJECT PLAN

A total water supply of 126,900 acre-feet annually would be made available with project development. Approximately 120,800 acre-feet of this supply would be provided for irrigation on 61,00 acres of land, including 32,340 acres not presently irrigated and 28,660 acres in need of supplemental supplies. Approximately 1,500 acres of the full service lands are Indian lands in the Ute Mountain Indian Reservation. Municipal and industrial water supplies would be increased by an average of 6,100 acre-feet annually, including 1,200 acre-feet for Dove Creek and 4,900 acre-feet for Cortez. The supplies would provide for future growth in both cities and would completely replace the existing costly pumped supply of Dove Creek.

The entire water supply for the project would be obtained from the Dolores River. Primary regulation for the river runoff would be provided at the 364,000-acre-foot McPhee Reservoir. Supplementary storage would be provided at three small terminal reservoirs along the project canal lines, including the 4,300-acre-foot Cahone Reservoir, 16,400-acre-foot Ruin Canyon Reservoir, and the 5,040-acre-foot Monument Creek Reservoir. The main facility for distribution of project water would be the 68-mile-long Dove Creek Canal that would convey water northwestward from McPhee Reservoir at Great Cut Dike. The Dove Creek Canal would have two main branch canals—the Great Cut Canal and the South Canal. Other major canal, including the Cahone and Hovenweep, would head at the terminal reservoirs. Laterals and drains would be constructed as needed on full service lands of the projects. The Montezuma Valley Irrigation Company, which presently serves the supplemental lands, has indicated to the Bureau of Reclamation that it is interested only in purchasing a supplemental water supply from the project.

Municipal water supplies for Cortez would be delivered to the city's supply line through project and existing works. Dove Creek would obtain its municipal supplies directly from Monument Creek Reservoir. It would be necessary for the town to construct a small treatment and pumping plant at the reservoir and a connecting pipeline to existing facilities. The quality of water for both Cortez and Dove Creek is expected to be improved with project development as water hardness would be reduced as a result of project storage.

Recreation developments are expected to be provided at all the project reservoirs. The project would create several good fishing reservoirs in an area now relatively devoid of significant fishery resources. Project funds would be provided for improvement of big game range to mitigate big game losses that would otherwise be incurred by the project.

Snowmelt floods which presently cause considerable damage along the Dolores River would be reduced. Conservation storage in McPhee Reservoir would be evacuated for control of the floods as the need was indicated by snow survey forecasts.

Studies have shown that development of the Dolores Project would be possible if the Montezuma Valley Irrigation Company used only about 615.5 second-feet of water under its existing direct flow rights to the Dolores River, with no more than 31,000 acre-feet of this amount diverted from the river during the period October 16 of one year through May 31 of the succeeding year. The irrigation company has indicated its willingness to accept such a limitation in order to permit project development although it has conditional rights to substantially greater use. At a meeting on October 9, 1962, the Irrigation Company's Board of Directors voted as being in general accord with the project plan.

PROJECT ADMINISTRATION

The Dolores Water Conservancy District would be the general administrative and contracting agency for the project. The McPhee Reservoir is partly within the San Juan National Forest. It is recommended that the forest boundaries be extended to include the entire reservoir area and all recreation development at the reservoir be operated by the Forest Service. The State of Colorado has indicated its intent to administer other project land and water areas for recreation and fish and wildlife enhancement and to pay the portion of the costs for these purposes that would be riembursable under the Federal Water Project Recreation Act of July 9, 1965.

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STREAM DEPLETION

The Dolores Project would deplete the flow of the Colorado River by an estimated average of 87,300 acre-feet annually. This depletion would be within the apportionment of water made to Colorado by the Upper Colorado River Basin Compact and remaining for use of the State after allowance is made for present depletions and those of authorized reclamation projects and those currently under consideration for authorization.

SIZE OF FARMS

At the time investigations were made for the Dolores Project, farm income objectives were less than those utilized in current studies. It is anticipated that new studies based on current farm objectives will show that successful farms will require 160 acres or less of Class 1 land but larger acreages of lands in lower classes. Accordingly, it would be desirable for the project authorizing legislation to provide for delivery of water to 160 acres of Class 1 land or the equivalent, as determined by the Secretary, of land in lower classes.

COST AND REPAYMENT

Project construction costs are estimated at $46,643,300 on the basis of January 1962 prices and operation, maintenance, and replacement costs at an average of $175,900 annually on the basis of 1958–60 prices. The construction costs include all costs of recreation facilities except for $761,000 of recreation developments at McPhee Reservoir which are within the forest boundaries to be financed by the Forest Service through its own appropriations.

The project costs have been allocated to the various project purposes. The reimbursable construction costs, amounting to nearly 90 percent of the total, would include costs allocated to irrigation of $38,578,000; municipal and industrial use, $1,992,500; improvement of water quality, $184,200; recreation and fish and wildlife enhancement, $4,907,400; flood control, $473,600; and nonreimbursable investigation costs of $507,300.

Irrigation water users would pay operation, maintenance, and replacement costs of $127,000 allocated to irrigation. Construction costs allocated to irrigation would be repaid without interest within a 50-year period, following a suitable development period, by payments of $6,500,000 by the farmers; ad valorem taxes levied by the Dolores Water Conservancy District, $1,424,600; and revenues from the Colorado River Storage Project apportioned to the State of Colorado, $30,353,400. Irrigation payments of $300,000 by Indians would be deferred, however, under provisions of the Leavitt Act of July 1, 1932. Apportioned revenues from the storage project required for the Dolores Project, assuming prior repayment assistance commitments in Colorado for Paonia, Smith Fork, Florida, Silt, Bostwick Park, Fruitland Mesa, Savery-Pot Hook, and the Animas-La Plata Projects, which have been authorized or are being considered for authorization as participating projects, would become available as needed to complete repayment in 50 years.

The municipal and industrial water users would pay $3,000 annual operation, maintenance, and replacement costs and would repay the construction costs allocated to municipal and industrial water and improved water quality, including interest during construction, with interest at a rate to be certified as of the year in which project construction is initiated. Interest during construction in the amount of $160,500 and repayment in current studies were based on a rate of 3.222 percent.

Non-Federal interests would repay with interest $582,300 of project costs plus $34,000 in interest during construction allocated to recreation and fish and wildlife enhancement under provisions of the Federal Water Project Recreation Act. As previously stated, the State of Colorado has indicated its intent to be responsible for repayment of these costs plus $15,000 associated operation, maintenance and replacement costs.

Costs allocated to flood control ($473,600) and remaining costs allocated to recreation and fish and wildlife enhancement ($4,325,100) plus associated operation, maintenance, and replacement costs of $30,900 would be nonreimbursable.

ECONOMIC JUSTIFICATION

The project would be economically justified. The ratio of total benefits to average annual equivalent costs is estimated at 1.96 to 1.00. Benefits would

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amount to an average of $3,838,600 annually, of which $3,365,200 would stem from irrigation. The remaining benefits would be realized from municipal and industrial water, $178,700; improved water quality, $8,300; fish and wildlife enhancement, $61,800; recreation, $188,700; flood control, $22,000; and area redevelopment, $13,900. The ratio direct benefits to costs is estimated to be 1.07 to 1.00.

ATTACHMENT 3

DALLAS CREEK PROJECT

The Dallas Creek Project is a potential multiple-purpose water resource development in Delta, Montrose, and Ouray Counties in the Uncompahgre River Basin in west-central Colorado. The project will provide irrigating, municipal, and industrial water supplies, recreation opportunities, fish and wildlife benefits, and flood control.

The project irrigation water supplies are urgently needed to relieve serious water shortages that now plague farmers in the project area. At the present time late-season water shortages commonly result in crop losses. On presently irrigated lands, water shortages average about 21 percent of requirements and in extreme drouth years range up to 27 percent. Dryland farming is practiced to a limited extent but results are uncertain. Large acreages of land once cleared for dry farming at considerable expense are no longer farmed because of frequent crop failures due primarily to insufficient rainfall. Decreases in grazing privileges on public lands in recent years have adversely affected some livestock operations and increased the need for more farm-grown feed. Many of the farmers have depressed living standards because of limited agricultural production.

Additional municipal and industrial water is needed to meet existing and anticipated needs of local communities and to provide a safe and convenient supply for surrounding rural areas. The need for additional water in the communities is accentuated by the population growth anticipated in the years ahead. Substantial population increases are expected as a result of the increasing popularity of the surrounding area for vacationers and the impact of activities at the nearby Curecanti Unit of the Colorado River Storage Project and at the power operations center for the storage project at Montrose. Also, population growth will be stimulated by a petro-chemical and steam-power enterprise planned in the region by the Pittsburgh and Midway Coal Mining Company. Development of the Dallas Creek Project itself, if authorized for construction, would increase agriculture and would improve recreation and fish and wildlife attractions, further stimulating growth of the general area. The present water supply for rural areas surrounding the communities is inadequate nad in many cases unsafe. Most of the rural residents must haul their water from nearby communities or from streams and canals and store it in cisterns. Much of the water for domestic purposes is used without treatment. Cisterns often are not properly built and maintained and present a continual health hazard. Despite high operation costs, irrigation canals must be operated in the winter to provide water for livestock. The municipal and industrial water supply needed for the area would be developed as part of the project development, and treatment and distribution of the water would be handled by the Tri-County Water Conservancy District.

Local residents, western slope interests in Colorado, and State officials have long urged the development of the Dallas Creek Project as a means of utilizing undeveloped land and water resources in the Uncompahgre River Basin. Almost without exception, the farmers in the area have expressed support of the project and a desire to subscribe for additional water.

PROJECT PLAN

Under the potential plan for development, irrigation water supplies would be increased by an average of 60,300 acre-feet annually for the service of 23,620 acres, including supplemental service of 8,720 acres of presently irrigated land now having inadequate supplies and for full service of 14,900 acres of land not now irrigated. An average of 15,000 acre-feet of municipal and industrial water also would be provided each year for the communities of Olathe, Montrose, Delta, and surrounding rural areas.

Storage would be provided in three project reservoirs which, in order of their size, would include the 146,500-acre-foot Ridgway Reservoir on Uncompahgre

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River and Dallas Creek, the 17,600-acre-foot Dallas Divide Reservoir on Pleasant Valley Creek, and the 825-acre-foot Sneva Reservoir offstream from Cow Creek. The water supply at Ridgway Reservoir would be supplemented by water diverted from Cow Creek by the Cow Creek Feeder Canal, and the supply at Dallas Divide Reservoir would be supplemented by water from the East and West Forks of Dallas Creek that would be diverted by the Dallas Creek Feeder Canal. The entire water supply for the Sneva Reservoir would be supplied by feeder canal from Cow Creek.

Irrigation releases from Ridgway Reservoir would be pumped up 465 feet by the Ridgway Pumping Plant to the McKenzie Canal for distribution to project lands. The project municipal and industrial water supply, all from Ridgway Reservoir, would be delivered to the Tri-County Water Conservancy District on the Uncompahgre River below Ridgway Pumping Plant. Water from the Dallas Divide Reservoir would be distributed to project lands through the Log Hill Mesa Canal which would divert from the reservoir outlet and through the Pleasant Valley Canal which would divert from the stream channel below the reservoir. Water from Sneva Reservoir would be conveyed by the potential Sneva Outlet Canal to a stream channel and then distributed to project lands by existing ditches diverting from the channel. Project laterals and drains would be constructed as neded for efficient irrigation. The Tri-County Water Conservancy District would be responsible for treatment of the municipal and industrial water supply and delivery of that water to the water users.

The town of Ridgway would be flooded by Ridgway Reservoir. Ridgway is a small agricultural community with a gradually declining population that presently numbers about 250. The project plan provides for residents of the town to be paid for the value of their land and facilities. The residents of the town recently passed a resolution favoring development of the Dallas Creek Project as planned. The resolution provided that residents so wishing could move elsewhere and others that desired would jointly and cooperatively reestablish the town.

Recreation development would be provided at all three of the project reservoirs. Specific measures would be taken for fish and wildlife, including acquisition of public access easements along the Uncompahgre River, control of nongame fish in streams tributary to Ridgway Reservoir, development of a 1,900-acre game management area, and development of a 1,000-acre waterfowl production area at Ridgway Reservoir. Streamflows also would be maintained for fish so far as compatible with other project purposes.

Conservation storage in Ridgway Reservoir would be evacuated for control of snowmelt floods as the need was indicated by forecasts.

PROJECT ADMINISTRATION

The Tri-County Water Conservancy District would serve as the general administrative and contracting agency for project reclamation and joint-use facilities. The Bureau of Sport Fisheries and Wildlife would operate the waterfowl production area at Ridgway Reservoir. The State of Colorado has indicated its intent to administer other project land and water areas for recreation and fish and wildlife enhancement and to pay the portion of the costs of these purposes that would be reimbursable under the Federal Water Project Recreation Act of July 9, 1965.

STREAM DEPLETION

The Dallas Creek Project would deplete the flow of the Colorado River by an average of 37,000 acre-feet annually. This depletion would be within the apportionment of water made to Colorado by the Upper Colorado River Basin Compact and remaining for use of the State after allowance is made for present depletions and those of authorized reclamation projects and those presently being considered for authorization.

SIZE OF FARMS

A farm on the Dallas Creek Project is expected to require approximately 155 acres of Class 1 land in single ownership or its equivalent of land in lower classes in order to provide an adequate level of living for the farm family and permit reasonable payments on project costs. Therefore, it would be desirable

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for the project authorizing legislation to provide for delivery of water to 160 acres of Class 1 land or the equivalent, as determined by the Secretary, of land in lower classes.

COSTS AND REPAYMENT

The total construction cost of the proposed Dallas Creek Project is estimated to be $37,687,000, based on January 1964 prices. This includes $678,000 of preauthorization investigation costs, of which $336,000 were financed from the Colorado River Development Fund and are not reimbursable by the project. It also includes $520,000 of nonreimbursable costs of relocating roads to current standards in excess of costs for replacement to existing conditions. Annual operation, maintenance, and replacement costs of the project are estimated to be $174,200.

Of the total project construction cost, $26,881,000 are allocated to irrigation, $4,620,000 to municipal and industrial water supply, $3,840,900 to recreation, $1,260,600 to fish and wildlife enhancement, and $228,500 to flood control. These allocations exclude project costs of $336,000 nonreimbursable investigation costs funded from the Colorado River Development Fund and $520,000 of incremental costs to construct relocated highways to current standards which are nonreimbursable by law.

Irrigation water users would pay their annual operation, maintenance, and replacements costs, which are estimated to be $72,100. The construction costs allocated to irrigation ($26,881,000) would be interest-free and would be repaid in 50 years following development periods of 10 years for full service and 3 years for supplemental service lands from the following sources: water users, $3,195,000; ad valorem taxes, $2,496,000; and apportioned revenues from the Colorado River Storage Project, $21,190,000.

Assuming prior repayment assistance commitments in Colorado for the Paonia, Smith Fork, Florida, Silt, Bostwick Park, Fruitland Mesa, and Savery-Pot Hook Projects which are either constructed, under construction, or authorized participating projects, and with allowance for prior repayment assistance for the Animas-La Plata and Dolores Projects which have been, or are being, considered for authorization as participating projects, it has been determined that revenues would become available as needed to complete repayment in 50 years.

The municipal and industrial water users would repay the costs ($4,620,000) allocated to that purpose with interest, including interest during construction, as well as all annual operation, maintenance, and replacement costs for that purpose, which are estimated to be $6,800. The allocated construction costs would be repaid in 50 years with the exception of the prorated costs for 4,000 acre-feet of water supply for which repayment is deferred 10 years under the provisions of the Water Supply Act of 1958, as amended. The interest during construction on municipal and industrial water supply is estimated to be $290,400 at 3.222 percent current interest rate. The actual rate of interest to be used, however, would depend on the rate certified by the Secretary of the Treasury, as applicable in the fiscal year in which construction is initiated, as provided by the Colorado River Storage Project Act, as amended by the Act of June 27, 1960 (74 Stat. 225).

The separable costs of the project allocated to recreation ($1,091,000) and fish and wildlife enhancement ($308,000) would be shared between the Federal Government and the State of Colorado pursuant to the provisions of the Federal Water Project Recreation Act (P. L. 89–72). In addition to paying annually the reimbursable operation, maintenance, and replacement costs of $83,900 for recreation, the State of Colorado would repay, within 50 years, $8,000 of interest during construction and $699,500 of the separable project costs allocated to recreation and fish and wildlife enhancement. A copy of letter dated February 21, 1966, from the Governor of Colorado expressing the intent of the State to administer the project land and water areas for recreation and fish and wildlife enhancement and to share the separable costs thereof is included with the Regional Director's report (pages 69 and 70). The remaining costs allocated to fish and wildlife enhancement ($1,106,600) and recreation ($3,295,400) would be nonreimbursable. The costs allocated to flood control ($228,500) and for relocation of roads to current standards in excess of costs for replacement to existing conditions ($520,000) also would nonreimbursable. The operation, maintenance, and replacement costs associated therewith would be nonreimbursable.

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ECONOMIC JUSTIFICATION

The total benefits to be derived from the project are estimated to be $2,825,300 annually (irrigation, $1,982,700; municipal and industrial water supply, $420,700; recreation, $324,200; fish and wildlife, $80,700; and flood control, $17,000). An economic evaluation of this proposed development for a 100-year period of analysis, using an interest rate of 3⅛ percent, indicates that the estimated total annual benefits of the project would exceed the average annual equivalent cost in the ratio of 1.89 to 1.00. The ratio of direct benefits to cost is evaluated to be about 1.17 to 1.00.

ATTACHMENT 4

WEST DIVIDE PROJECT

The West Divide Project is a potential multipurpose water resource development in Garfield, Mesa, Pitkin, and Gunnison Counties in west-central Colorado. It is planned primarily to provide irrigation water to establize and expand agricultural development and to put in readiness municipal and industrial water supplies for processing plants and urban developments expected to be established in connection with the vast oil shale reserves nearby. The project also would provide benefits to recreation, fish and wildlife, and flood control.

Construction of the project for the multiple purposes it would serve has long been advocated by local residents, western slope interests in Colorado, State officials, and private industry. In view of the imminent development of an oil shale industry in the area, the project is now being particularly urged for the municipal and industrial water supply it would provide. The Roan Plateau on the northern border of the project contains some of the richest oil shale reserves in the world. Research by several major companies indicates that production of oil from the shale might soon be possible on large-scale commercial basis. Large-scale production will need substantial local municipal and industrial water supplies, part of which can be supplied by the West Divide Project.

In addition to the important requirement for municipal and industrial water, a great need exists for increased irrigation supplies. Because of the presently inadequate supplies, agricultural incomes in the project area are unstable and many farm operations are marginal. Less than half the arable lands are irrigated. Even lands with high priority water rights often have late-season water shortages, and lands with low priority water rights receive almost no irrigation water in drouth years. Annual shortages average about 55 percent of requirements and in extreme drouth years shortages for the overall area have been as high as 71 percent. Recent decreases in grazing permits on public lands have aggravated the agricultural problems and forced a number of farmers to reduce their livestock herds and sell or abandon their farms. An increased supply of irrigation water made dependable by reservoir storage, such as would be provided by the West Divide project, would alleviate the farm problems and provide a base for an expanded and more prosperous agriculture.

PROJECT PLAN

A total water supply of 193,100 acre-feet annually would be made available by the project at points of diversion. Under present plans approximately 115,600 acre-feet of this supply would be provided for irrigation on about 39,920 acres of land, including 18,890 acres not presently irrigated and 21,030 acres in need of supplemental supplies. The remaining 77,500 acre-feet of the project supply is planned for municipal and industrial use. This would include 34,500 acre-feet of high-quality water that would be diverted to the high bench areas south of the Colorado River and that would require a minimum of treatment for general use and 43,000 acre-feet of lower quality water released to the Colorado River that may require extensive treatment for unrestricted use.

Since it is impossible at this time to accurately forecast the extent and timing of industrial development and population growth in the project area, considerable flexibility has been incorporated in the project plan. If the municipal and industrial water demands develop more rapidly and in greater magnitude than presently anticipated, part of the project water allocated to irrigation could readily

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be converted to municipal and industrial use. Also, storage facilities could be added to the present project plan to increase the municipal and industrial water supplies. If the industrial development occurs at a slower pace than anticipated, project water allocated to municipal and industrial use could be beneficially used on arable land in the area not served by the present project plan.

Project water would be obtained from a series of Colorado River tributaries south of the river. Crystal River flows would be regulated at the 106,000-acre-foot Placita Reservoir. Some reservoir releases would be made directly to the river for downstream uses. Most of the releases, however, would be diverted into the Huntsman Canal and conveyed westward to West Divide Creek for subsequent distribution in the western portion of the project area by the East and West Divide Canals. The diverted flows would be supplemented by water stored in the 7,600-acre-foot Haystack Reservoir on small tributaries of West Divide Creek. Natural flows at Haystack Reservoir would be augmented by flows of nearby streams diverted by the Haystack Feeder Canal. Yank Creek Reservoir, with 9,200 acre-feet of capacity on North Thompson Creek, would provide irrigation and municipal water to the eastern portion of the project area. Releases from this reservoir would be distributed by the Fourmile Canal. Irrigation laterals would be constructed from the main project canals, and drains would be provided as needed. Facilities for reregulation, distribution, and treatment of the municipal and industrial supplies would be the responsibility of the water users. Firm expressions of interest have already been received from various oil companies and local communities for 55,400 acre-feet of the municipal and industrial water supply.

Recreation developments associated with the project would be constructed at the three project reservoir sites. These deevlopments would be provided by the Forest Service through its own appropriations since the reservoirs would be entirely within the White River National Forest.

Conditions for fish and upland game would be enhanced with project development. Snowmelt floods which presently cause damage on the Crystal River would be reduced. Conservation storage in Placita Reservoir would be evacuated for control of floods as the need was indicated by run-off forecasts.

PROJECT ADMINISTRATION

The West Divide Water Conservancy District would be the general administrative agency for the project features and would be the contracting agency between the Federal Government and the water users for the repayment of reimbursable project costs. The district would coordinate with the Forest Service and Colorado Department of Game, Fish, and Parks on operation of the reservoirs to assure optimum use of these facilities for water conservation, recreation, and fisheries. The Forest Service would assume responsibility for maintenance of the specific recreation facilities at the reservoirs.

The West Divide Water Conservancy District encompasses the agricultural lands of the project and some areas expected to receive municipal and industrial water. The present boundary, however, lies just outside some of the local communities expected to require project municipal and industrial water, including Carbondale, New Castle, Silt, Rifle, Grand Valley, and De Beque. It would be necessary for these towns to become part of the district when they receive project water.

STREAM DEPLETION

The West Divide Project would deplete the flow of the Colorado River by an average of 76,400 acre-feet annually. This depletion would be within the apportionment of water made to Colorado by the Upper Colorado River Basin Compact and remaining for use of the State after allowance is made for present depletions and those of authorized reclamation projects and those currently being considered for authorization.

SIZE OF FARM

In most of the West Divide Project areas, successful farms in single ownership would require 160 acres or less of irrigable land for successful operation and thus could comply with the acreage limitations for delivery of project water provided by existing reclamation law. Larger farms would be required to provide a satisfactory farm income, however, in an area along the eastern border of the project, designated as the Thompson area, which has more severe climatic conditions than the rest of the project. This area contains only Class 2 and 3 lands.

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Provision should be made in the authorizing legislation to permit delivery of water to more than 160 acres when the larger acreages are based on the equivalent of 160 acres of Class 1 land as determined by the Secretary of the Interior.

COSTS AND REPAYMENT

The total construction cost of the proposed West Divide Project is estimated to be $99,800,000, based on October 1965 prices. This includes $1,010,000 of pre-authorization investigation costs of which $255,000 were funded from the Colorado River Development Fund and are not reimbursable by the project. The total cost excludes $569,000 of construction costs for recreation facilities at project reservoirs, which are expected to be financed by the Forest Service from its own appropriations.

Annual operation, maintenance, and replacement costs of the project are estimated to be $93,500. Approximately $16,700 annually would also be required from Forest Service appropriations for operation and maintenance costs of recreation facilities within the national forests.

Of the total project construction cost, $68,328,400 are allocated to irrigation and $28,140,200 to municipal and industrial water and are reimbursable. The allocations of $1,738,000 to recreation, $1,278,100 to fish and wildlife enhancement, and $315,300 to flood control are nonreimbursable. There are no separable costs allocated to recreation and fish and wildlife enhancement that would be subject to cost sharing by non-Federal public bodies as required by the Federal Water Project Recreation Act. The operation, maintenance, and replacement costs specifically for, or allocated to, recreation ($1,800), fish and wildlife enhancement ($600), and flood control ($300) would be nonreimbursable.

The irrigation water users would pay their annual operation, maintenance, and replacement costs amounting to a total of $76,600. The construction costs allocated to irrigation would be interest-free and would be repaid in 50 years, exclusive of suitable development periods, from the following sources: water users ($11,770,000), ad valorem taxes ($4,958,500), apportioned revenues from the Colorado River Storage Project ($51,344,900), and credit for prepaid investigation costs funded from the Colorado River Development Fund ($255,000).

Assuming prior repayment assistance commitments in Colorado for the Paonia, Smith Fork, Florida, Silt, Bostwick Park, Fruitland Mesa, and Savery-Pot Hook Projects, which are authorized participating projects, and with allowance for prior repayment assistance for the Animas-La Plata, Dolores, and Dallas Creek Projects, which are being considered for authorization as participating projects, it has been determined that revenues would become available as needed to complete repayment in 50 years.

The municipal and industrial water users would repay the costs allocated to municipal and industrial water with interest, including interest during construction, as well as all annual operation, maintenance, and construction costs for that purpose, which are estimated to be $14,200. The repayment schedule is based upon development in three blocks, with payment on storage costs deferred in two of the blocks in accordance with provisions of the Water Supply Act of 1958, as amended. Repayment of the costs associated with each block would be made within 50 years from the related time of initial use of water.

The interest during construction on municipal and industrial water supply is estimated to be $2,024,300 at 3.222 percent current interest rate. The actual rate of interest to be used, however, would depend on the rate certified by the Secretary of the Treasury as applicable in the fiscal year in which construction is initiated, as provided by the Colorado River Storage Project Act, as amended by the Act of June 27, 1960 (74 Stat. 225).

ECONOMIC JUSTIFICATION

The project would be economically justified. An economic evaluation of this potential development for a 100-year period of analysis, using an interest rate of 3⅛ percent, indicates that the estimated total annual benefits of the project would exceed the average annual equivalent cost in the ratio of 1.98 to 1.00. The ratio of direct benefits to cost is evaluated to be 1.16 to 1.00. Benefits would amount to an average of $7,481,200 annually, including $5,260,100 in irrigation benefits, $1,979,100 in municipal and industrial water benefits, and $156,200 in recreation, $63,800 in fish and wildlife, and $22,000 in flood control benefits.

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ATTACHMENT 5

SAN MIGUEL PROJECT

The San Miguel Project in southwestern Colorado is a potential participating project of the Colorado River Storage Project. The project would provide irrigation water to stabilize and expand agriculture and municipal and industrial water for industrial growth expected in connection with development of the area's extensive coal and other mineral and forest resources. It would also benefit recreation, fish and wildlife conservation, and flood control.

Construction of the San Miguel Project is advocated by local residents, western slope interests in Colorado, and State officials. They see is as an essential step in transforming a lagging economy into an expanding one that will provide opportunities for more people through the development of valuable natural resources.

Reductions in recent years in the mining and milling of gold, silver, copper, lead, and zinc have had a depressing effect on the general economy of the project area. While metal mining activities have declined, favorable opportunities exist for offsetting developments and further economic progress in other mineral and forest resources and in agriculture, provided water is made available.

The large bituminous coal reserves in the vicinity of the project offer the greatest single base for an industrial development. A tentatively planned enlargement of a coal-fueled powerplant near Nucla will require about 15,000 acre-feet of additional water annually by 1975 or 1980. Potash deposits in Gypsum Valley adjacent to the San Miguel Project are attracting interest by prospective developers. The deposits are of the type that may be best adapted to solution mining which would require a considerable amount of water.

New agricultural development made possible by increased irrigation supplies are needed to create new settlement opportunities, more work on existing farms, and employment in related service industries. The population increase associated with the agricultural and industrial developments will call for an increase in municipal water supplies.

PROJECT PLAN

Flows of the San Miguel River would be regulated at the potential Saltado Reservoir with a capacity of 72,600 acre-feet. Water would be released into the river at the Saltado Dam for existing rights, for maintenance of the river fishery, and to provide part of the project needs for municipal and industrial purposes. The remainder of the project water would be released at the dam into the potential Norwood Canal and conveyed about 22 miles to a system of other canals and laterals in which it would be distributed for irrigation, municipal and industrial use, and fish and wildlife. The Naturita and Radium Reservoirs would be constructed in the project land area to stabilize the diverted flows. Existing reservoirs and distribution systems of private irrigation companies would be integrated in the project irrigation system and exchanges made between project and existing water supplies to obtain optimum use of the available water.

The project would provide an average of 77,800 acre-feet of water annually for the irrigation of 38,950 acres of land including 26,420 acres not presently irrigated and 12,530 acres in need of supplemental water. About 44,000 acre-feet of water annually would be made available for municipal and industrial use, and 500 acre-feet of water annually would be provided to maintain the fish and wildlife at the Radium-Stone Cabin Reservoir area. Recreation facilities would be provided at all three project reservoirs. The Saltado Reservoir, operated for flood control on the basis of runoff forecasts, would protect the downstream river channel against snowmelt-type floods.

PROJECT ADMINISTRATION

The San Miguel Water Conservancy District, organized in 1957, would serve as administrative and contracting agency for the project reclamation and joint-use facilities. Responsibility for the wildlife management area at Radium Reservoir is expected to be assumed by the Colorado Department of Game, Fish, and Parks, and responsibility for recreation is expected to be by the Bureau of Land Management. The State of Colorado has expressed its willingness to administer land and water areas developed for such fish and wildlife enhance-

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ment and bear an assigned portion of the project cost as required by the Federal Water Project Recreation Act of July 9, 1965.

STREAM DEPLETION

Development of the San Miguel Project would deplete the flow of the Colorado River by 85,000 acre-feet annually. This depletion would be within the water allocation to Colorado by the Colorado River Basin and Upper Colorado River Basin Compacts after allowance is made for present depletions and those of authorized reclamation projects and for projects presently being considered for authorization.

SIZE OF FARM

Successful farms in single ownership on the San Miguel Project will require different farm acreages, depending on the class of land and the growing season. Farms in the higher and shorter growing season areas may require more than 160 acres to provide a satisfactory farm income. Delivery of project water to more than 160 acres in single ownership when the larger acreages are based on the net farm income equivalent of 160 acres of Class 1 land should be permitted.

COST AND REPAYMENT

The total construction cost of the potential San Miguel Project is estimated to be $67,815,000, based on July 1965 prices. This includes $998,000 of pre-authorization investigation costs, of which $27,000 were contributed funds and $357,000 were financed from the Colorado River Development Fund and are not reimbursable by the project. Annual operation, maintenance, and replacement costs of the project are estimated to be $185,000.

Of the total project construction cost, $51,020,000 are allocated to irrigation, $11,415,000 to municipal and industrial water, $4,198,000 to recreation and fish and wildlife enhancement, and $1,182,000 to flood control.

Irrigation water users would pay their annual operation, maintenance, and construction costs, which are estimated to be $121,000. The construction costs allocated to irrigation ($51,020,000) would be interest-free and would be repaid in 50 years, following varying development periods of up to 10 years as necessary from the following sources: irrigation water users ($5,050,000), ad valorem taxes ($587,000), apportioned revenues from the Colorado River Storage Project ($45,068,000), and prepaid investigation costs from the Colorado River Development Fund and contributions ($315,000).

Assuming prior repayment assistance commitments in Colorado for the Paonia, Smith Fork, Florida, Silt, Bostwick Park, Fruitland Mesa, and Savery-Pot Hook Projects which are either constructed, under construction, or authorized participating projects, and with allowance for prior repayment assistance for the Animas-La Plata, Dolores, Dallas Creek, and West Divide Projects, which are being considered for authorization as participating projects, it has been determined that revenues would become available as needed to complete repayment in 50 years.

Of the costs allocated ($11,415,000) to municipal and industrial water supply, $69,000 are associated with prepaid investigation costs financed from contributions and the Colorado River Development Fund. The municipal and industrial water users would repay the remaining costs ($11,346,000) allocated to that purpose with interest, including interest during construction. Under provisions of the Water Supply Act of 1958, as amended, the costs would be repaid within 50 years after each block of water is first used. In addition, the water users would pay all annual operation, maintenance, and replacement costs for that purpose, which are estimated to be $26,000.

The interest during construction on municipal and industrial water is estimated to be $569,000 at 3.222 percent current interest rate. The actual rate of interest to be used, however, would depend on the rate certified by the Secretary of the Treasury as applicable in the fiscal year in which construction is initiated, as provided by the Colorado River Storage Project Act, as amended by the Act of June 27, 1960 (74 Stat. 225).

The separable project costs allocated to recreation and fish and wildlife enhancement will be nonreimbursable for those features operated by the Bureau of Land Management. Under the Federal Water Project Recreation Act (P.L. 89-72), in addition to operation, maintenance, and replacement costs, the State of Colorado would repay within 50 years with interest, including interest during

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construction, one-half the separable project costs allocated to fish and wildlife enhancement for features operated by the State. A letter dated February 21, 1966, from the Governor of Colorado, expressing the intent of the State to agree to administer and to share in the costs of the recreation and fish and wildlife enhancement facilities, has been received. The remaining project costs allocated to such fish and wildlife enhancement would be nonreimbursable. The cost allocated to flood control ($1,182,000) also would be nonreimbursable.

ECONOMIC JUSTIFICATION

The estimated total benefits for the project are 4,039,500 (irrigation, $2,954,000; municipal and industrial water supply, $790,000; fish and wildlife, $193,000; recreation, $40,000; and flood control, $62,000). An economic evaluation of this potential development for a 100-year period of analysis, using an interest rate of 3⅛ percent, indicates that the estimated total annual benefits of the project would exceed the average annual equivalent cost in the ratio of 1.52 to 1.00. The ratio of direct benefits to costs is evaluated to be 0.89 to 1.00.

ATTACHMENT 6

BUREAU OF RECLAMATION ANALYSIS OF SECTION 601 OF COMMITTEE PRINT NO. 19—RECOMMENDED REVISION OF H.R. 4671

Section 601 would direct the Secretary of the Interior, in consultation with the official representatives of each of the seven Colorado River Basin States and with affected contractual interests, to promulgate equitable criteria for the coordinated long-range operation of reservoirs constructed under the authority of the proposed act, the Colorado River Storage Project Act, and the Boulder Canyon Project Act. It sets forth the broad objectives to be attained by such criteria and, in that portion of Section 601 through line 21, page 54, it outlines in broad terms guiding policies to be followed. That portion of Section 601 beginning with the word "Provided" on line 22, page 54, through line 6, page 55, sets forth more specific and detailed provisions to be incorporated in the criteria.

We believe that that portion of Section 601 through Line 21 of page 54 is clearly stated. The intent of the broad guidelines presented therein is readily understandable and the effect of their application can be anticipated.

That portion of Section 601 beginning with the word "Provided" on line 22 of page 54 through line 6 of page 55 sets forth specific criteria that will apply to a myriad of conditions in the future. It is impossible to anticipate all of the combinations of hydrologic sequences and economic and financial factors that will occur in the future and to evaluate precisely the effect of applying rigid criteria under all such conditions. Strict adherence to these specific criteria under some future conditions might reqiure, temporarily, a reservoir operation which would not be the optimum operation, given those conditions. We believe, however, that such occasions would be rare, of a few months duration at the most, and of minor consequence.

Section 601(a) is clear. In promulgating equitable criteria for the coordinated operation of reservoirs, such criteria, as we interpret this subsection, will cover all aspects of reservoir operation, including water supply, power, flood control, and others, for which the reservoirs were constructed.

Under 601(a), the criteria would become effective upon enactment of the bill.

To the extent that we can foresee, reservoir operations under Section 601 would not be inconsistent with reservoir operations permitted under the Glen Canyon filling criteria promugated by the Secretary of the Interior as printed in the Federal Register on July 19, 1962 (27 F.R. 6851). Thus the filling criteria would continue until terminated at some later date. We anticipate there would be no change in the manner of determining deficiencies in Hoover generation during the remainder of the filling period, but that the matter of payments for such deficiencies would be governed by Section 502 of the bill. It is noted, however, that the filling criteria provide greater flexibility to the Secretary in reservoir operations than does Section 601 and this could result in an earlier termination of the filling criteria.

Section 601(b), lines 15 through 23, page 53, contains a clear, concise statement of objective.

Section 601(b) (1) and (2) are, we believe, self-explanatory.

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Section 601(b)(3), line 11 through line 21, provides that, after meeting the releases required under (1) and (2) preceding, priority shall be given to the storage of water in the storage units of the Colorado River Storage Project to the extent reasonably necessary, considering all relevant factors, to assure deliveries under subparagraphs (1) and (2) without impairment of the consumptive uses in the Upper Basin pursuant to the Colorado River Compact. We believe this to be consistent with the intent of the Colorado River Storage Project Act, and that the language provides the Secretary, after consultation with Basin interests, the necessary latitude in determining the extent of storage reasonably required. Among the relevant factors to be considered in making determinations, major emphasis certainly will be given to critical periods of streamflow record. As the Upper Basin depletions increase with time, the controlling critical periods will lengthen and the required amounts of carryover storage will increase. The establishment of requirements for carryover storage based on critical period considerations alone could lead to a risk of reservoir spills and wastage or overdelivery of water to Mexico. Therefore, it would be proper to consider also probabilities of water supply as provided in Section 601(b)(3). Also, the production of power and energy is a relevant factor that must be considered if the financial feasibility of Federal developments in the Colorado River Basin is to be reasonably assured.

The remainder of Section 601(b)(3) sets forth specific criteria for the distribution of water available in excess of that required for (1), (2), and the first part of (3), preceding. This is by far the most difficult portion of Section 601 to understand and evaluate. Before commenting specifically on the language involved, some general comments would appear appropriate.

During prolonged periods of low runoff, there would be no available excess water, and this latter portion of (3) would not apply. During prolonged periods of high runoff when excess water is available, the problems of reservoir operation are not critical and the application of this latter portion of (3) would not be of particular significance. Thus, it is only within the remaining ranges of runoff sequences that the criteria specified would be particularly meaningful. Furthermore, based on our projection of future Upper Basin depletions, the requirements for carryover storage in the Upper Basin reservoirs would, within 20 to 25 years, be such that only on rare occasions would there be available excess waters to which the criteria of the latter part of (3) would apply. Therefore, both the conditions and the period under which these criteria would have practical application would be much less than might appear on the surface.

The latter part of Section 601(b)(3) contains three specific operating criteria. It is not clear from the draft that the order of listing establishes a priority for their application. This might well be clarified, but as a practical matter it appears irrelevant.

The portion of the first listed criterion (i) through the word "compact" on line 1, page 55, provides that excess water available as defined above shall be released from Lake Powell to the extent it can be reasonably applied in the States of the lower division to the uses specified in Article III(e) of the Colorado River Compact. This appears to be consistent with Article III(e) of the Compact. The remainder of (i) modifies this criterion to the extent that no releases would be made when the active storage in Lake Powell is less than the active storage in Lake Mead. This modification has as its objective the equalizing of active storage in Lake Powell and Lake Mead and would establish the firm policy that water in Lake Powell not needed to meet the requirements of 601(b)(1), (2), and the first part of (3), would not be made available to meet Lower Basin consumptive uses when active storage in Lake Mead is greater than active storage in Lake Powell.

The second listed criterion (ii) has as its objective the distribution of available excess water in such manner as to equalize as nearly as practicable active storage in Lake Mead and Lake Powell. We believe the objective is reasonable and should be applied generally in the future. We can visualize conditions, however, where it would be desirable and to the advantage of all concerned to operate over a limited period of time in a manner different than that specified in (ii), particularly when both Lake Powell and Lake Mead have substantial reserves of storage. However, we do not regard this as serious.

The third listed criterion (iii) is obviously consistent with sound principles of reservoir operation.

Section 601(c) simply states that Section 7 of the Colorado River Storage Project Act shall be administered in accordance with the foregoing criteria. We can see no objection to this provision.

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Mr. ROGERS of Texas. General questioning will start at 2 o'clock this afternoon, and at that time, due to the fact that the freight car bill is before the House of Representatives, Mr. Aspinall, the gentleman from Colorado, chairman of the Full committee, will be presiding.

There is just one question I would like to ask Mr. Dominy, though, since I won't be here at that time.

On page 8 of your statement, down at the bottom, you say,

> We have determined that, considering our previously authorized projects, apportioned revenues from the Colorado River Storage Project will become available in amounts, and at the times required, to provide the necessary assistance in repaying the remaining costs allocated to irrigation for each of the projects.

Now, that is a general statement. Do you have that broken down in these projects matters as to when the pay-out period will start and what funds will be available?

Mr. DOMINY. Under the requirements of the Colorado Storage Project Act we make an annual accounting to Congress.

Mr. ROGERS of Texas. Yes. I understand.

Mr. DOMINY. We have studies showing the costs and returns projected. It is under this kind of projection that we can make the necessary finding. Were these projects to be authorized now and assuming a reasonable period for funding and construction, then within the 50-year pay-out period our estimates indicate there would be ample apportioned revenues available to Colorado to support these projects. We do have detailed projections that justify making this statement.

Mr. ROGERS of Texas. Well, what I am getting at is this, whether or not this is a loose statement, based upon estimates you are not too sure of or is it a statement that you think you can back up on basic, concrete evidence?

Mr. DOMINY. The economics——

Mr. ROGERS of Texas. As to past history, plus your more or less conservative potential of revenue production in the Colorado River Basin.

Mr. DOMINY. Yes. We think it is based on supportable and valid assumptions. As a matter of fact, we are forecasting power production based on low quartile water flow occurring for the next 8 years then followed by average flow.

Mr. ROGERS of Texas. Then you haven't had to strain to make this statement.

Mr. DOMINY. No, sir.

Mr. ROGERS of Texas. I just wanted to get that into the record.

Now, the subcommittee will stand adjourned until 2:00 p.m.

(Whereupon, at 12 o'clock noon, the above subcommittee adjourned, to reconvene at 2 p.m., this same day.)

AFTERNOON SESSION

Mr. ASPINALL. The subcommittee will now be in session.

The chairman of the subcommittee is detained over on the floor of the House on a matter of legislation, and he has asked the chairman of the full committee in his absence to preside.

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It will be necessary for this committee to adjourn at 4 o'clock this afternoon.

The figures would seem to indicate that there have been 12 individuals attending most of the time during these hearings. Two hours divided by 12 should give each one 10 minutes. Unless there is an objection, every member of the committee will be recognized for 10 minutes rather than 5 this afternoon, this because of the fact that the testimony now before us is extensive and important. Questioning for 5 minutes just about gives you time to get into the subject.

Mr. Holum, referring to your statement, you state that the administration supports the Marble Canyon Dam rather than the Hualapai Dam. What is the relative importance of these two installations as far as this legislation is concerned?

STATEMENT OF KENNETH HOLUM, ASSISTANT SECRETARY (WATER AND POWER), DEPARTMENT OF THE INTERIOR; ACCOMPANIED BY FLOYD E. DOMINY, BUREAU OF RECLAMATION—Resumed

Mr. HOLUM. Yes, Mr. Chairman, that is correct.

Mr. ASPINALL. What is correct?

Mr. HOLUM. The administration supports the authorization of the Marble Canyon Dam as a part of this project and recommends that the Hualapai or the Bridge Canyon Dam be deferred for further study.

Mr. ASPINALL. I know it. I said that. I wanted to know what the relative importance was, Mr. Secretary, as far as this program is concerned.

Mr. HOLUM. We have found, Mr. Chairman, after careful examination of the Marble Canyon Dam, that it can produce all of the power revenue assistance required for the features that will be authorized as a part of this legislation.

Mr. ASPINALL. Are you satisfied with that statement? Is there not something more involved rather than just furnishing sufficient monies for the Central Arizona project?

Mr. HOLUM. Yes, Mr. Chairman, there is of course a question that has become a matter of great national concern as to whether the Bridge Canyon project should be built or not. The administration feels that careful examination of these values would be in order before final decision is made.

Mr. ASPINALL. Which one of these installations will make the greatest contribution to the Central Arizona project if constructed?

Mr. HOLUM. I think in the context of the proposals of the administration, the Marble Canyon project.

Mr. ASPINALL. Do you agree to that, Mr. Dominy?

Mr. DOMINY. In the context of total revenue availability from either of these structures, I testified last year that Bridge Canyon Dam site has the greatest potential on the river. So if you were looking just as between the two dams for revenue production, you would have to say that Bridge Canyon is the one that would perform the greatest service.

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Mr. ASPINALL. When the authorization was first proposed, this was the position of the Department of Interior, was it not?

Mr. DOMINY. That is correct. The Bureau's report as well as the Secretary had both dams in, but as Secretary Holum says, that is not the position of the administration.

Mr. ASPINALL. Mr. Holum, the admistration now recommends that the study of the importation be a national study. This was not proposed in the first instance, was it?

Mr. HOLUM. I am sorry, I did not quite hear all of the question.

Mr. ASPINALL. I said the Department now proposes that the study of the importation of water into this area be a national commission study. This was not the position of the Department in the beginning.

Mr. HOLUM. It was not the original position of the Department. It was the position of the administration, and the Department supports it.

Mr. ASPINALL. Do you agree with me, Mr. Holum, that if Colorado is to have use of its entitlement under the compacts pertaining to the division of water in the Colorado River Basin, that action is necessary now in order to protect the State of Colorado as it sees a part of its entitlement being used by statutory authority in the lower basin?

Mr. HOLUM. Mr. Chairman, the compact of course provides protection for Colorado and the other upper basin States. There is no question, however, that putting the water to use at the earliest possible time increases the protection that is available to those States.

Mr. ASPINALL. In your statement you say:

"In respect to the Dallas Creek, West Divide, and San Miguel Projects, however, the unit costs of irrigation are high."

Under the Upper Colorado River compact which is the compact between the States of the Upper Colorado River Basin and approved by the Federal Government, who's responsibility is it at this time to determine whether or not the costs of these projects are high?

Mr. HOLUM. I would like to suggest, Mr. Chairman, that it is a shared responsibility. The administration does not question the availability of water in Colorado or the availability of revenues from the upper basin account to provide the assistance that these projects require. There is no question about that. We do feel that it is a shared responsibility to make certain that the investments that are made in Colorado and the use that is made of its water are for the highest possible use in the State.

Mr. ASPINALL. And you do not think that the State of Colorado has the primary responsibility in this instance?

Mr. HOLUM. I think the State of Colorado, Mr. Chairman, has a major interest in this. We are of course also talking about the investment of federal dollars, so there is a federal responsibility certainly involved.

Mr. ASPINALL. In regard to this study, what is the relationship between the study of importation of water as far as Colorado is concerned with this water already assigned to it, its share, and a national commission study?

Mr. HOLUM. First, Mr. Chairman, the relationship is indirect. Certainly the question of importation of water and augmenting supplies is a major question. I think, however, that the best possible use of

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water currently available within any particular area is also a matter of grave concern. We do think it will be appropriate to have these concerns studied by a top level commission composed of nongovernmental people.

Mrs. ASPNALL. Do you think that a national commission is required in this particular regional operation, that you have to have people on a national basis outside of the area making decisions for what is admitted to be a local problem, a regional problem?

Mr. HOLUM. Mr. Chairman, while I agree with you that we are talking about problems that are essentially local problems, I think there is also a national problem to make certain that the water resources in any given region of the country or any state in the country are used to the best possible advantage of the national economy and the local economy. I think that this commission——

Mr. ASPINALL. Do you think the State of Colorado has the ability and authority to determine how to use its water, and, if there is an importation, that it will know how to use that water?

Mr. HOLUM. I would hope, Mr. Chairman, that the State of Colorado would welcome the opportunity to receive advice from and to consult with an eminent and distinguished group of water experts who are looking at these problems on a national basis.

Mr. ASPINALL. If I have learned anything from the hearings this morning, I learned that it is almost an impossibility, if you get this matter on too large a focus, to get anything out of it.

Now, Mr. Dominy, as I understand your study, you show an overall combined feasibility benefit-cost ratio of 1.82 for all of these five projects taken as a unit, figuring indirect values as well as direct values, is that not correct?

Mr. DOMINY. That is correct, sir.

Mr. ASPINALL. And that you figure the benefit-cost ratio for direct values, benefit-cost ratio over a 100-year period of 1.08, if we figure all of them as a unit, is that correct?

Mr. DOMINY. That is correct, Mr. Chairman.

Mr. ASPINALL. If I understand the figures correctly in your report, there is contemplated to be used in these five projects some 728,100 acre feet of water, of which 398,100 feet of water will be depletion or complete consumptive use, is that correct?

Mr. DOMINY. We show a stream depletion of 432,100 acre-feet, 398,000 in Colorado and 34,100 in New Mexico.

Mr. ASPINALL. That means Colorado's share then would be 398,100, if my figures are correct.

Mr. DOMINY. 398,000, and 34,100 for New Mexico.

Mr. ASPINALL. My time has expired. The Chair recognizes the gentleman from Pennsylvania for 10 minutes.

Mr. SAYLOR. Thank you, Mr. Chairman.

Mr. Dominy, this is probably the first and only time that you will ever appear when I am the amicus curiae.

Mr. Holum, in your comments that you directed toward this piece of legislation, you said you felt the provision for the study should be on a national basis. Now, let me ask you this question. Was the decision of the Department of the Interior and the administration to place this study on a national basis affected in any way by the change of

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the language in the original bill, 4671, which will require the Secretary of Interior to submit within 3 years a plan to import 2.5 million acre feet of water into the Colorado River, whereas the amended language sets out more specifically the provisions for studying existing supplies and the needs in both the upper and lower basin and sets as a pattern for a floor, let me say, of importation 8.5 million acre-feet?

Mr. HOLUM. No, Congressman Saylor, I do not think that entered into the administration's decision at all. The Department of Interior's original position, as Chairman Aspinall has noted, was for a study chaired by the Department. But the administration recommended from the beginning that this study be made by a national commission.

The question of whether or not a specific time should be set for the completion of the study I do not think is affected by the group that does it. The time frame could be established administratively or by the Congress for either group that was conducting the study.

Mr. SAYLOR. Now, Mr. Dominy, when were the studies completed on the five participating projects which you have commented on in your statement?

Mr. DOMINY. The studies were actually completed only very recently. They were undertaken by direction of the Colorado Storage Project Act, but it took several years to complete them. The Animas-La Plata was completed about 2 years ago, Dolores less than a year ago, and the other three were completed just within the last few weeks, about a month or two ago.

Mr. SAYLOR. It is my recollection that the Upper Colorado River Storage Project Act was passed in 1956, and these five projects were among those names in which you were to conduct studies.

Mr. DOMINY. That is correct.

Mr. SAYLOR. Is that correct?

Mr. DOMINY. That is correct, sir.

Mr. SAYLOR. Did you undertake the studies within a short time after the passage of that act?

Mr. DOMINY. The Animas-La Plata and Dolores were undertaken quite promptly; the others as rapidly as we could make funds and personnel available.

Mr. SAYLOR. Now, in view of the fact that the Animas-La Plata and the Dolores projects were completed several years ago, is there any reason why they were not submitted to Congress before this time?

Mr. DOMINY. The Animas-La Plata project was reviewed as required by law, and submitted by the Secretary to the Bureau of the Budget, and the Budget deliberated on it for a little more than a year before making their official comments to us on the project.

Mr. SAYLOR. Now, the administration's position is that only one reservoir be built at this time in this bill, is that correct?

Mr. HOLUM. That is correct in respect to the main stem of the Colorado River.

Mr. SAYLOR. Is it the Marble Canyon?

Mr. HOLUM. One mainstem reservoir.

Mr. SAYLOR. What is that?

Mr. HOLUM. One mainstem reservoir.

Mr. SAYLOR. One mainstem reservoir in what is known as Marble Canyon or Marble Gorge, is that correct?

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Mr. HOLUM. That is correct.

Mr. SAYLOR. In the original hearings—is that part of the Grand Canyon?

Mr. HOLUM. Marble Canyon Gorge?

Mr. SAYLOR. Yes.

Mr. HOLUM. No, it is not part of the Grand Canyon National Park, no, sir.

Mr. SAYLOR. Oh, that is not what I asked you, sir. Is it part of the Grand Canyon?

Mr. DOMINY. Congressman Saylor—at one time this was considered on the maps as part of Grand Canyon. More recently it has been named by the Board on Geographic Names of the Interior Department as Marble Gorge.

Mr. SAYLOR. Well, the change in the name did not change the location of it at all, did it?

Mr. DOMINY. No, sir.

Mr. SAYLOR. And the waters that flow through it are still the same waters that flowed through before.

Mr. DOMINY. Yes, sir.

Mr. SAYLOR. And they are tributaries of and included in the decision of the U.S. Supreme Court in the case of *Arizona* v. *California*?

Mr. DOMINY. Yes, sir.

Mr. SAYLOR. I just wondered, when I read some of the things you had stated, I thought maybe this Marble Gorge or Marble Canyon was located somewhere in Alaska. I did not know just where you had it located.

I noted you commented, as did Dr. Bradley and certain other people, that it was not in Grand Canyon. It is not in the Grand Canyon National Park and it is not in the Grand Canyon National Monument.

Mr. HOLUM. That is correct, sir.

Mr. SAYLOR. But it is in that area of the country that is described on all the maps as the Grand Canyon, is that not correct?

Mr. HOLUM. That is correct.

Mr. SAYLOR. All right.

Now, when the Secretary was here before, he said that they were going to use the power from Marble Gorge Dam for peaking power, to sell it for peaking power. Has there been any change in those plans?

Mr. HOLCUM. No, sir.

Mr. SAYLOR. If you are going to sell that for peaking power, where are you going to get the power for pumping?

Mr. HOLUM. I think, Congressman Saylor, there have been some very exciting developments in this field since the Secretary appeared before this committee in August of last year. He told you at that time about the negotiations that were underway with the utilities associated in what we call the west group. Some of these negotiations have matured, and the group will be building two large complexes of steam generating plants in the area. Certainly these will provide a fine source of off-peak pumping power, and there is going to be more of these large steam generating plants built in the area as a result of these large steam generating plants. The hydro-electric powerplant at Marble Canyon will make an excellent combination for the region.

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Mr. SAYLOR. Mr. Chairman, might I ask whether or not it will be possible at a later time to have the Department witnesses back?

Mr. ASPINALL. If the committee find it necessary by committee action.

Mr. SAYLOR. Under those circumstances, Mr. Chairman, I would reserve whatever balance of time I have and hope that we might have an opportunity to examine Mr. Holum and Mr. Dominy a little further in regard to these two projects.

Mr. ASPINALL. The gentleman has 1 minute left. He may have more time on the second go-around.

The gentleman from California, Mr. Johnson.

Mr. JOHNSON. Thank you, Mr. Chairman.

I just want to ask a few questions about the developments in main Colorado River; namely, Marble and Bridge Canyon Dams. As I have understood your studies, that you had recommended construction heretofore of the mainstem dam known as Marble and the Bridge Canyon Dam. And as near as I can figure from the information that we received, that Bridge Canyon was the best producer of revenue.

Mr. DOMINY. That is correct, Mr. Johnson.

Mr. JOHNSON. Is that true?

Mr. DOMINY. Yes, sir.

Mr. JOHNSON. Now, at the start of the hearings when the people from Arizona testified, they testified to the effect that the hydropower that would be developed on the mainstem was a cheaper source of power in the long run for the entire project than was conceived, do you agree with that?

Mr. DOMINY. Yes, sir.

Mr. JOHNSON. Then why is it that the bureau or the Secretary at the present time does not recommend the construction of Bridge Canyon?

Mr. DOMINY. Secretary Udall covered that rather extensively in his reply a year ago. In effect his reply was that while the Bureau reports and the Department recommended it, that we lost the battle in the final considerations for what would be the administration's official report on the project.

As near as I can tell from the discussions, it was primarily because Bridge Reservoir did occupy 13 miles of the river where the river is the boundary of the Grand Canyon National Park.

Mr. JOHNSON. But it did not alter the feasibility.

Mr. DOMINY. No, sir, not as far as feasibility——

Mr. JOHNSON. The feasibility consideration.

Mr. DOMINY (continuing). For a reservoir or for power production purposes, no, sir.

Mr. JOHNSON. Would you say that in the life and efficiency of a hydroplant it is longer and more efficient than a steam plant or a coal-fired plant?

Mr. DOMINY. All of the studies that we have been able to get from the industry indicate that steam plants need to be completely rehabilitated or replaced after a 35-year period. One of the factors that favors hydro is that 85 percent of the costs of a hydro installation is in the dam, the power plant structure and other non-replaceable works and only 15 percent is in the moving parts and other replaceable items,

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whereas in steam plant construction almost 100 percent of the cost is in the moving parts and other replaceable items.

In any long-term forecast, the hydro shows up quite well, even though it might be more expensive in the initial installation.

Mr. JOHNSON. At the present time it is your recommendation that the pumping power be secured from private sources?

Mr. DOMINY. Yes. As Mr. Holum indicated, Marble Canyon power production would of course be used on-peak for pumping. The pumping power for off-peak loads we would purchase from base load steam sources due to our interconnection with the base load steam powerplants.

Mr. JOHNSON. At what price is this power available for pumping?

Mr. DOMINY. We think it will be available at a more reasonable rate actually when compared to the additional profit that we would make from selling peaking service from Marble.

Mr. JOHNSON. Then you would sell the peaking power out of Marble and use the money to finance the pumping.

Mr. DOMINY. That is right. It would be a sort of bank account arrangement with the interconnected system. In other words, we would be putting peaking power into the system at a premium rate, and we would be buying back out of the system off peak base load power for pumping at the project pumps.

Mr. JOHNSON. But that would not be as economical as if you had the two structures in the river.

Mr. DOMINY. Even if Bridge Canyon Dam were to be built, we think that there is such a demand for peaking production that it would be more advantageous to market it primarily as peaking rather than to use it for pumping, except on peak periods.

Mr. JOHNSON. But it would add to your financial status if you had the second facility in the river.

Mr. DOMINY. Yes, Bridge Canyon Dam would add to the year 2025 $1,645 million to the development fund. Pardon me, that would be the total revenues. Then you would have your operating costs and repayment. The contribution to the development fund would be $916 million to the year 2025.

Mr. JOHNSON. That is all, Mr. Chairman. I yield the balance of my time.

Mr. ASPINALL. The gentleman has consumed 5 minutes.

The gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Dominy, I understand that in the year 2025 by not building Bridge Canyon there will be almost $1 billion, to wit $916 million, less in the basin fund.

Mr. DOMINY. Actually I had better amend that statement, because my staff reminds me that the table that I am reading from was titled with Bridge Canyon Dam only, but it also took into account the revenues from Hoover and Parker and Davis after payout. So the contribution for Bridge alone would be about $500 million. About $500 million of that figure would be from Hoover and Park and Davis after payout. So Bridge Canyon alone to the year 2025 would contribute about $400 million to the development fund.

Mr. HOSMER. $500 million.

Mr. DOMINY. About $400 million.

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Mr. HOSMER. And this project has about a 100-year life I presume, at least.

Mr. DOMINY. I thing that is a safe assumption, 100 years easily.

Mr. HOSMER. So there is another 50 years beyond that that it would be producing some kind of revenues.

Do you have any idea what it might be on an annual or total basis?

Mr. DOMINY. It would be about $23.5 million annually after pay-out that it would contribute.

Mr. HOSMER. So that is around $115 million? No, it is more than that.

Mr. DOMINY. It would be about $1,150 million.

Mr. HOSMER. Yes.

Now, this power comes from the energy of falling water, is that right?

Mr. DOMINY. That is correct, sir.

Mr. HOSMER. Is there any way to store the energy of falling water except behind a dam?

Mr. DOMINY. That is the only practical way I know. At Niagara Falls nature has already provided the drop, and a good bit of power is made there, of course without storage.

Mr. HOSMER. Now, if there is not a Bridge Canyon Dam, what happens to that energy that otherwise could be turned into electricity and sold?

Mr. DOMINY. It just is not utilized if the water is not impounded and the powerhead created. We just do not utilize that drop in the river as an energy producer.

Mr. HOSMER. It is a transitory asset. If you do not use it at the moment that it is there, it is never recapturable, is that correct?

Mr. DOMINY. That is correct.

Mr. HOSMER. Let me ask Mr. Holum now about this national water commission. They have some water problems in the Northeast section of the United States, do they not?

Mr. HOLUM. They have some very critical problems in the Northeast, that is correct.

Mr. HOSMER. Are they the same problems they have in the Southeast United States?

Mr. HOLUM. I think the problems are different, but at least we found out last year they can be very critical in the Northeast. I think, however, that there is no place in the country where the absolute shortages exist or can exist in the immediate future to the extent that they do in the Pacific Southwest.

Mr. HOSMER. Are the national water problems not the accumulation of the individual water problems of all the regions of our country?

Mr. HOLUM. The national water problem is certainly the total accumulation of the local and regional problems.

Mr. HOSMER. It is not one monolithic problem. It is the collection of problems from many areas.

Mr. HOLUM. That is correct, and they are different in many areas of the country.

Mr. HOSMER. Do you see this national water commission as an organization which during its 5 years life is to accumulate a large bureaucratic staff and attempt to penetrate these various widely spread problems?

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Mr. HOLUM. No, I do not, Mr. Hosmer. The Congress last year very wisely provided in the Water Resources Planning Act for the Water Resources Council, as an agency of the Federal Government, to act as a coordinating agency between the Federal Government and the State governments.

Certainly a major share of the responsibility lies now and should lie with Federal-State commissions organized under the Water Resources Planning Act. I think the broad overall look at water resource policies, interbasin diversions of water, the best use of water where it is, the opportunities for supplementing it from desalting and water reclamation, are areas that this national commission could appropriately address itself to. But the act very carefully provides for very close coordination between this national commission and the Water Resources Council.

Mr. HOSMER. Your language in your statement was:

The Administration recommends that the study be conducted under the direction of a national water commission rather than being carried out by the Secretary with the advice and assistance of regional water commissions as the bill provides.

That infers that the national water commission is going to do some kind of direction of somebody else that does the actual work.

Mr. HOLUM. Actually I think the direction will flow both ways. The legislation that proposes to establish the national commission provides that the commission shall consult with the Water Resources Council regarding its studies and do studies as directed by the President, and certainly the opportunities are available in legislation which we are considering this afternoon for the Congress to give direction to the Commission.

Mr. HOSMER. I understand that a lot of directions are going to be given. I am trying to find out who they are going to be given to, who is going to do the work.

Mr. HOLUM. The act provides, of course, for a small staff for the commission. It also provides that they can draw on the resources of the Water Resources Council and the agencies of the Federal Government to do the detailed work for them, and I am sure that is the way they would operate.

Mr. HOSMER. The Bureau of Reclamation is just going to get out of this business?

Mr. HOLUM. By no means.

Mr. HOSMER. What?

Mr. HOLUM. By no means. Get out of what business, the business of planing water projects or the business of——

Mr. HOSMER. Studying water problems and so forth.

Mr. HOLUM. No, I think the Bureau of Reclamation role will stay substantially the same as it is, a Department of Interior role.

Mr. HOSMER. Well, will the national water commission be directing the Bureau of Reclamation of the Interior Department?

Mr. HOLUM. I think, Congressman Hosmer, that the act provides for very careful and very appropriate liaison between the Council and the Secretary of the Interior as Chairman of the Council.

Mr. HOSMER. Mr. Holum, I am not talking about liaison. I am talking about who is going to do the work. Somebody talks about

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this national water commission making a study. Here you say that the administration recommends that a study be conducted "under the direction" of the national water commission. Now who in the devil is going to do the study?

Mr. HOLUM. The broad policy studies that I have attempted to outline will be the product of the commission. The legwork will be done by the existing Federal agencies who will provide the information to the commission.

Mr. HOSMER. Is the Bureau going to do this study?

Mr. HOLUM. The national commision is going to do the study.

Mr. HOSMER. With its small staff?

Mr. HOLUM. They are going to do the studies that relate to broad national policy, Congressman Hosmer. The legwork, the detail will be furnished ——

Mr. HOSMER. All right, who is going to do the study on this matter of importation of water from the Pacific Northwest?

Mr. HOLUM. It is the administration's views that the commission should determine the guidelines for the conduct of that study; the question of protecting the rights to water and the cost protection of water in the Pacific Northwest would be guidelines determined by the commission. Actual physical surveys, if a decision of that nature were made to import water, would be done by the existing Federal agencies, I assume the Bureau of Reclamation.

Mr. HOSMER. All right. Now, this water commission is going to set down some criteria and guidelines for somebody to do some work. Do you say then it is the Bureau that is going to do it?

Mr. HOLUM. The Bureau and the other existing agencies that are involved in water resources in the West.

Mr. HOSMER. We have got so many agencies you cannot even count them up. Nobody has made an index of them. Who is going to get them all together and make something sensible out of them?

Mr. HOLUM. I think there is a rather substantial degree of coordination among the water resource agencies in the executive branch and that the Water Resources Council that the Congress provided last year is an excellent additional step in the coordination of these executive branch activities.

Mr. HOSMER. It sounds to me like everybody is going to be falling all over each other.

Mr. HOLUM. I do not think so.

Mr. HOSMER. The Bureau of the Budget, when they sent up some kind of a report giving their blessing to this water commission, said something about the commission taking on the importation problem we are talking about here first, did they not?

Mr. HOLUM. The last report from the Bureau of the Budget says specifically that immediate attention should be given to western water problems and specifically the problems of the Colorado River Basin.

Mr. HOSMER. Thank you, sir.

Mr. ASPINALL. The time of the gentleman has expired.

The gentleman from Arizona.

Mr. UDALL. Thank you, Mr. Chairman.

I compliment you on a very effective and comprehensive statement as you always have made before. I have a number of matters to

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over in a very limited time, and I will try to ask limited questions nd hope for direct answers.

Are you familiar with a study made by the U.S. Atomic Energy Commission in February 1965 which made a specific comparison of he economics of nuclear electric power and hydro electric power as roduced from the proposed Bridge and Marble Canyon project?

Mr. HOLUM. Yes, I am familiar with it generally.

Mr. UDALL. As luck would have it, I have a number of copies of his available, and at some point here I am going to ask, after the hairman has had an opportunity to look at it, unanimous consent that t be inserted in the record because it deals with a lot of the matters hat we will be hearing later today and tomorrow in these hearings.

In summary, however, is it not true that this study shows that omparable Federal atomic plants with the same capacity as Marble nd Bridge will produce in mills per kilowatt hour for Marble 3.8 as gainst Marble hydro of 2.4, and for an alternate to Bridge nuclear t 3.8 as against a Bridge hydro 2.2?

Mr. HOLUM. I do not have the study in front of me, Congressman.

Mr. UDALL. Are you familiar with that?

Mr. DOMINY. That is correct. That was the results of their study.

Mr. UDALL. I will return to that later if I have the time, but I will sk for unanimous consent.

Mr. ASPINALL. Unless there is objection, the study will be placed in he record at this place.

(The study referred to follows:)

SPECIFIC COMPARISON OF THE ECONOMICS OF NUCLEAR ELECTRIC POWER AND HYDRO ELECTRIC POWER—BRIDGE AND MARBLE CANYON PROJECTS

U.S. Atomic Energy Commission, Division of Reactor Development and Technology, Office of Civilian Power, DR&T:PCA:JMV, February, 1965

This preliminary analysis has been prepared in response to a request[1] from Mr. taats, Deputy Director of the Bureau of the Budget, for "An analysis of the omparative costs of atomic power plants and the two proposed hydroelectric ower dams" (Bridge and Marble Canyon), as set forth in Senate bill 1658, 88th ongress. The analysis presented herein is a comparison of the economic costs nvolved in "at site" production of power and energy from nuclear and hydro-lectric plants based on federal financing in each case.

In preparing the information developed in this paper, the source of data on the ridge and Marbel Canyon projects has been taken from the following reports:

(1) Pacific Southwest Water Plan. Supplemental Information Report on Bridge Canyon Project, Arizona, January 1964, by Bureau of Reclamation.

(2) Pacific Southwest Water Plan. Supplemental Information Report on Marble Canyon Project, Arizona, January 1964 by Bureau of Reclamation.

As described in the Bureau of Reclamation reports, the purpose of the proposed ydroelectric project is to provide electricity to help meet the peaking require-ent of the commercial load in Arizona, Southern California and Southern evada; to provide electricity for a portion of the water project pumping load n the Pacific Southwest Water Plan; and to provide the major portion of the evenue flowing into the development fund used to financially assist in con-tructing works to import new water into the Colorado River Basin.

SIMPLIFYING ASSUMPTIONS

It is not possible to make an exact comparison of nuclear versus hydro power ince there are inherent differences between the two. Hydro power is especially

[1] Letter Mr. Staats to Dr. Seaborg dated January 15, 1965.

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suitable for peaking requirements. In addition, hydro projects have various non-power benefits.

The economic comparison presented in this paper is very limited in scope. Certain simplifying assumptions have been made in order to permit making the comparison. The three major simplifying assumptions pertain to:

1. Nuclear Plant Capacity Factor
2. Transmission Costs
3. Plant Outages

Nuclear plant capacity factor

The assumed nuclear plant alterative is evaluated on the bases of its providing the same peak and annual generation as the hydro plant. This is a conservative assumption and results in overstating the energy cost potential of the nuclear plant. The output of the hydro plant is determined by water flow characteristics and in designing the plant for meeting peaking loads, the annual capacity factor is relatively low. A nuclear plant can provide the same peaking load and can also operate at a high capacity factor. The capacity factors at which the nuclear plant are evaluated are around 40%.

Transmission costs

The hydro projects listed in this paper have large investments in transmission facilities. For Bridge Canyon, they run $199 million; for Marble Canyon, $87 million. For a nuclear alternative, there would be freedom in selecting a site location closer to load center and the cost of the transmission facilities would be less than those of the referenced hydro projects. A compensating factor would be the cost of cooling water which could be significant if the nuclear plants were not located near a source of cheap water supply. However, we do not know where the nuclear alternative would be located and therefore do not know the transmission or cooling water costs. Without a detailed study, it is not possible to determine the transmission and cooling water costs which would make a nuclear addition to the existing power system comparable to a hydroelectric addition. Rather than make assumptions about these costs, this analysis compares the nuclear and hydro plants based on "at site" costs. That is, the cost data apply to generation at the dam site or nuclear plant site and *no* costs are included for transmission. Once again, this is a simplifying assumption which could place the nuclear plant at a relative disadvantage. If transmission and cooling water costs had been included in the comparison, a nuclear alternative could be more economic (in M/KWH) if its transmission and cooling water costs for the particular site location were equal to or less than 33% and 16% of the Marble and Bridge Canyon transmission costs, respectively.

Plant outage

The hydro plants are made up with smaller size units than a nuclear alternative. Hence, they have less requirement for reserve capacity in the event of a forced outage. For the Marble Canyon comparison, there is one nuclear unit compared with four hydro units. In the Bridge Canyon Comparison, there are two nuclear units compared with six hydro units. Deletion of the effects of this factor from the analysis favors the nuclear alternative.

REFERENCE NUCLEAR ALTERNATIVE

The economic characteristics of the nuclear plants used in this analysis are intended to be representative of a light water reactor of either the pressurized or boiling water reactor type; which could enter construction at the present and begin service around 1970. The fuel cost data pertain to the early years of operation of the plant—in particular, the estimated performance of the second core. No attempt has been made to project fuel costs over the entire 100 year period of interest.

CASES CONSIDERED

Two comparisons of nuclear and hydro power are presented below. Case I is a nuclear alternative of the Marble Canyon Project. Case II is a nuclear alternative to the Bridge Canyon Project.

The subsequent tables indicate the basic economic and operational data that have been used in this analysis. The results are presented in Table VI.

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TABLE I.—*Plant Size and Capacity Factor (At Site Data)*

Case I. Marble Canyon Alternate:	
Net Electric Power (1 unit @ 600 MW) (MW)	600
Annual capacity factor (%)	44
Annual energy output, 10^6 eKWH	2,308
Case II. Bridge Canyon Alternate:	
Net Electric Power (2 units @ 750 MY) (MW)	1,500
Annual capacity factor (%)	41
Annual energy output, 10^6 eKWH	5,362

NOTE.—The Marble Canyon Hydroelectric plant consists of 4 units at 150 MW. The Bridge Canyon Hydroelectric plant consists of 6 units at 250 MW.

TABLE II.—*Summary—ecomonic comparison assumptions (Federal financing)*

	Hydro	Nuclear
Depreciation period, years	100	30
Annual fixed charge rate on plant, percent:		
Cost of money	3.0	3.0
Depreciation (sinking fund)	0.165	2.102
Interim replacement	[1] 0	0.4
Total	3.165	5.502

[1] Interim replacement for the hydro plant is included as part of the annual operating cost.

TABLE III.—*Economic assumptions for nuclear plant*

Case	I	II
Station size, eMW net	600	1500
Unit size, eMW net	600	750
Station cost, millions dollars	72	165
Station cost, dollars/net KW	120	110
Average investment in fuel, millions of dollars	18	45
Fuel cost:		
Fixed, dollars/KW	30	30
Variable, M/KWH	1.4	1.4
Operation & maintenance M/KWH: [2]		
Fixed, dollars/KWYr	1.4	1.4
Variable, M/KWH	.1	.1

[1] Includes all costs for the generating plant, up to and including the step-up transformer.
[2] At 40% C. F.

TABLE IV. *Marble Canyon Nuclear Alternative*

(1) Annual Capacity Cost, $/KW–Year:	
Plant $120/KW × 5.5%/year	6.6
Fuel $30/KW × 3%/year	0.9
Oper. & Maint	1.4
Total (per KW–Year)	$8.9
(2) Variable Costs, M/KWH:	
Fuel	1.4
Oper. & Maint	0.1
Total (M/KWH)	1.5
(3) Energy Cost @ 44% Capacity Factor, M/KWH:	
Fixed $\frac{\$8.9/KW–Year}{3850\ KWH/KW–Year}$ =	2.3
Variable	1.5
Total (M/KWH)	3.8

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TABLE IV. *Marble Canyon Nuclear Alternative*—Continued

(4) Equivalent Annual Cost, $/Year:	
Fixed $8.9/KW–Yr × 600 MW =	5,340,000
Variable 1.5 M/KWH × 2.308 × 10^9 KWH/Year =	3,462,000
Total (Per Year)	$8,802,000

TABLE V.—*Bridge Canyon Nuclear Alternative*

(1) Annual Capacity Cost, $/KW–Year:	
Plant $110/KW × 5.5%/year	6.05
Fuel $30/KW × 3.0%/year	0.9
Oper. & Maint	1.4
Total (per KW–Year)	$8.35
(2) Variable Costs, M/KWH:	
Fuel	1.4
Oper. & Maint	0.1
Total (M/KWH)	1.5
(3) Energy Cost @ 41% Capacity Factor, M/KWH:	
Fixed $\frac{\$8.35/KW–Year}{3570\ KWH/KW–Year}$ =	2.3
Variable	1.5
Total (M/KWH)	3.8
(4) Equivalent Annual Cost, $/Year:	
Fixed: $8.35/KW–Yr. × 1500 MW =	12,520,000
Variable 1.5 M/KWH × 5.362 × 10^9 KWH/Yr. =	8,040,000
Total (per Year)	$20,560,000

TABLE VI.—*Results (3 percent money)*

	Hydro	Nuclear
I. Marble Canyon:		
Initial cost, millions of dollars:		
Plant	154	72
Fuel	0	18
Total	154	90
Equivalent annual cost, millions of dollars	5.6	8.8
Equivalent energy cost, millions of kilowatt-hours	2.4	3.8
II. Bridge Canyon:		
Initial cost, millions of dollars:		
Plant	299	165
Fuel	0	45
Total	299	210
Equivalent annual cost, millions of dollars	11.7	20.6
Equivalent energy cost, millions of kilowatt-hours	2.2	3.8

NOTE.—The hydro cost data exclude costs of transmission facilities ($87,000,000 for Marble Canyon and $199,000,000 for Bridge Canyon) and nonpower costs and benefits. The nuclear cost data also exclude transmission costs. If transmission costs were included in the comparison, the hydro energy costs increase to 4.5 million kilowatt-hours for Marble Canyon and 4.1 million kilowatt-hours for Bridge Canyon. Thus, for the capacity factors used in the comparison, a nuclear alternative could be more economic (in million kilowatt-hours) if its transmission and cooling water costs for the particular site location were equal to or less than 33 percent and 16 percent of the Marble and Bridge Canyon transmission costs, respectively. See pp. 2 and 3 for further discussion of this factor.

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TABLE VI-A.—*Results (4 percent money)*

	Hydro	Nuclear
I. *Marble Canyon*		
Initial Cost, 10⁶$		
Plant	158	73.4
Fuel		18
Total	158	91.4
Equivalent Annual Cost 10⁶$	7.2	9.6
Equivalent Energy Cost, M/KWH	3.1	4.1
II. *Bridge Canyon*		
Initial Cost, 10⁶$		
Plant	305	168
Fuel		45
Total	305	213
Equivalent Annual Cost 10⁶$	14.7	22.3
Equivalent Energy Cost, M/KWH	2.7	4.2

NOTE.—As in the previous table, transmission costs are not included in the above data. If transmission costs were included, the hydro energy costs increase to 5.6 M/KWH for Marble Canyon and 5.1 M/KWH for Bridge Canyon. Thus, a nuclear alternative could be more economic (in M/KWH) if its transmission and cooling water costs for the particular site location were equal to or less than 60% and 38% of the Marble and Bridge Canyon transmission costs, respectively.

Mr. UDALL. Now then, Mr. Dominy, I want to ask specifically about the Central Arizona project. When this project comes in, large quantities of water are delivered to the service area. This might do a lot to firm up the underground water supplies. After the water is used, we would have waste water, seepage, sewage, effluent, and things of this kind. Has it not been the policy in the contracts of the Bureau of Reclamation survey that this water is subject to recapture by the Bureau of Reclamation so that if possible it can be used again, and the sale of it, the revenue, the proceeds be used as project proceeds and the Bureau tries to keep control of this water as long as it can?

Mr. DOMINY. That is correct. On all of our projects when we go to the expense of providing a water supply, we write right into the contract the provision that we reserve the right of reuse, capture and reuse as long as the water is within the project area.

Mr. UDALL. So we would not just be giving a gift to somebody who happened to be downstream to pick up the effluent or the waste. If possible we can get this and use it again in the service area.

Mr. DOMINY. That is correct.

Mr. UDALL. And you contemplate doing that——

Mr. DOMINY. Yes, sir.

Mr. UDALL (continuing). In the Central Arizona project area.

My next point, we have had some discussion here, some testimony from Mr. Ely—and I testified on the subject of the aqueduct side of the Central Arizona project. The posture of the matter last summer was that the original studies I think were with an 1,800 second foot aqueduct. Are you familiar with the testimony Mr. Ely gave that Arizona and California have agreed that the hydrology of the river, the economics of the project, can support, and that we would be better off with the minimum 2,500-foot aqueduct?

Mr. DOMINY. Yes, I am very familiar with that subject, sir.

Mr. UDALL. You see no problems from the standpoint of hydrology or economics?

Mr. DOMINY. No, sir.

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Mr. UDALL. And if Arizona could find revenues as per our agreement with California, revenues attributable to Arizona power users and water users, it would support a somewhat larger canal, after you make all of your studies, you would find no problems in hydrology or economics in going slightly above the 2,500?

Mr. DOMINY. No, sir. Our studies would indicate that the larger size actually would give you greater economic benefits for the expenditure than the smaller size.

Mr. UDALL. And last summer you and I had a colloquy when you testified. Without going into all of that, I suppose you would stand in general——

Mr. DOMINY. Yes, sir.

Mr. UDALL (continuing). On the statements you made then.

Mr. DOMINY. Yes, sir.

Mr. UDALL. Regarding the size of this aqueduct.

Mr. DOMINY. Yes, sir.

Mr. UDALL. Now then, let me turn to a couple of other matters here if I may.

The question has come up several times about the feasibility of the central Arizona unit even assuming that we do not get any water imports. Is the project economically feasible if the imports never arise?

Mr. DOMINY. Yes. That was testified to, you will remember in some detail last year, and the Department's report was predicated on a completely feasible project, even though no augmentations to the Colorado were ever achieved.

Mr. UDALL. Would your answers be changed that you gave last summer with regard to this same matter about the feasibility of the project in the light of the new provisions of 601, which deal with the power versus need regulation of the river?

Mr. DOMINY. No, sir, this gives us no problem because the Basin interests have worked out criteria that are fully consistent with river operation as we had visualized it.

Mr. UDALL. And similarly do you see any problem arising from the feasibility of Central Arizona project if we incorporate the five Colorado projects, one partly being in New Mexico, that are now included in the committee print?

Mr. DOMINY. No, sir. All of our forecasts of the water supply in the river were predicated upon complete development of the upper basin as visualized in the compact, and of course the upper basin fund will take care of the costs of those projects with no burden whatever on the financial arrangements for the lower basin.

Mr. UDALL. If you took all of this into account.

Mr. DOMINY. Yes, sir.

Mr. ASPINALL. Will my colleague yield?

Mr. UDALL. I yield.

Mr. ASPINALL. What happens to the Central Arizona project when the people in the upper basin put all their water to work?

Mr. DOMINY. As we testified a year ago, we anticipate by 1990 that there will be declining amounts of water available to the Central Arizona project by reason of increased upper basin use. This will mean then that unless augmentation is in immediate prospect for additional

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waters from some source to bring into the river, there will be a decline in the water for irrigated agricultural lands because Arizona is going to have increasing use of municipal and industrial water.

Mr. ASPINALL. Inasmuch as all of us are looking to the future and trying to protect ourselves, trying to foresee what will happen in the future, let me ask you and the Secretary what he thinks the position of the Department and of the Commissioner of Reclamation will be in 1995 if there were not any water in the river to take care of the efficient operation of the Central Arizona project?

Mr. HOLUM. Mr. Chairman, I understand that the members of Congress would concern themselves with that problem, but I do not think it is going to occur. I think that by development of the desalting technology or atmospheric water research, better use of water or importation, that the water supplies of the Colorado River are going to be augmented by that time.

Mr. ASPINALL. Of course, Mr. Secretary, this is what caused the Secretary of the Interior to first propose the Lower Colorado River project, the prime purpose of which was to take care of this matter of importation.

Mr. HOLUM. That is correct.

Mr. ASPINALL. Now apparently everybody is willing to go out from under that in order to get a project except the Upper Basin States who feel that they too have to have some protection as far as the future is concerned, is that not right?

Mr. HOLUM. I am sure that the Upper Basin feels it must have protection.

Mr. ASPINALL. With the political power being where it is, let us be realistic—with the political power being where it is and where it is likely to be in the future, if the Upper Basin does not get consideration at this time, how much chance do they have of getting consideration later on when the water is being put to use and they need authorization and money to develop their part of the Colorado River?

Mr. HOLUM. I think, Mr. Chairman, that the Upper Basin is getting consideration at this time and that all the administration is doing is looking for the best possible machinery, to find the best possible way, to augment the supplies of the Colorado River.

Mr. ASPINALL. But, Mr. Secretary, in your statement you said that three of these projects should wait until the National Water Commission had completed its review, and I asked you directly what the National Water Commission had to do with Colorado's use of its own water. This is what bothers some of us in the Upper Basin. This is just a delay, that is all it amounts to.

Mr. HOLUM. I would like to assure you, Mr. Chairman, that when the administration suggests that this use of Colorado's water in Colorado be reviewed by the national commission, we are not talking about the question of whether or not it should be put to use in Colorado. We are only concerning ourselves with making certain that the best possible use of Colorado's water is made in Colorado.

Mr. ASPINALL. Which is largely a Colorado responsibility.

Mr. HOLUM. Certainly a major share of the responsibility rests with Colorado.

Mr. ASPINALL. Well, let me ask you a very practical question. I have all the faith in the world in the present administration we will

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say, with perhaps some reservations, and I have no reservations as far as the representatives from the lower basin, especially Arizona, are concerned at this time. But if along about 1990, when it became a very critical problem we had the office of the chief executive of the United States filled by somebody from the coastal area, the Pacific coastal area with heavy representation, do you think that they are going to come in and say, "Well, we made a promise and although it is going to cost us all of this and we can't get any water from the Northwest and we can't get it from Canada, we will go ahead and authorize these projects and construct these projects in the upper basin just the same"? Do you think they would do that?

Mr. HOLUM. I think they will in all probability—that the Colorado water will be put to work in Colorado long before the date that you are talking about, Mr. Chairman.

The thing that concerns us is that we saw so many opportunities for spectacular growth in Colorado—and particularly in western Colorado—related to your mineral resources, the tremendous pressures on the beautiful recreation opportunities in western Colorado, that we just want to be sure that the Federal dollars in Colorado water are applied in the best way to make use of these resources.

Mr. ASPINALL. I have taken too much time. I am charged 4 minutes of my second round time.

Mr. UDALL. The chairman is always very kind and very fair.

Just a couple of more items.

Mr. Dominy, we have had a lot of advice from our friends, the conservationists, many alternative schemes for getting Arizona the water and we appreciate the sincerity with which they have said they want us to get the water. But among the statements that are made is one that neither Bridge nor Marble Canyon Dam is needed to make the Central Arizona project and the import plan feasible. Is there any basis for having an import plan and building the Central Arizona project without these dams?

Mr. DOMINY. It appears possible, but I doubt the practicability of attempting to build the Central Arizona unit with power revenue assistance only from Hoover and Parker-Davis Dams after payout of those investments. This would require assuming the same rates for Hoover and Parker-Davis power after payout that have been used in our proposal and which now includes of course Marble Canyon. This would mean rates of 4.0 mills for Hoover power and 4.7 mills for Parker-Davis power, which would be an increase over the rates that that power is being sold from Hoover for during payout, because the current rates for Hoover and Parker-Davis are on an average of about 2.4 mills for Hoover and 4.7 mills for Parker-Davis. However, under those circumstances all pumping power from the Central Arizona unit would have to be purchased at the going market rates of at least 5 mills per kilowatt-hour. At such a pumping power rate, the proposed rate of $10 per acre foot for irrigation water would not cover the operation and maintenance. So you would have to load part of that cost on the Hoover and Parker-Davis power revenues to pick up that overburden that could not be paid by the farmer. This would be contrary to longstanding reclamation policy, but if it were done, you could theoretically do it and actually have a small remaining surplus of about $100 million.

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Mr. UDALL. Of course another practical answer to that which Mr. Hosmer would make if he were here, or Mr. Ely if he were on the stand, is that California thinks they have some right to the future revenues from the Hoover-Parker-Davis system, and they undoubtedly do.

Mr. DOMINY. Well, as you know, California allottees have contracted for 65 percent of Hoover's and did sign up a contract to buy the power. Otherwise the dam would not have been built. That was one of the requirements of the authorization. They have also contracted for 75 percent of the installed capacity.

Mr. UDALL. Well, this nails this down, because this suggestion is often made, and I wanted some extra comment on it.

One final question I wanted to raise here. Some of our same friends that I have been referring to sometimes say that project payout and development funds and enhancement that we are talking about could be improved if a larger part of the Central Arizona project water supply were sold for municipal industrial purposes in the early years. I had understood that your planning had provided for all of the M. & I. water demands projected with population growth in our area to about the year 2000 when imports would begin to rise, is that correct?

Mr. DOMINY. This is correct. We have based our study entirely on the thought that municipal and industrial water supply was the highest and best use, and that the full demand of that ought to be taken into account in the Central Arizona project development. So there really is not a market for more municipal industrial water than we have projected.

Mr. UDALL. I thank you both for your helpful testimony here.

Mr. JOHNSON. The gentleman from Washington, Mr. Foley.

Mr. FOLEY. Thank you, Mr. Chairman.

Secretary Holum, in your statement you say that "While it is agreed there is a requirement for long-term study to determine the best use of the water of the Colorado River, the administration recommends that the study be conducted" and so on, under the direction of the national water commission rather than a regional commission. Would you have any objection to such legislation being provided in this legislation, a separate authorization?

Mr. HOLUM. No, not at all, from the point of view of the administration. I think there is a very definite relationship between the administration's proposal for a national water commission and the legislation that we are considering this afternoon. But the administration's proposal is actually before the Congress now in the form of H.R. 13849 as separate legislation. The administration's report on the five Colorado projects that you are considering this afternoon specifically says that the administration would like to see western water resource problems and particularly the problems of the Colorado Basin studied by this commission on a high priority basis.

Mr. FOLEY. Now is it still the Department's position that possible importations of water to the Colorado River Basin, that there is only one of several alternative means of augmenting water in the Colorado?

Mr. HOLUM. It certainly is, and that is one of the jobs that will be the responsibility of the national water commission, to look at de-

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salting, water reclamation, atmospheric water resources research, and all the various alternative sources for the importation of water, before a final decision would be made.

Mr. FOLEY. Is it correct that at the present state of the Department's knowledge there is no reason to assume that importations of water from outside the Basin might be more feasible than other forms of augmenting water in the Colorado?

Mr. HOLUM. We have made no definitive studies of the application of any of these technologies so we cannot say with finality what the cost would be and which would be the most attractive alternative.

Mr. FOLEY. As a matter of fact, the extent of your studies were cost analysis comparisons between desalting and diversion, is that not correct?

Mr. HOLUM. That would be one of the purposes of the study.

Mr. FOLEY. My question is this. I say is it not correct that the extent of your studies of the feasibility of importing water from outside the basin into the Colorado were in the character of cost comparative studies comparing that method of augmenting with desalinization?

Mr. HOLUM. To the limited extent that we have studied it.

Mr. FOLEY. And to the extent that you did compare the costs, your conclusions were that without further study, it would be impossible to tell which was more feasible.

Mr. HOLUM. That is right. We have no firm data, no information on which to make a final decision at this time.

Mr. FOLEY. Then from the Department's position, and with the Department's present knowledge, is there any reason why this Committee should direct a feasibility study to be presented to the Congress for importation rather than desalinization or whether modification or some other means of augmenting water?

Mr. HOLUM. No, sir. It is the Administration's position that this commission, or whoever does the study, should look at all of the alternatives that are available.

Mr. FOLEY. Not only should they look at all of them, but is it not correct that you have no knowledge on which to even indicate that at the present time it is more likely that the importation of water would be more feasible than desalinization?

Mr. HOLUM. Yes, that is correct.

Mr. FOLEY. Is it correct that it is the Department's consistent position that the Central Arizona project is feasible both financially and from the standpoint of the water resources of the Colorado River at this time, and without regard to any augmentation of water proposals?

Mr. HOLUM. Yes, it is. I say that though in light of what I have said in the past, but I would like to hasten to add that the water problems of the Colorado Basin are critical and these studies should be made, and they should be made on an urgent crash basis, so the answers will be available in the near term future.

Mr. FOLEY. What effect would it have on the economic feasibility of the Central Arizona project unit considered alone if either Marble or Bridge were built?

Mr. HOLUM. Under existing reclamation policy it would seem infeasible.

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Mr. FOLEY. It would be infeasible without one of those two dams?

Mr. HOLUM. Yes.

Mr. DOMINY. That is correct. We would not have the revenue availability that has been a hallmark of reclamation requirements for repayment over the years.

Mr. UDALL. Will my friend yield?

Mr. FOLEY. Yes, I yield.

Mr. UDALL. While you were out, I asked a series of questions on this very point. For your own information you may want to pursue it, but the record has considerable colloquy on this very point.

Mr. FOLEY. Just to finish that line then, either Bridge or Marble being constructed would in your judgment satisfy the feasibility requirements?

Mr. DOMINY. That is correct.

Mr. FOLEY. I think I will reserve whatever time I have remaining.

Mr. JOHNSON. Mr. Burton of Utah.

Mr. BURTON of Utah. Thank you.

I have a few questions to direct to you. First at the bottom of page 8 of your statement you say there will be sufficient funds in the basin account to repay the cost of the Colorado River projects. My question is, are you sure there is sufficient funds allocated to the State of Colorado under the Upper Basin Storage Act to accomplish this payout?

Mr. DOMINY. Yes, sir. While you were out, Congressman Burton, Congressman Rogers inquired about that, and we told him the economic studies we were required to make and to submit to the Congress will clearly demonstrate the accuracy of these statements.

Mr. BURTON of Utah. Are these projects included under the allocations or would these be future allocations?

Mr. DOMINY. We have made a projection of costs and return. We have included the costs of these projects in that projection and find that the revenues will be there to retire such costs as required in the authorizing act.

Mr. BURTON of Utah. Very well. Then again, Mr. Commissioner, on page 12 you state that section 601(a) directing the Secretary to promulgate equitable criteria is clear. I would like to ask, you in your judgment, is this section of the proposed bill, 601, consistent, in your judgment, with the Colorado River compact?

Mr. DOMINY. Yes, I think it is fully consistent with the compact and it is fully consistent with our own projected plan of operating the river.

Mr. BURTON of Utah. You cannot conceive of any future conflicts vis-a-vis that section and the compact?

Mr. DOMINY. No, sir.

Mr. BURTON of Utah. I ask you, in your judgment, is this section 601 compatible with the provisions of the Upper Basin Storage Act of 1956.

Mr. DOMINY. Yes, and it is fully consistent with the filling criteria that we worked out with upper and lower basin participation as to how to operate the river during the filling of Glen Canyon.

Mr. BURTON of Utah. You are aware of my consuming interest in

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Mr. REINECKE. But at what point can you begin to fill those dams? Apparently there is only a 30-percent chance that they will fill in 10 years after you start filling them.

Mr. DOMINY. Oh, no. What we are saying is that we have to predict, of course, on the basis of past hydrologic history on the river, and that in the next 10 years, if history repeats itself, we would have acquired sufficient storage so that you could fill them very easily by the Dixie project, which was authorized 2 years ago, assure that all reimbursable costs above the ability of the water users to pay, can come from the development fund of the lower basin account?

Mr. DOMINY. Yes, we think so if this bill were enacted in its present form. As our studies progressed on the Dixie project we came to the conclusion that a change in plans has become necessary by reason of the failure of the Virgin City damsite to prove watertight and that the costs of a revised plan are likely to be above those which the municipal water users and the irrigators will be able to return in full. This bill would provide the basis for obtaining financial assistance on the overrun in the irrigation costs from a basin account.

Mr. BURTON of Utah. For the record, because of the elimination of the power aspects of the Virgin River Dam, it is pretty well established that the water users themselves cannot repay the project in its present form. I just want to have in the record your statement that this language will protect the Dixie and allow you to repay the costs above the water users ability.

Mr. DOMINY. That is correct.

Mr. BURTON of Utah. And is that the judgment of the Secretary?

Mr. HOLUM. Yes, it is, Congressman. It was always our view that the Dixie project should be part of the Colorado River project. This is completely consistent with the administration position.

Mr. BURTON of Utah. Now, Mr. Commissioner, I understand that a study is being made to extend the Dolores project, which you commented on this afternoon, into San Juan County, Utah. Could you comment on that?

Mr. DOMINY. I would like Mr. McCarthy to comment on that.

Mr. BURTON of Utah. It is not mentioned in the report. I tried to check through this feasibility study, and I see no mention made of it, but it is important to our people. If such an extension is in the works, I would like to know about it.

Mr. DOMINY. There is some study being made, and I would like Mr. McCarthy to tell you the details of it.

Mr. MCCARTHY. We have a reconnaissance study underway at present of the San Juan County area. We will, upon completion of the reconnaissance study—if the findings are favorable—then propose going into a feasibility study for this area.

Mr. BURTON of Utah. If your present study proves that this is feasible, would it be safe to assume that it will be included in this project?

Mr. DOMINY. We would first make the feasibility grade study. Then we would have to get an authorization for it, because we don't have enough information to recommend it as part of this project.

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Mr. BURTON of Utah. Do you think you need separate authorization?

Mr. DOMINY. It would be a separate authorization under the upper basin development fund.

Mr. BURTON of Utah. I didn't stay here and listen to the finish of your colloquy with Mr. Hosmer, but I will read the record tomorrow. Ever since I have heard anything about the Central Arizona, I have been told that these two big dams at Bridge and Marble are cash registers that are going to pay for it. It is still unclear in my mind how you can eliminate a half billion dollar works and still make it feasible. We won't belabor that point now. I will read the record tomorrow.

Mr. Chairman, I would like to reserve the balance of my time.

Mr. ASPINALL. You have about 2 minutes. Mr. Tunney.

Mr. TUNNEY. Mr. Holum, today and last year the Secretary of the Interior, Mr. Udall, had both testified that you are in favor of eliminating the feasibility study conducted by the Secretary of the Interior with the advice of the Colorado Pacific Regional Water Commission, and that in fact you feel that the study should be conducted by a National Water Commission. Now, what would be the relationship of the National Water Commission with the Water Resources Planning Commission that we created last year?

Mr. HOLUM. The administration's proposal, Congressman Tunney, for the creation of a National Water Commission as introduced by Chairman Aspinall of this committee shows a very close relationship between this proposed National Commission, and the Water Resources Council, and the State-Federal Commissions that might be established under the Water Resources Planning Act.

It is my view, and I had an opportunity to express it earlier while you were not able to be here, that there would be a close working relationship between these two groups. The Commission would essentially address its attention to major national issues and big regional issues, and the Water Resources Council and the existing Federal agencies would provide the detailed work and the information that they needed in order to make their decisions. Then their decisions and recommendations having been made, again the agencies would do the actual work.

Mr. TUNNEY. Of course, the Water Resources Planning Commission is precluded by section 3(d) of the act from conducting any interbasin studies.

Mr. HOLUM. That is correct.

Mr. TUNNEY. So this would be a sharp distinction.

Mr. HOLUM. The National Commission, however, as the administration recommends it, would have authority to do that if the authority is granted by the Congress, and it is our recommendation that that authorization be granted.

Mr. TUNNEY. Assuming that the National Water Commission legislation which I believe has already been introduced into the Congress by the chairman of the full committee, were substituted for the present title II of the bill, do you feel that the language that is contained in the current bill for the National Water Commission could

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the Dixie project. I know you have a big interest in it, too. I would like to ask and I would also like to have the Secretary comment on this, does the language in title V that we have written in relating to Would you feel that the same date would apply in the case of a National Commission making a report?

Mr. HOLUM. I think it would be entirely appropriate for the Congress to specify the date on which they wanted this National Commission to report its findings on this specific problem or any other problem that they thought deserved this priority attention.

The administration has already recognized that this problem should receive the highest priority attention.

Mr. TUNNEY. Now, from what I understand of your colloquy with Mr. Hosmer, that the Secretary and that the Bureau of Reclamation would actually be doing work and that the National Commission would be directing the Secretary in this work and setting the policy guidelines, is that correct?

Is my understanding of that correct?

Mr. HOLUM. I don't think that either one would be superior to the other. They would be working essentially in addressing themselves to separate accounting, but on the basis of the closest liaison. I am a keen advocate of the Water Resources Planning Act as enacted by the Congress last year, and I hope that this tool is put to work in the Western States and in the Colorado River Basin.

Mr. TUNNEY. Would the National Water Commission have its own bureaucracies? For instance, its own engineers, hydrologists, and other water experts? Would we be creating a separate agency, a separate bureaucracy, or would we be in fact just providing for a few policymakers who would then utilize the services of the Bureau of Reclamation of the Department of the Interior to do the actual work, leg and study?

Mr. HOLUM. I am sure that the staff of the National Commission would be small. The act provides that they have full authority to call on all the Federal agencies for assistance, help and the technical work that you and I are talking about now.

Mr. TUNNEY. Would the National Water Commission have the right to direct the Secretary to do this investigation and to make a report to the Commission in sufficient time so that the Commission could make a report to this Congress by the 31st of December 1970?

Mr. HOLUM. I thing they would have to have the authority to ask for information and to get it within the time frame that they have to meet in order to meet the directives laid down by the Congress.

Mr. TUNNEY. Well then, certain amendments would probably have to be made to the pending National Water Commission bill to give them the specific authority to direct the Secretary of the Interior in regards to the feasibility study of the Colorado River project.

Mr. HOLUM. I think that the authority is probably implicit in the act the way it has been drafted, but certainly we would look at it carefully, particularly because of the concern of this Committee and the Congress, that these studies which we are talking about here this afternoon, be done quickly and expeditiously.

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Mr. TUNNEY. Would you feel that the problems of the Colorado River Basin would receive first priority under any study by a National Water Commission?

Mr. HOLUM. The letter dated April 30, 1966, signed by the Deputy Director of the Bureau of the Budget says specifically:

> We would favor acceleration and review of western water problems with particular emphasis on the Colorado basin.

This concern that we are talking about here this afternoon is a concern that goes not only through the Congress but all through the executive branch, that a study be made and that it be made quickly and expeditiously.

Mr. TUNNEY. I have no further questions, Mr. Chairman.

Mr. ASPINALL. Mr. Reinecke.

Mr. REINECKE. First, let me thank you gentlemen for cooperating with me to replace those letters that disappeared. I appreciate it very much. We have heard several comments here today regarding the Bridge Canyon Dam that you are not recommending that it be included but inasmuch as it is included in the present legislation are you recommending that it be deleted?

Mr. HOLUM. Yes. The administration's position is quite clear on Bridge Canyon. The administration's position is that it ought to be referred to this national Commission that we have been talking about for study.

Mr. REINECKE. With respect to filling these reservoirs, as you well know I have had several letters between myself and the Department, and there are several statements that came back that I would like to have clarified. In the letter signed by the Secretary, by Secretary Udall, regarding this question, he said:

> We would expect then to fill to a useable content the first runoff, and to fill to maximum capacity after the first full year of operation.

Secondly, I will phrase several things here so you can answer at once. Secondly, in Commissioner Dominy's letter of December 30, he indicated that the filling would be provided for Marble and Bridge Canyon Reservoirs by exchanging storage in either Lake Mead or Lake Powell. Recognizing the capacity of these two reservoirs plus the bank storage of three or four hundred thousand acre-feet will run on the order of four million acre-feet, it seems to me that is quite an exchange that must be effected.

Thirdly, again in the Secretary's letter, he indicates that it appears in the next 10 years there will be a 90-percent chance that the flow of the river would be adequate to fill Marble and Bridge without drawing down Mead and Powell. But he further says that there is a 30-percent chance that all reservoirs would be full within the next 10 years.

Now, does this mean that we have to look to a 10-year filling period before these dams are up to a power-producing capability?

Mr. DOMINY. We are talking, of course, about two dams that are not yet authorized. Were they to be authorized, there would be a construction period of 6 to 7 years, so what we are saying is that there is a 90-percent chance that by the time they were constructed, we would have storage in Lake Mead and——

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very easily be adapted to the current legislation that we are considering?

Mr. HOLUM. I think so. The idea can easily be adapted. The administration's proposed legislation, of course, was prepared on the basis of Congress enacting separate legislation, but the idea can certainly be incorporated into any legislation dealing with this specific problem that the Congress might enact.

Mr. TUNNEY. What about a specific time that the Commission would have to report to the Congress and to the President as to the results of its findings? The present bill being considered specifies December 31, 1970, as the date that the Secretary must make a report. drawing down the two reservoirs without drawing them below their operating heads.

Mr. REINECKE. Do you propose then filling the two present reservoirs to the spill-over level so that you would be in a position to fill these two at such time as they are ready for——

Mr. DOMINY. Certainly, we will bring both Lake Powell and Lake Mead to as high levels as possible, taking into account the requirements on the river for annual depletion, depending, of course, on runoff.

Mr. REINECKE. That still leaves a question in my mind. Also in view of the fact that the Secretary indicated that the study covered a 60-year runoff from 1906 to 1965, and I believe the committee has been informed that some of that early data was not as reliable as we would like to think.

The next question, again quoting from the Secretary's letter:

The various water delivery requirements impose constraints which will not permit optimization of the hydropower system for power production.

Do you agree with this, Mr. Holum and Mr. Dominy?

Mr. HOLUM. Yes, sir. The Colorado River has basic requirements for water supply and they take precedence over power generation. We do not operate this system so as to optimize power generation. We optimize to meet our water requirements. That is our first responsibility.

Mr. REINECKE. Do you feel then that some of our power projects may be contingent upon adequate water supply or I would say optimistic though I am sure that wouldn't be your choice of words.

Mr. HOLUM. The power projections have been made on the basis of careful and conservative estimates as to what the available water will be for power generation.

Mr. REINECKE. There are several other places in this letter where the Secretary refers to contribution to the development fund. Again, this is in consideration of alternative methods of producing that amount of power. Or stated in another way, "thermonuclear plants of the same size as hydro operating on the same basis would contribute much less toward the development fund." And finally, "none of these facilities are substitutes for Bridge or Marble hydro facilities in that they will produce no revenues for the development fund."

It was my understanding that power production was to help pay the cost of the dams with priority being given to the irrigation works.

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Now it appears from the statements here that the dams are being built solely for the sake of putting money into the development fund and not for the works involved in this piece of legislation, is that correct?

Mr. DOMINY. Well, they would be built.

Mr. REINECKE. These are future——

Mr. DOMINY. They would be built for two purposes. Number one, we get cheaper pumping power for the Central Arizona project by having power available from Marble Canyon Dam. With an irrigation allocation we can pay out the Marble Canyon irrigation allocation by a 2½ mill rate for the pumping power, and if we had to go in the market and buy that pumping power, it would be at least 5 mills. So there is that advantage to the project, and helps hold the cost down for the irrigation water supply.

Of course, the irrigation assistance on repayment is also very important, coming from the Marble.

Mr. REINECKE. On that subject that you mention holding down the costs of pumping power, I presume this chart which you included last year, where the various columns show net operating revenue, this is net revenue after operating expenses, that is it is applied toward interest and amortization of the debt, is that right?

Mr. DOMINY. That shows the revenue only after operation and maintenance cost.

Mr. REINECKE. Right. Well then, looking at these two columns under M. & I. water and irrigation, I find that each of these projects pays more than the corresponding allocated costs to M. & I. and irrigation, and as such it doesn't look like power is necessary to help pay out the irrigation costs.

I believe this was stated in the committee recently, that the Central Arizona project will pay for itself out of irrigation and M. & I. water sales without the assistance from the dams.

Mr. MCCARTHY. Mr. Reinecke, the municipal and industrial water rate is set at such a level that it will pay out all of the costs allocated to municipal and industrial water in about 45 years, which leaves 5 years for accumulation of excess municipal and industrial waters revenues to help pay the entire project costs. The irrigation rate of $10 an acre-foot will not pay out the entire irrigation allocation. It requires something in the neighborhood of $183 million of financial assistance from the development fund to meet the irrigation costs.

Mr. REINECKE. This chart shows an unpaid balance at the year 53 of zero.

Mr. MCCARTHY. That is with assistance from the development fund.

Mr. REINECKE. Then the net operating revenue is not the net operating revenue. It is net operating revenue plus subsidization of power, is that right?

Mr. MCCARTHY. It is the net operating revenue, taking out the components of operation and maintenance and pumping power. Out of the $10 per acre-foot charge for irrigation, there is only about $2.70 I believe which is available to retire capital cost, and that is what we consider the net operating revenue.

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Mr. REINECKE. Does this net operating revenue pay for power or does it not?

Mr. MCCARTHY. Yes, as reflected in the column of net power revenue.

Mr. REINECKE. I mean before it comes to this column? It doesn't show on here.

Mr. MCCARTHY. In the $10 rate there is about a $4.50 component for pumping power for irrigation.

Mr. REINECKE. Then the point is, is this net operating revenue after the power is paid for?

Mr. MCCARTHY. Yes, sir.

Mr. REINECKE. Then according to that your column here shows in the year 1953 it will pay itself out without power.

Mr. MCCARTHY. But there is some assistance shown there from the development fund.

Mr. REINECKE. So the gross revenue includes power as well as water revenue, is that right?

Mr. MCCARTHY. To get down to the zero remaining balance to be paid you have to have some revenues from the development fund.

Mr. ASPINALL. The time of the gentleman has expired. The gentleman from California, Mr. Burton.

Mr. BURTON of California. I yield 2 minutes to Mr. Reinecke.

Mr. REINECKE. Thank you kindly. Also in a letter from you, Mr. Dominy, you indicated that there would be access to the lower side of Marble Canyon Dam for the sake of boatsmen and fishermen, is that correct?

Mr. DOMINY. Yes. We have proposed an access road with a boat launching facility immediately below the dam.

Mr. REINECKE. Below Marble?

Mr. DOMINY. Yes.

Mr. REINECKE. Now you also indicated that the river would rise and fall some 15 feet in a 24-hour cycle. I am thinking of the safety of these fellows that are sleeping on sandbars about the time that that flood hits. What do you propose to do about this, or what is the time period between the minimum and the maximum of this peak, peak discharge because of the power requirements?

Mr. DOMINY. This, of course, is something that will have to be worked out in detail, and will have to be very carefully handled with the Park Service. Advice and counsel to the users of the river would have to be very explicit as to the changing in level, when it would occur and how to protect themselves against the very thing you point out.

Mr. REINECKE. Having been at the bottom of the canyon I know of places where you can't get more than two or 3 feet above the level of the river. This would be a rather embarrassing situation.

Mr. DOMINY. I agree. I am confident that Marble Dam does not offer the full potential for peaking power that it might otherwise offer because we will have to restrict the surges to within limits that can be tolerated consistent with park use immediately below.

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Mr. BURTON of California. As I understand it, the Department has concluded that the project is feasible without Bridge Canyon Dam, is that correct?

Mr. HOLUM. Yes, the immediate project that we are considering today.

Mr. BURTON of California. What electrical cost does the $4.50 rate presuppose the 2.5 mills, the 5 mills or what?

Mr. HOLUM. $10 water rate for irrigation purposes ——

Mr. BURTON of California. What mill rate is implicit in that figure?

Mr. DOMINY. Pumping power for irrigation would be 2½ mills and the pumping power for M. & I. would average 4¼ mills per kilowatt-hour at the project pumps.

Mr. BURTON of California. What is the cost for constructing this project without Marble?

Mr. HOLUM. Under all currently existing policies for water resources development in the West it is impossible. Financial assistance is needed as well as pumping power in order to make the project operate.

Mr. BURTON of California. What is the dollar factor? What are the component parts?

Mr. DOMINY. With Marble Canyon Dam in the project plan, and by using the revenues from Parker-Davis Dam and Hoover Dam at higher rates than the users now pay, this project is completely feasible. It would provide in the development fund at the end of 2025 an accumulation of $481 million, a $481 million surplus in the development fund.

Mr. BURTON of California. Taking the bill as the administration has agreed to support it and then taking the bill as is proposed by Congressman Udall, what is the net cost of all the new projects added to the basic bill?

Mr. DOMINY. Of course, the net effect of the five projects in Colorado does not affect the Central Arizona portion of the project, since the financial contribution to the Colorado projects come out of the Colorado storage project fund. They do add, of course, to the total cost of the project over what was considered last year. With both Bridge and Marble as this bill before the committee provides, instead of having an accumulation of $481 million by the year 2025 in the development fund you would have an accumulation of $917 million in the development fund.

Mr. BURTON of California. And if the project was authorized without Bridge and Marble what would it be?

Mr. DOMINY. Without either Bridge and Marble, you would have little accumulation, and you could not build the project at the water rates that we have projected. You would have to either charge more, and, of course, in the case of irrigation we don't think ability to pay is greater than $10 per acre-foot for water, or we would have to subsidize the irrigation water even for operation and maintenance.

Mr. BURTON of California. Is it your testimony then that the added projects wash out and have no effect on water costs for the central Arizona basic plan?

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Mr. DOMINY. That is correct, sir.

Mr. BURTON of California. If I have any time, I would like to yield to Mr. Reinecke.

Mr. REINECKE. Thank you. Just following up on that last question, you mentioned without one of the dams there would not be that deposit in the development fund. Isn't it true that the Parker-Davis and Hoover would be paid out before the end of the century and that their contribution could well pay for the irrigation required here?

Mr. DOMINY. I responded in detail to a question earlier from Congressman Udall on that very point, that theoretically you could build the project without either Marble or Bridge by charging about 5 mills or more for the pumping power. If you did that, you would run the costs of irrigation above the $10 per acre-foot that is the payment capacity, and, therefore, you would have to do something we have never done in any other reclamation project, and that is draw on power revenues to apply on irrigation operations and maintenance.

Mr. UDALL. Would my friend yield there?

Mr. REINECKE. Let me just make one further statement. You are proposing that these dams all contribute to the fund and that since Hoover will be paid out by 1987, I am suggesting these funds could then be applied toward the Central Arizona project.

Mr. DOMINY. Yes.

Mr. REINECKE. Without the incorporation of either Bridge or Marble.

Mr. DOMINY. And I say that when you do that, you still don't have sufficient revenue to meet Reclamation standards. You wouldn't have the cheap pumping power for one thing, and you would have to charge more than the irrigators' payment capacity to just cover irrigation operation and maintenance costs.

Mr. REINECKE. I yield the balance of my time.

Mr. ASPINALL. The gentleman from California, Mr. Burton, has the floor.

Mr. BURTON of California. I have yielded to Mr. Reinecke and he can yield to whoever he sees fit.

Mr. ASPINALL. He cannot yield to whoever he sees fit.

Mr. BURTON of California. I yield to Mr. Udall.

Mr. UDALL. I was going to make the observation neither you nor Mr. Hosmer were in the room, but I said in your own defense at that time I thought if you were here you would point out that California has a considerable interest in these Hoover revenues, but I didn't think there would be a great deal of enthusiasm in California for Arizona taking all of these postpay out revenues for Hoover and Parker-Davis.

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Mr. ASPINALL. The gentleman still has two minutes.

Mr. BURTON of California. I reserve the time.

Mr. ASPINALL. Who wishes to be recognized during the remaining 30 minutes?

Mr. SAYLOR. Mr. Chairman, I would like some time.

Mr. ASPINALL. Hold up your hand if there are any others. This is for your own purposes, not to yield to anybody else. The gentleman from Pennsylvania is recognized for 7 minutes.

Mr. SAYLOR. Mr. Chairman, I would ask unanimous consent that the Bureau furnish us an itemized statement showing the payout study on the Lower Colorado River Basin without Bridge and including Marble in the first study, and without Bridge or Marble in the second study.

Mr. UDALL. Reserving the right to object, does the gentleman from Pennsylvania understand that we had that first study he requested in the 1965 hearings.

Mr. SAYLOR. I was just trying to get it. If they have it I would like to have them bring it up to date and put it in here at this point.

Mr. UDALL. I withdraw my objection.

Mr. ASPINALL. Without objection it is so ordered.

(The information requested follows:)

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Consolidated payout study, Lower Colorado River Basin project (with Marble Canyon unit only)

[In thousands of dollars]

Year of study	Year	Power								Municipal and industrial		
		Net operating revenue	Interest-bearing investment			Non-interest-bearing investment		Allowable unpaid balance	Credit to development fund	Net operating revenue	Interest, at 3.222 percent	Unpaid balance
			Interest, at 3.222 percent	Unpaid balance	Plant in service	Unpaid balance	Plant in service					
	1971											
	1972			169,730	169,730	69,967	69,967	69,967				36,576
1	1973	4,264	5,469	170,936						521	1,178	142,890
2	1974	7,222	5,508	169,222						2,942	4,604	150,635
3	1975	7,134	5,452	167,540						3,316	4,853	209,567
4	1976	7,151	5,398	165,787						3,461	6,752	212,858
5	1977	7,259	5,342	163,870						5,176	6,858	214,540
6	1978	7,273	5,280	161,877						5,472	6,912	215,980
7	1979	7,298	5,216	159,795						5,773	6,959	217,166
8	1980	7,323	5,149	157,621						6,064	6,997	218,099
9	1981	7,352	5,079	155,348						6,384	7,027	218,742
10	1982	7,345	5,005	153,008						6,767	7,048	219,023
11	1983	7,357	4,930	150,581						7,078	7,057	219,002
12	1984	7,372	4,852	148,061						7,381	7,056	218,677
13	1985	7,380	4,771	145,452						7,685	7,046	218,038
14	1986	7,375	4,686	142,763						8,007	7,025	217,056
15	1987	7,370	4,600	139,993						8,334	6,994	215,716
16	1988	7,362	4,511	137,142						8,738	6,950	213,928
17	1989	7,370	4,419	134,191						9,064	6,893	211,757
18	1990	7,365	4,324	131,150						9,387	6,823	209,193
19	1991	20,028	4,226	115,348						9,728	6,740	206,205
20	1992	20,015	3,716	98,950						9,993	6,644	202,856
21	1993	20,186	3,188	81,952						10,337	6,536	199,055
22	1994	20,259	2,640	64,333						10,681	6,414	194,788
23	1995	20,337	2,073	46,069						10,957	6,276	190,107
24	1996	20,401	1,484	27,152						11,307	6,125	184,925
25	1997	20,481	875	7,846		69,967				11,586	5,958	179,297
26	1998	20,523	243	0		57,233				11,939	5,777	173,135
27	1999	20,633	0			36,600				12,224	5,578	166,489
28	2000	20,701				15,899				12,586	5,364	159,267
29	2001	20,203				0			4,306	12,533	5,132	151,866
30	2002	20,203							20,203	12,554	4,893	144,205
31	2003	20,211						20,211	12,504	4,646	136,347	
32	2004	20,210						20,210	12,525	4,393	128,215	
33	2005	24,013						24,013	12,543	4,131	119,803	
34	2006	24,026						24,026	12,496	3,860	111,108	

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[In thousands of dollars]

Year of study	Year	Municipal and industrial			Irrigation						Recapitulation development fund			
		Plant in service	Allowable unpaid balance	Credit to development fund	Net operating revenue	Unpaid balance	Plant in service	Payment from development fund	Allowable unpaid balance	Credit to development fund	Power	Municipal and industrial	Irrigation	Cumulative net balance
	1971													
	1972	36,576	36,576			23,146	23,146		23,146					
1	1973	142,233	142,233		349	219,760	220,108		220,108					
2	1974	148,316	148,316		343	248,835	249,527		249,527					
3	1975	205,711	205,711		3,353	267,299	271,344		271,344					
4	1976				3,357	263,942								
5	1977				3,133	260,809								
6	1978				3,095	257,714								
7	1979				3,065	254,649								
8	1980				3,025	251,624								
9	1981				2,985	248,639								
10	1982				2,874	245,765								
11	1983				2,834	242,931								
12	1984				2,801	240,130								
13	1985				2,749	237,381								
14	1986				2,706	234,675								
15	1987				2,670	232,005								
16	1988				2,557	229,448								
17	1989				2,512	226,936								
18	1990				2,469	224,467								
19	1991				2,343	222,124								
20	1992				2,271	219,853								
21	1993				2,142	217,711								
22	1994				2,010	215,701								
23	1995				1,933	213,768								
24	1996				1,798	211,970								
25	1997				1,725	210,245								
26	1998				1,589	208,656								
27	1999				1,510	207,146								
28	2000				1,356	205,790								
29	2001				1,350	204,440					4,306			4,306
30	2002				1,287	203,153					20,203			24,509
31	2003				1,281	201,872					20,211			44,720
32	2004				1,218	200,654					20,210			64,930
33	2005				1,148	199,506					24,013			88,943
34	2006				1,138	198,368					24,026			112,969

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Consolidated payout study, Lower Colorado River Basin project (with Marble Canyon unit only)—Continued

[In thousands of dollars]

Year of study	Year	Power								Mun cipal and industrial		
		Net operating revenue	Interest-bearing investment			Non-interest-bearing investment		Allowable unpaid balance	Credit to develop-ment fund	Net operating revenue	Interest, at 3.222 percent	Unpaid balance
			Interest, at 3.222 percent	Unpaid balance	Plant in service	Unpaid balance	Plant in service					
35	2007	24,025						24,025	12,516	3,582	102,334	
36	2008	24,036						24,036	12,472	3,294	93,056	
37	2009	24,029						24,029	12,493	2,998	83,561	
38	2010	24,045						24,045	12,448	2,692	73,805	
39	2011	23,711						23,711	12,469	2,378	63,714	
40	2012	23,717						23,717	12,425	2,053	53,342	
41	2013	23,726						23,726	12,386	1,719	42,675	
42	2014	23,725						23,725	12,407	1,375	31,643	
43	2015	23,734						23,734	12,369	1,020	20,294	
44	2016	23,654						23,654	12,390	654	8,558	
45	2017	23,659						23,659	12,351	276	0	
46	2018	23,662							23,662	12,375	0	
47	2019	23,666							23,666	12,340		
48	2020	23,676							23,676	12,281		
49	2021	23,381						69,967	23,381	12,305		
50	2022	23,385						0	23,385	12,273		
51	2023	23,394							23,394	12,240		
52	2024	23,392							23,392	12,264		
53	2025	23,405	0	0	169,730	0	69,967	0	23,405	12,235	0	0
	Subtotal	911,124	108,436	0	169,730	0	69,967	0	562,991	533,081	225,540	0
54	2026	23,355			169,730		69,967		23,355	12,203		
55	2027	23,353							23,353	12,173		
56	2028	23,364							23,364	12,147		
57	2029	23,364							23,364	12,117		
58	2030	23,390							23,390	12,081		
59	2031	23,230							23,230			
60	2032											
61	2033											
62	2034											
63	2035	23,230							23,230			
64	2036	23,211							23,211			
75	2047	23,211			169,730		69,967		23,211	12,081		
	Total	1,422,632	108,436		169,730		69,967		1,074,499	799,179	225,540	

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[In thousands of dollars]

Year of study	Year	Municipal and industrial			Irrigation						Recapitulation of development fund			
		Plant in service	Allowable unpaid balance	Credit to development fund	Net operating revenue	Unpaid balance	Plant in service	Payment from development fund	Allowable unpaid balance	Credit to development fund	Power	Municipal and industrial	Irrigation	Cumulative net balance
35	2007				1,085	197,283					24,025			136,994
36	2008				1,073	196,210					24,036			161,030
37	2009				1,010	195,200					24,029			185,059
38	2010				997	194,203					24,045			209,104
39	2011				925	193,278					23,711			232,815
40	2012				920	192,358					23,717			256,532
41	2013				895	191,463					23,726			280,258
42	2014				843	190,620					23,725			303,983
43	2015				824	189,796					23,734			327,717
44	2016				751	189,045					23,654			351,371
45	2017			3,517	743	188,302					23,659	3,517		378,547
46	2018			12,375	671	187,631					23,662	12,375		414,584
47	2019			12,340	659	186,972					23,666	12,340		450,590
48	2020			12,281	640	186,332					23,676	12,281		486,547
49	2021		205,711	12,305	566	185,766			271,344		23,381	12,305		522,233
50	2022		169,135	12,273	551	185,215			248,198		23,385	12,273		557,891
51	2023		63,478	12,240	530	51,236		133,449	51,236		23,394	12,240	−133,449	460,076
52	2024		57,359	12,264	475	21,817		28,944	21,871		23,392	12,264	−28,944	466,788
53	2025	205,711	0	12,235	449	0	271,344	21,368	0	0	23,405	12,235	−21,368	481,060
	Subtotal	205,711	0	101,830	87,583	0	271,344	183,761	0	0	562,991	101,830	−183,761	481,060
54	2026	205,711		12,203	443		271,344			443	23,355	12,203	443	517,061
55	2027			12,173	408					408	23,353	12,173	408	552,995
56	2028			12,147	381					381	23,364	12,147	381	588,887
57	2029			12,117	366					366	23,364	12,117	366	624,734
58	2030			12,081	324					324	23,390	12,081	324	660,529
59	2031										23,230			
60	2032													
61	2033													
62	2034													
63	2035										23,230			
64	2036										23,211			
75	2047	205,711		12,081	324		271,344			324	23,211	12,081	324	
	Total	205,711		367,928	95,013		271,344	183,761		7,430	1,074,499	367,928	176,331	1,266,096

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Consolidated payout study, Lower Colorado River Basin project (exclusive of mainstream reservoir division)

[In thousands of dollars]

Year of study	Year	Power		Municipal and industrial						Irrigation					Recapitulation of development fund				Year of study
		Net operating revenue [1]	Credit to development fund	Net operating revenue [2 3]	Interest, at 3.222 percent	Unpaid balance	Plant in service	Allowable unpaid capital investment	Credit to development fund	Net operating revenue [2]	Unpaid balance	Plant in service	Allowable unpaid capital investment	Payment from development fund	Power [4]	Municipal and industrial	Irrigation	Cumulative net balance	
----	1972					36,576	36,576	36,576			23,146	23,146	23,146						----
1	1973			522	1,178	142,889	142,233	142,233		349	219,759	220,108	220,108						1
2	1974			2,715	4,604	150,861	148,316	148,316		−2,513	251,691	249,527	249,527						2
3	1975			3,063	4,861	210,054	205,711	205,711		−4,107	277,615	271,344	271,344						3
4	1976			3,162	6,768	213,660				−3,979	281,594								4
5	1977			4,783	6,884	215,761				−3,927	285,521								5
6	1978			5,038	6,952	217,675				−3,845	289,366								6
7	1979			5,301	7,013	219,387				−3,759	293,125								7
8	1980			5,565	7,069	220,891				−3,683	296,808								8
9	1981			5,827	7,117	222,181				−3,607	300,415								9
10	1982			6,244	7,159	223,096				−3,678	304,093								10
11	1983			6,506	7,188	223,778				−3,603	307,696								11
12	1984			6,776	7,210	224,212				−3,523	311,219								12
13	1985			7,046	7,224	224,390				−3,463	314,682								13
14	1986			7,314	7,230	224,306				−3,394	318,076								14
15	1987			7,591	7,227	223,942				−3,322	321,398								15
16	1988			8,007	7,215	223,150				−3,399	324,797								16
17	1989			8,283	7,190	222,057				−3,336	328,133								17
18	1990			8,552	7,155	220,660				−3,267	331,400								18
19	1991	12,592	12,592	8,860	7,110	218,910				−3,230				3,230	12,592		−3,230	9,362	19
20	1992			9,030	7,053	216,933				−3,069				3,069			−3,069	18,885	20
21	1993			9,343	6,990	214,580				−3,038				3,038			−3,038	28,439	21
22	1994			9,659	6,914	211,835				−3,014				3,014			−3,014	38,017	22
23	1995			9,852	6,825	208,808				−2,871				2,871			−2,871	47,738	23
24	1996			10,180	6,728	205,356				−2,854				2,854			−2,854	57,476	24
25	1997			10,381	6,617	201,592				−2,715				2,715			−2,715	67,353	25
26	1998			10,715	6,495	197,372				−2,704				2,704			−2,704	77,241	26
27	1999			10,928	6,359	192,803				−2,578				2,578			−2,578	87,255	27
28	2000	12,592	12,592	11,281	6,212	187,734				−2,596				2,596	12,592		−2,596	97,251	28
29	2001	12,080	12,080	11,194	6,049	182,589				−2,494				2,494	12,080		−2,494	106,837	29
30	2002			11,239	5,883	177,233				−2,517				2,517			−2,517	116,400	30

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31	2003			11,157	5,710	171,786				−2,415				2,415			−2,415	126,065	31
32	2004	12,080	12,080	11,203	5,535	166,118				−2,438				2,438	12,080		−2,438	135,707	32
33	2005	15,873	15,873	11,242	5,352	160,228				−2,464				2,464	15,873		−2,464	149,116	33
34	2006			11,166	5,163	154,225				−2,374				2,374			−2,374	162,615	34
35	2007			11,211	4,969	147,983				−2,387				2,387			−2,387	176,101	35
36	2008			11,143	4,768	141,608				−2,299				2,299			−2,299	189,675	36
37	2009			11,188	4,563	134,983				−2,321				2,321			−2,321	203,227	37
38	2010	15,873	15,873	11,119	4,349	128,213				−2,238				2,238	15,873		−2,238	216,862	38
39	2011	15,533	15,533	11,164	4,131	121,180				−2,271				2,271	15,533		−2,271	230,124	39
40	2012			11,096	3,904	113,988				−2,180				2,180			−2,180	243,477	40
41	2013			11,039	3,673	106,622				−2,113				2,113			−2,113	256,897	41
42	2014			11,085	3,435	98,972				−2,125				1,125			−2,125	270,305	42
43	2015	15,533	15,533	11,031	3,189	91,130				−2,056				2,056	15,533		−2,056	283,782	43
44	2016	15,444	15,444	11,076	2,936	82,990				−2,089				2,089	15,444		−2,089	297,137	44
45	2017			11,019	2,674	74,645				−2,009				2,009			−2,009	310,572	45
46	2018			11,071	2,405	65,979				−2,041				2,041			−2,041	323,975	46
47	2019			11,022	2,126	57,083				−1,970				1,970			−1,970	337,449	47
48	2020	15,444	15,444	10,966	1,839	47,956				−1,900	331,400			1,900	15,444		−1,900	350,993	48
49	2021	15,124	15,124	11,018	1,545	38,483		205,711		−1,938	271,344		271,344	61,994	15,124		−61,994	304,123	49
50	2022			10,975	1,240	28,748		169,135		−1,873	248,198		248,198	25,019			−25,019	294,228	50
51	2023			10,932	926	18,742		63,478		−1,809	51,236		51,236	198,771			−198,771	110,581	51
52	2024			10,984	604	8,362		57,359		−1,829	21,817		21,817	31,248			−31,248	94,457	52
53	2025	15,124	15,124	10,948	269	0	205,711	0	2,317	−1,779	0	271,344	0	23,596	15,124	2,317	−23,596	88,302	53
	Subtotal	499,983	499,983	479,812	271,784		205,711		2,317	−142,654	0	271,344		413,998	499,983	2,317	−413,998	88,302	
54	2026	15,063	15,063	10,904	0		205,711		10,904	−1,723	0	271,344		1,723	15,063	10,904	−1,723	112,546	54
55	2027			10,868					10,868	−1,664				1,664		10,868	−1,664	136,813	55
56	2028			10,839					10,839	−1,614				1,614		10,839	−1,614	161,101	56
57	2029			10,802					10,802	−1,554				1,554		10,802	−1,554	185,412	57
58	2030	15,063	15,063	10,773					10,773	−1,528				1,528	15,063	10,773	−1,528	209,720	58
59	2031	14,903	14,903												14,903			233,868	59
60	2032																	258,016	60
61	2033																	282,164	61
62	2034									−1,528				1,528			−1,528	306,312	62
63	2035	14,903	14,903	10,773					10,773	−1,527				1,527	14,903	10,773	−1,527	330,461	63
64	2036	14,884	14,884	10,772					10,772						14,884	10,772		354,590	64
75	2047	14,884	14,884	10,772	0		205,711		10,772	−1,527	0	271,344		1,527	14,884	10,772	−1,527	620,009	75
	Total	828,421	828,421	717,127	271,784		205,711		239,632	−176,700	0	271,344		448,044	828,421	239,632	−448,044	620,009	

[1] Net operating revenue of power from Boulder Canyon and Parker-Davis projects after their respective payouts at same rates used in other studies.

[2] Pumping energy for Central Arizona project purchased commercially at 6.5 mills per kilowatt-hour. (See attached explanation.)

[3] Required charge for municipal and industrial water is $50.70.

[4] Power net operating revenues used to finance irrigation net operating deficiency after 1990.

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An average cost for power of 6.5 mills per kwhr has been used throughout this study. Use of this figure has been based upon several considerations. During the period of purchase of power to offset Hoover capacity impairment (1964–1965), the best price the Bureau of Reclamation received in the area was $1.50 per kw month, plus 3 mills for energy. This equates to an average price of 5.3 mills per kwhr at 88 percent load factor. This price was one secured during a period of power surplus and is not expected to be available throughout the repayment period of the project. Nevertheless, if the $1.50 and 3 mill rate is projected throughout the payout period in relationship to the expected load factor on the project pumps, the rate in 2025 would be 7.4 mills. This rate does not include provision for any special transmission. However, transmission would be required from sources of power supply to the various pump sites. The cost of this transmission is estimated at $135.00 per kw of installed pump capacity. The annual cost of such transmission, considered as an irrigation cost, is equivalent to 0.7 mills per kwhr. If the above favorable rates could be obtained throughout the payout period, the cost of power delivered to the pumps would run, including transmission, from 6 mills in 1975 to 8.1 in 2025. However, it is recognized that technology is improving and is lowering costs of producing power. In recognition of the fact that the 6.0 mill rate is probably low at the beginning of the payout period and that the 8.1 mill rate is probably high at the end, a constant rate of 6.5 mills has been used throughout the study.

To cover the possibility that technical improvements may result in more favorable power rates in the future than assumed in the study, a separate payout analysis was run using a constant rate of 5.0 mills per kwhr throughout the study. A comparison of the results of the two studies is as follows:

	Development fund balance	
	5-mill energy	6.5-mill energy
Year 2025:		
Irrigation	[1] −$327,659,000	[1] −$413,998,000
Power	499,983,000	499,983,000
Municipal and industrial	56,102,000	2,317,000
Balance	228,426,000	88,302,000
Year 2047:		
Irrigation	[1] −346,158,000	[1] −448,044,000
Power	828,421,000	828,421,000
Municipal and industrial	307,228,000	239,632,000
Balance	789,491,000	620,009,000

[1] Total financial assistance required for irrigation, including assistance in meeting operation and maintenance costs.

Mr. SAYLOR. In the bill before us, the Secretary of Interior is charged with the responsibility of planning the first stages of work to import water in the Colorado River from outside the natural drainage area, "which shall include facilities to provide 2,500,000 acre-feet annually for use in the main stream of the Colorado River below Lee Ferry including satisfaction of the obligations of the Mexican treaty and losses of water associated with the performance of that treaty."

Has the Bureau made any study or can you tell us what will be the cost of that 2.5 million acre-feet of water?

Mr. DOMINY. No, sir, we have not made any detailed study or even reconnaissance studies, so we could not give you any cost estimate at this time.

Mr. SAYLOR. Then the second question, if this is the case, then you would not be in a position to give us any cost estimate whatsoever of the next three facilities which are requested to be studied, namely 2 million acre-feet of the Colorado River for use in the Lower Colorado

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River Basin; up to 2 million acre-feet annually in the Colorado River system for use in the Upper Colorado River Basin, and such additional quantities not to exceed 2 million acre-feet as the Secretary may find may be required and marketable in areas which can be served by transportation facilities in route to the Colorado River system.

Mr. DOMINY. No, sir.

Mr. SAYLOR. Do you know, Mr. Dominy, of any person in the United States or anywhere else who has made a study that could tell this committee the cost of that water?

Mr. DOMINY. There have been some so-called paper studies, but no engineering and economic study of competence has been made.

Mr. ASPINALL. Will the gentlemen yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. Mr. Holum, in this title II, page 29, there is this language: "The Secretary is authorized and directed to prepare planning and feasibility reports of a staged plan for projects, adequate in his judgment," and etc. Does this mean Congress gives authority for the preparation of a feasibility report before a reconnaissance study is made?

Mr. HOLUM. Yes, sir, Chairman Aspinall. We are forbidden by law to make feasibility studies now, including those that involve interbasin transfers of water, without specific act of Congress.

Mr. ASPINALL. Yes, but you are supposed to go ahead and make your investigations first, and under the present policy under which you are operating, you make your reconnaissance survey and then you come up and ask us for this authority. This comes because of the act passed last year.

Now, there hasn't been any reconnaissance surveys made on this project as yet, have there?

Mr. HOLUM. No, sir, there have not been any reconnaissance surveys, but we also are forbidden at the present time to make feasibility studies, including those that involve interbasin transfers of water, and unless Congress gives us specific authority in this legislation or in some other legislation, we cannot make feasibility studies.

Mr. ASPINALL. Do you think it would be better if you just asked for and got authority to spend some money for reconnaissance studies to see where you are? You don't have to answer. Thank you.

Mr. HOLUM. Under any procedure we would be required to make reports to the Congress——

Mr. ASPINALL. You have authority to make reconnaissance surveys provided you can get appropriations from the Appropriations Committee and the Congress of the United States. You don't have to ask for that authority in this legislation. That is all.

Mr. SAYLOR. Mr. Secretary, is there anything in this legislation that can tell this committee the needs of the States outside of the Colorado River Basin who might need or use water from the Columbia, northern California, the Mississippi, the Missouri or the Great Lakes? In other words, is there any survey that you have made that can tell us what the water needs are at the present time? The reason I ask that, Mr. Secretary, we had a man here from Texas this morning who said Texas needed for the Panhandle somewhere between 11 and 17 million acre-feet. He said he had word from Kansas that they needed be-

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tween 4 and 5 million acre-feet, and I haven't taken up the other States in between. I would just like to know if anybody down there has any idea of how big an undertaking this is?

Mr. HOLUM. I don't think there is any question, Congressman Saylor, but that maintaining, establishing first of all and then maintaining a current inventory of the Nation's water needs and water deficiencies is a major job. I have had the opportunity to listen to part of the statement of the gentleman from Texas, and certainly while I don't see any easy answer to the problems that they raise, it is obvious that there is a serious water problem in western Texas and there are serious water problems in lots of other areas of the country.

Mr. ASPINALL. The time of the gentleman has expired. The gentleman from California, Mr. Tunney, will you yield to the Chair?

Mr. TUNNEY. Yes, Mr. Chairman.

Mr. ASPINALL. Mr. Holum, would you furnish for the committee an estimated cost of making a study, a reconnaissance survey for the importation of water as suggested in this legislation, with and without the State of Texas?

Mr. HOLUM. I will be happy to, Mr. Chairman.

Mr. ASPINALL. I ask unanimous consent that it be placed in the record when received. There is no objection. It is so ordered.

(The information referred to follows:)

ESTIMATED COST OF RECONNAISSANCE STUDIES OF MEANS TO AUGMENT COLORADO RIVER WATER SUPPLY

The purpose of such reconnaissance studies would be to determine the approximate costs of various means of augmenting Colorado River flows. The studies would be of sufficient accuracy to permit comparison of the costs of alternative means of augmenting Colorado River flows and to guide the selection and prosecution of subsequent feasibility type studies. A period of three years would be required for such studies.

Source of Augmentation:	*Estimated study cost*
Columbia Basin Import	$2,000,000
Northern California Import	1,000,000
Desalting	500,000
Water Salvage and Waste Water Renovation	500,000
Weather Modification	(1)
Total	4,000,000

[1] Already funded.

If means to augment water supplies in Western Texas were included in the estimate an additional $1,000,000 would be required, bringing the total to $5,000,000.

It is estimated that follow-up feasibility studies would cost from two to three times as much reconnaissance studies.

Title II of the recommended revision of H.R. 4671 presented in Committee Print No. 19 also directs other studies as follows:

(1) Prepare estimates of the long-range water supply available for consumptive use in the Upper and Lower Basins of the Colorado River, of current water requirements in said basins, and of the rate of growth of water requirements to at least the year 2030.

(2) Investigate projects within the Lower Basin including projects on tributaries of the Colorado River, where undeveloped water supplies are available or can be made available by replacement or exchange.

(3) Undertake investigation, in cooperation with other concerned agencies, of the feasibility of proposed development plans in monitoring an adequate water quality throughout the Colorado River system.

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Studies to accommodate these items are already underway as parts of existing Federal agency planning programs or are scheduled to start in fiscal year 1967 or part of the Federal interagency comprehensive basin planning program.

Mr. ASPINALL. Mr. Tunney?

Mr. TUNNEY. Thank you, Mr. Chairman. Mr. Secretary, in your statement this morning on page 2 you indicated that the administration recommends that "the study be conducted under the direction of the National Water Commission rather than carried out by the Secretary of the Interior with the advice and assistance of the regional water commissioner as the bill provides."

Now those words, "rather than carried out by the Secretary of the Interior" seems to indicate that the National Water Commission is going to be conducting the study to the exclusion of the Secretary of the Interior.

Mr. HOLUM. If it indicates that view, Congressman Tunney, I was very careless with the words that I used, because certainly the Secretary of the Interior and the Water Resources Council will have and must have a major role in these studies. But again I reiterate our conviction in the administration that there are certain broad policy questions, and certain important problems with interregional implications that ought to be studied by this National Water Commission.

Mr. TUNNEY. I just would like to tie down for my own purposes and benefit this language. Then you believe that your statement this morning was intended to convey the impression that the National Water Commission would have the right to conduct these studies, but that the Secretary of the Interior would be working under the National Water Commission, and perhaps would also be directed by the National Water Commission to do certain leg work in this feasibility study?

Mr. HOLUM. I would like to change the preposition. In both cases when I speak of the Secretary of the Interior, it is both as Secretary of his department and as Chairman of the Water Resources Council, to say "with" instead of "under". I think it would be a joint cooperative effort.

Mr. TUNNEY. As I read the National Water Commssion legislation S. 3107 as it has been introduced on the Senate side, under section 6 it says that "The Commission shall to the extent practicable utilize the services of the Federal Water Resources agencies" and then it goes on. Nowhere there do I see any language empowering the Commission to direct the Secretary of the Interior to conduct a study, and consequently if we were to incorporate the language of this National Water Commission bill into title II of the bill before us, we would have to rewrite it to some extent to give it the power to direct the Secretary to report to it within 5 years, if we were going to remain within the spirit of title II as it is presently written, isn't that right?

Mr. HOLUM. Yes, I think so.

Mr. TUNNEY. I have no further questions.

Mr. ASPINALL. Will you yield to the gentleman from California? The gentleman from California is recognized on his own.

Mr. REINECKE. Thank you, Mr. Chairman. Again, referring to the Secretary's letter, Mr. Chairman, I ask unanimous consent that this letter and my letter asking these questions, be made a part of the record.

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Mr. ASPINALL. Will you let the chairman see what it is? Unless there is objection, the request will be granted.

(The letter referred to follows:)

HOUSE OF REPRESENTATIVES,
Washington, D.C., April 25, 1966.

Mr. WILLIAM PECORA, *Director,*
U.S. Geological Survey
Washington, D.C.

DEAR MR. DIRECTOR: On May 9, the House Committee on Interior and Insular Affairs will reopen hearings on the Central Arizona Project legislation.

In view of partial and/or conflicting testimony regarding the problem relating to the operation of Marble and Bridge Canyon dams, I would be very grateful if you could provide this Member with your usual high quality, objective conclusions to the following statements and questions. This legislation has far reaching implications and costs, and due to the fact that Secretary Udall has frequently cited your office as the most knowledgeable source of water control and management information, I am relying on you to be of substantial assistance to the committee in its deliberation on this matter.

Time, unfortunately, is short for this request but I sincerely hope that you will be able to provide the desired information. It will be very much appreciated.

1. What should be anticipated for evaporative losses from the projects defined in this legislation:

Bridge Canyon Reservoir at half capacity and full capacity;
Marble Canyon Reservoir at half capacity and full capacity;
Dallas Creek Reservoir at half capacity and full capacity;
Animas-La Plata Reservoir at half capacity and full capacity;
Dolores Creek Reservoir at half capacity and full capacity.

2. In view of the substantial non-recoverable loss to seepage (and/or bank storage) from Lake Powell, do you anticipate any similar type of losses from the projects mentioned above. A quantitative answer is desired if possible. Please indicate these losses with each reservoir half full and full.

3. The geological formation at the proposed Marble Dam site has been questioned. Do you consider possible losses from this cause a serious threat?

4. If only Marble Canyon dam were built, what would be the probable effects and losses on the operation of that dam and its related effect on Hoover Dam?

5. If only Bridge Canyon dam were built, what would be the probable effects and losses on the operation of that dam and its related effect on Hoover Dam?

6. If both Bridge and Marble are built, what would then be the combined losses and their effects on the Hoover operation (assume that Bridge and Marble are to be operated according to the schedule proposed by the Bureau of Reclamation).

7. Regarding the problem of filling these reservoirs, can you by the Q theory provide a probability curve for filling these five reservoirs giving priority to Bridge, then Marble, but recognizing the power head requirements for operation at Hoover and Glen Canyon and of course treaty obligations to Mexico, the lower basin States, and anticipated stream losses as well as bank storage and evaporation losses for the entire length of the river.

8. Please provide your best judgment for a plan of River Operation interrelating water and power commitments and the probability of water flow, keeping all reservoirs at or above: minimum specified power head.

9. What appears to be the best possible power output from this combination of four dams? Can you compute power production and probable costs based on 50-year authorization of capital expenditures and interest rates of 3.222%, 3½%, 4%, 4½%? Construction cost and operating cost figures to be those supplied by the Bureau before the Committee.

10. If known, what alternative sources of power may be considered, i.e. nuclear, coal, oil, gas and what costs and payout periods should be anticipated? How practical are these alternatives in your opinion?

11. Finally, what alternative sources of power are available in terms of other agency construction, private utilities, municipal or state utilities? Comparative costs (construction and mill rate) would be desirable.

12. Please provide any pertinent information available regarding the possible transport of 3 to 8 million acre feet of water through open canal (presumably lined) from the general area of the Pacific Northwest to a convenient point near Lee Ferry.

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13. On pages 155–160 of the Lower Colorado River Basin Project Hearings of August 23–31, Sept. 1, 1965, Serial No. 17, Mr. Dominy and I discussed bank storage and the question of recovery from it. I would appreciate your comments on that exchange.

Your response prior to May 6, even if only in part, will be genuinely appreciated. Thank you.

Sincerely,

ED REINECKE,
Member of Congress.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., May 6, 1966.

Hon. ED REINECKE
House of Representatives
Washington, D.C.

DEAR MR. REINECKE: Your letter of April 25, 1966, addressed to the Geological Survey requested answers to several questions associated with the Colorado River Basin Project proposal. On projects such as this the Geological Survey and the Bureau of Reclamation of this Department are in close contact with each contributing in their respective fields of expertise. This definition of responsibility and close working relationship is necessary to eliminate duplication of effort. The answer to your questions reflect the expert judgment of the two agencies' staffs.

1. "What should be anticipated for evaporative losses from the projects defined in this legislation:

Bridge Canyon Reservoir at half capacity and full capacity;
Marble Canyon Reservoir at half capacity and full capacity;
Dallas Creek Reservoir at half capacity and full capacity;
Animas-La Plata Reservoir at half capacity and full capacity;
Dolores Creek Reservoir at half capacity and full capacity."

Bridge Canyon Reservoir at full capacity, elevation 1,866 feet—85,000 acre-feet. The normal plan of operation contemplates only a 4-foot drawdown—hence the figure of 85,000 acre-feet represents the average annual evaporation losses Since we don't anticipate operation at one-half storage capacity, we have not made computations of reservoir losses at that capacity.

Marble Canyon Reservoir at full capacity, elevation 3,140 feet—10,000 acre-feet. Since this reservoir has a normal expected drawdown of 10 feet, it is assumed that the evaporation loss with a full reservoir would represent future average annual losses. We have not made computations of reservoir losses at half capacity.

The Dallas Creek Project has three reservoirs. Our reservoir operation studies show a combined average annual evaporation loss of 4,100 acre-feet.

The Animas-La Plata Project has five reservoirs. Our reservoir operation studies show a combined average annual evaporation loss of 6,600 acre-feet from these reservoirs.

The Dolores Project has four reservoirs. Our reservoir operation studies show a combined average annual evaporation loss of 8,500 acre-feet from these reservoirs.

The future evaporation losses from these reservoirs is included in the estimates of future depletion of the flows of the Colorado River at Lee Ferry.

2. "In view of the substantial non-recoverable loss to seepage (and/or bank storage) from Lake Powell, do you anticipate any similar type of losses from the projects mentioned above. A quantitative answer is desired if possible. Please indicate these losses with each reservoir half full and full."

With the possible exception of the Marble Canyon Reservoir, we do not anticipate any large accumulations of bank storage at these reservoirs. As indicated in Commissioner Dominy's letter of December 30, 1965, to you, we recognize there will be an accumulation of bank storage during the initial filling period of the Marble Canyon Reservoir. Our preliminary estimates indicate that this bank storage could amount to between *300,000* and *400,000* acre-feet.

3. "The geological formation at the proposed Marble Dam site has been questioned. Do you consider possible losses from this cause a serious threat?"

No. A grouting program is anticipated in connection with the Marble Canyon Dam and Powerplant to minimize the loss of water around the damsite.

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Any water that would escape from the reservoir by seepage would return to the Colorado River and be available for use at the proposed Bridge Canyon site and Lake Mead. In our computations of power output at Marble Canyon, we have assumed that 200 cubic feet per second of streamflow might seep past the dam and not be available for use at the Marble Canyon powerplant. This water would return to the river system as streamflow available for use in downstream areas. Such a seepage loss would be a very small percentage of the total flow at this site.

4. "If only Marble Canyon dam were built, what would be the probable effects and losses on the operation of that dam and its related effect on Hoover Dam?"

After the initial filling of the reservoir, the effects at Hoover Dam would be to decrease the annual inflow and the annual outflow by the amount of the annual evaporation loss of 10,000 acre-feet from the Marble Canyon Reservoir.

5. "If only Bridge Canyon dam were built, what would be the probable effects and losses on the operation of that dam and its related effect on Hoover Dam?"

After the initial filling of the reservoir, the entire inflow, except for the relatively small annual evaporation loss of 85,000 acre-feet, would be released. The annual inflow to Lake Mead and the annual release from that reservoir would be decreased by 85,000 acre-feet per year.

6. "If both Bridge and Marble are built, what would then be the combined losses and their effects on the Hoover operation (assume that Bridge and Marble are to be operated according to the schedule proposed by the Bureau of Reclamation)."

The combined annual evaporation losses from Bridge Canyon and Marble Canyon Reservoirs are estimated to be 95,000 acre-feet. With this annual depletion on the river, the inflow to Lake Mead and the outflow from that reservoir would be decreased by 95,000 acre-feet.

7. "Regarding the problem of filling these reservoirs, can you by the Q theory provide a probability curve for filling these five reservoirs giving priority to Bridge, then Marble, but recognizing the power head requirements for operation at Hoover and Glen Canyon and of course treaty obligations to Mexico, the lower basin States, and anticipated stream losses as well as bank storage and evaporation losses for the entire length of the river."

Insofar as the reservoirs associated with the three Upper Basin projects (Animas-La Plata, Dolores, and Dallas Creek), these will be filled as needed in connection with the use of water from these projects. We would expect them to fill to a usable content the first runoff season following completion and to fill to maximum capacity the first series of average years or during the first year of above average runoff following the first year of operation. Water withheld from the stream during the initial filling of these reservoirs associated with Upper Basin projects, the annual evaporation losses therefrom, and the depletion effects of water released from such reservoirs and diverted to lands were taken into consideration in making our estimate of future average annual Upper Basin depletions as summarized on pages 229 and 230 of hearings of August 23 to September 1, 1965, on H.R. 4671 and similar bills (Serial No. 17).

As indicated in response to item 11 in Commissioner Dominy's letter of December 30, 1965, to you, it is expected that, if necessary, provisions could be made to fill Marble Canyon and Bridge Canyon Reservoirs by exchanging storage in either Lake Mead or Lake Powell.

Taking into account the present storage contents of the reservoirs the probable demands below Lake Mead, the anticipated schedule of upstream depletions, etc., it appears that in the next 10 years there would be a 90 percent chance that the flow of the Colorado River would be adequate to fill Marble and Bridge Canyon without drawing Lake Mead or Lake Powell below the rated power head. There is a 97 percent chance that filling of these reservoirs could be accomplished without drawing Lake Powell and Lake Mead below the minimum power pool. There is a 30 percent chance that all reservoirs would be full within the next 10 years.

8. "Please provide your best judgment for a plan of River Operation interrelating water and power commitments and the probability of water flow, keeping all reservoirs at or above minimum specified power head."

It is contemplated that the reservoirs of the Colorado River Storage Project and Lake Mead will be operated primarily to meet present and future consumptive use demands in the United States according to compact and to meet the Mexican water treaty commitment. Within these primary objectives, the water

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will be released in such a manner as to generate the maximum practical amount of electrical energy. The project analysis has used a series of four cyclic operation studies based on four levels of upstream development. Each study covered the 60-year runoff sequence 1906 to 1965, inclusive. The results of these studies are summarized on page 236 of the hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, on H.R. 4671 and similar bills, August 23 to September 1, 1965 (Serial No. 17).

9. "What appears to be the best possible power output from this combination of four dams? Can you compute power production and probable costs based on 50-year authorization of capital expenditures and interest rates of 3.222%, 3½%, 4%, 4½%? Construction cost and operating cost figures to be those supplied by the Bureau before the Committee."

We assume that the four dams you speak of are Glen Canyon, Marble Canyon, Bridge Canyon, and Hoover. As pointed out above, the reservoir system is operated first to meet the water commitments and second for power production. *The various water delivery requirements impose constraints which will not permit optimization of the hydropower system for power production.*

The average estimated annual energy generation at the four powerplants using the water supply analysis summarized on page 236 of the August 23-September 1, 1965, hearings, is summarized as follows:

Estimated power production at the powerplants

[Billions of kilowatt-hours]

Powerplant	Year			
	1975	1990	2000	2025
Glen Canyon	4.69	4.36	4.13	4.01
Hoover	4.40	3.96	3.79	3.58

Estimated delivery at load center[1]

[Billions of kilowatt-hours]

Powerplant	Year			
	1975	1990	2000	2025
Bridge Canyon	5.39	4.99	4.84	4.69
Marble Canyon	2.35	2.16	2.11	2.04

[1] Peaking power and energy (35 to 37 percent load factor) with deduction for transmission losses to load centers in Phoenix, Ariz., and Los Angeles, Calif.

Repayment arrangements for the Glen Canyon power system have been justified and are being accomplished as part of the Colorado River Storage Project and it would be inappropriate to evaluate it by the alternative amortization criteria given. This is also true of the Hoover plant which has been under the repayment schedule of the Boulder Canyon Project for some years. The repayment schedule presented to the committee for the Lower Colorado River Basin Project pools all revenue from water and power, including the Hoover, Parker, and Davis plants, after payout and retires the interest-bearing investment as quickly as possible. This procedure shortens the amortization period for all interest-bearing components and produces the greatest amount of revenue to the proposed development fund. The interest rate used was 3.222 percent, the current approved rate for Federal water resource projects under the Water Supply Act of 1958. Any change in this rate would be inconsistent with the current directive of the Congress. Another factor taken into account in the Lower Colorado River Basin Project is that Reclamation law permits costs associated with irrigation to be interest-free, and pumping power costs allocated to irrigation are carried as an interest-free component. However, for the purpose of

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demonstrating the magnitude of change in unit cost of power produced by a varying interest rate, we have made a theoretical analysis of the costs associated with the power allocation of the Bridge and Marble proposals using your prescribed interest rates and a 50-year amortization period. We would like to emphasize that the repayment period and method of interest computation used in this theoretical analysis are *not* consistent with the development fund concept proposed by the current legislation. The results of this study are shown on Attachement A.

10. "If known, what alternative sources of power may be considered, i.e. nuclear, coal, oil, gas and what costs and payout periods should be anticipated? How practical are these alternatives in your opinion?"

It is theoretically possible to consider nuclear, coal, oil, and gas as potential alternative sources. But to obtain meaningful cost comparisons requires that the alternatives be comparative in meeting similar load characteristics, accomplish the same payout objectives, and make similar contributions to the development fund. Total capital costs per installed kilowatt for these thermal and nuclear alternatives may be less than for hydro, but for peaking purposes (35 to 37 percent plant factor) the annual costs will be greater for thermal when considering the same payout objectives. Therefore, to contribute the *same amount to the development fund* and be as reliable as hydro, the thermal and nuclear alternatives will need to be of larger size. The higher operation, maintenance, and replacement costs of these thermal alternatives are the primary cause of the higher annual costs due principally to the continuing fuel costs and the more rapid wearing out of the plant components. Or, stated in another way, thermal or nuclear plants of the *same size* as the hydro plants operating on the same basis would contribute *much less toward a development fund.*

Only by operating at an 80 to 90 percent plant factor can thermal or nuclear plants of very large size produce baseload power at low unit cost. However, part of any electrical utility system load requires generation operating at less than base load. The Bridge and Marble hydro facilities would operate at a 35 to 37 percent plant factor supplying a part of the peak load, and at these plant factors the large nuclear and thermal alternatives would not be competitive. Also, hydro plants are superior for meeting peak load needs and for meeting emergencies, as they can be started suddenly and can pick up loads quickly. Furthermore, the possibility of the *construction of* one *of these alternative* facilities *by the Federal Government* to provide pumping energy and reimbursement revenue over and above that which the water users have the ability to repay *seems remote.* The Congress has not heretofore provided for a Federal agency to enter into this type of construction and depart from the traditional role of constructing hydroelectric facilities to provide needed pumping energy and reimbursement revenue to assist in meeting multipurpose project repayment objectives.

11. "Finally, what alternative sources of power are available in terms of other agency construction, private utilities, municipal or state utilities? Comparative costs (construction and mill rate) would be desirable."

In this particular area, gas-fired and coal-fired powerplants are in use with some 3,000,000 kilowatts of new mine-mouth thermal plants recently announced for construction by the Western Energy Supply and Transmission Associates (WEST). Also, pumped storage has been given some consideration in Arizona. There are no nuclear power installations in the immediate area.

None of these facilities are *substitutes* for the Bridge and Marble hydro facilities in that they would produce *no revenues for the development fund.*

Costs have not been announced for the new WEST facilities nor for the pumped storage plants. However, from our knowledge of costs of power from coal-fired thermal plants in the area, we would make the following estimates of costs of power delivered to load centers at 35 to 37 percent load factor: public ownership, about 7 mills per kilowatt-hour; private ownership, about 13 mills per kilowatt-hour. We estimate the cost of power from nuclear plants operated at the same load factor to be about the same.

12. "Please provide any pertinent information available regarding the possible transport of 3 to 8 million acre feet of water through open canal (presumably lined) from the general area of the Pacific Northwest to a convenient point near Lee Ferry."

There have been no cost data developed by this Department and as the pending legislation suggests, this diversion plan must be studied along with other alterna-

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tives to secure reliable information on the most feasible means of augmenting the Colorado River flows. In view of the nature of the terrain between the Northwest to the Colorado River Basin, it is apparent that in addition to open canal the aqueduct system would include tunnels, pumping plants, power drops, discharge lines, and regulatory reservoirs.

13. "On pages 155–160 of the Lower Colorado River Basin Project Hearings of August 23–31, Sept. 1, 1965, Serial No. 17, Mr. Dominy and I discussed bank storage and the question of recovery from it. I would appreciate your comments on that exchange."

In 1948–49 the Geological Survey led a joint study by many scientists of the diverse and complicated aspects of Lake Mead. One of the variables investigated was bank storage. Analysis of the data available for the period 1935 to 1949 showed that the annual change in gross storage averaged about 12 percent more than the change in the surface storage contents indicated by the capacity table. The Geological Survey has continued to collect data at Lake Mead on such variables as inflow, outflow, evaporation, and reservoir content. Although extensive restudy of the lake has not been made, casual review of the data collected since 1949 confirms the initial analysis but suggests that the figure of 12 percent might be as much as 1 or 2 percent high.

Thus, within the geologic setting of the Colorado River canyon country between Hoover Dam and Lake Powell, the Lake Mead studies support the answers given by Mr. Dominy to your questions about bank storage. Your questions are well worded to develop the concept of subsurface storage capacity as an unseen but very real adjunct to the commonly considered surface storage capacity of a reservoir.

There is no evidence available to suggest that water lost from reservoirs in this bedrock canyon could escape to some other river system. The Geological Survey has not made studies of possible or potential seepage bypassing the dams and returning to the river downstream.

Sincerely yours,

(Sgd) STEWART L. UDALL, *Secretary of the Interior.*

ATTACHMENT A

[Thousands of dollars]

	Marble Canyon Project	Bridge Canyon Project
Construction cost allocated to power	225,701	474,911
Interest during construction for power at:		
3.222 percent	20,284	33,186
3.5 percent	22,034	36,049
4.0 percent	25,182	41,199
4.5 percent	28,330	46,349
Total power investment cost at:		
3.222 percent	245,985	508,097
3.5 percent	247,735	510,960
4.0 percent	250,883	516,110
4.5 percent	254,031	521,260
Average annual interest and amortization cost at:[1]		
3.222 percent	9,967	20,588
3.5 percent	10,562	21,784
4.0 percent	11,679	24,025
4.5 percent	12,854	26,377
Annual operation, maintenance, and replacement cost	1,785	4,028

[1] Amortized over 50-year period.

DECEMBER 30, 1965.

HON. ED REINECKE,
House of Representatives,
Washington, D.C.

DEAR MR. REINECKE: Following are the answers to the questions asked in your letter of October 29, 1965, which we acknowledged on November 8.

1. Regarding the redraft of the bill. Is it your intention to provide hearings on all eleven of the Upper Basin projects conditionally authorized or will we just hear about the three that are actually authorized in the bill?

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The decision as to whether there should be hearings on any Upper Basin projects that might be included in legislation on the Colorado River Basin Project is a matter that rests entirely with the Committees on Interior and Insular Affairs. Should such hearings be scheduled, we will, of course, be prepared to present testimony to the extent that our information on the projects permits.

2. What is the present surface area of Lake Mead at its normal operating level and what is the upper and lower elevation of the lake under intended operation?

	Upper	Normal	Lower
Present operation:			
Elevation (feet—mean sea level)	1,213.17	1,160	1,083
Surface area (acres)	153,100	120,400	88,200
Projected operation:			
Elevation (feet—mean sea level)	1,219.62	1,160	1,083
Surface area (acres)	156,900	120,400	88,200

3. What change in surface area is incurred in each ten foot increase in the depth of the lake from the minimum to the maximum levels?

The following table shows the surface area of Lake Mead at various operating levels and the surface area change by ten foot increments:

Elevation (feet—mean sea level)	Surface area (acres)	Surface area change (acres)
1,070	83,400	
1,080	87,000	3,600
1,090	90,900	3,900
1,100	94,700	3,800
1,110	99,000	4,300
1,120	103,000	4,000
1,130	107,100	4,100
1,140	111,000	3,900
1,150	115,500	4,500
1,160	120,400	4,900
1,170	125,500	5,100
1,180	132,500	7,000
1,190	138,900	6,400
1,200	145,100	6,200
1,210	151,300	6,200
1,220	157,100	5,800

4. Do I understand correctly that the cost of the necessary importation facilities to augment the Colorado would be on a non-reimbursable basis or would only the first 2½ million acre-feet be on a non-reimbursable basis? If so, what revenues from the CAP will apply toward importation costs?

The proposed legislation provides that only the costs of measures to develop water required to meet deliveries to Mexico under the obligation on the United States imposed by the Mexican Treaty, including associated carriage losses, would be non-reimbursable. The basic delivery obligation is 1.5 million acre-feet per year. The quantity of water required to offset carriage losses has not been accurately determined, but it would amount to several hundred thousand acre-feet.

Revenues from the Central Arizona Unit would be from the sale of water only and would be directed for the first 50 years of operation to the repayment of the costs of that Unit. Thereafter, revenues from water sales would be available for meeting other project costs including importation costs.

5. In view of the substantial changes in the importation figure of 8.5 million acre-feet, I would appreciate your best guess at this point for importation costs and how these reimbursable costs will be allocated toward the revenues from projects on the Colorado River, with specific emphasis on Bridge and Marble.

The Bureau has made only rough paper estimates of the cost of import plans, and we do not at this time have estimates which can be reliably used. We have made no studies on how reimbursable costs would be allocated toward revenues with specific emphasis on Bridge and Marble. Possible methods of repayment of reimbursable costs would be one of the subjects to be treated if the Secretary is directed to make a study of imports.

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Information submitted at the hearings on H.R. 4671 and similar bills indicates that with the Bridge Canyon and Marble Canyon Units in operation by 1975 the revenues after payout from these and other existing Lower Colorado River powerplants would accumulate about 2.2 billion dollars in the Development Fund by the year 2047. About one-half of this would be derived from Bridge Canyon and Marble Canyon power revenues.

6. In view of the fact that more water is to be used for M and I in the Central Arizona Valley than was originally intended, I would appreciate a breakdown of present best guesses of M and I water versus irrigation water and secondly, intended selling rates of the two types of water.

The Central Arizona Unit, as presently proposed, would deliver from the Colorado and Gila Rivers the following annual quantities of new water for irrigation and municipal and industrial uses:

	Irrigation (acre-feet average)	M. & I. (acre-feet firm)	Total (acre-feet)
1975	1,048,000	82,000	1,130,000
2000	547,000	312,000	859,000
2025	252,000	312,000	564,000

By the year 2025 practically all of the firm water yield of the Central Arizona Unit would be devoted to municipal and industrial purposes plus the servicing of exchanges for development in the northern Arizona counties. While it now appears that the municipal and industrial water demands by the year 2025 will substantially exceed 312,000 acre-feet per year, we believe they can be satisfied only by a firm water supply. Thus, in our analysis we have devoted all water supplies available intermittently to irrigation.

An average charge of $50 per acre-foot would be required to repay the costs allocated to municipal and industrial uses, and an average payment of $10 per acre-foot is projected for irrigation water.

7. In the hearings you indicated that the Marble damsite was in a position where certain leaks could be anticipated. What is the nature of the geological formation and what is the anticipated volume of leakage around the dam?

The two formations at Marble Canyon damsite, the Muav formation which forms the lower portion of the abutments and the Redwall formation which comprises the upper portion of the abutments, are composed predominately of limestone. The upper 200 feet of the Redwall formation is often cavernous, but this is well above the top of the dam. At the damsite these formations are predominately massive and tight and are expected to form a sound, essentially impermeable, foundation.

At places the lower 300 feet of the Redwall and the upper part of the Muav may also be cavernous, but far less than in the upper 200 feet of the Redwall; this cavernous condition in the lower Redwall and upper Muav is largely restricted to zones of strong fracturing.

There are zones of significant fracturing within and adjacent to the reservior, and it is expected that water would seek out paths of leakage around the dam. Untreated, the leakage might amount to several hundred second feet. There are no specific data on which to base an estimate of seepage loss. This is a matter that would require extensive and detailed geologic exploration. However, grouting is expected to be an effective means of controlling the seepage loss to an acceptable quantity.

The power loss at Marble would be negligible for a few hundred second feet of water leakage. Average power release will be about 13,000 c.f.s. Leakage of a few hundred c.f.s. is a very small percentage of average flow. In present power computations, a leakage of 200 c.f.s. was allowed. This represents the total continuing loss after bank storage has been satisfied. Additionally, as is pointed out in answer to your question No. 10, this leakage would not represent a net loss as the water will return to the river below the dam.

8. My information does not indicate any particular public access to the river immediately below Marble Canyon Dam. Please clarify this in view of the fact that this stretch of the river was, I understand, intended to be preserved for white water sportsmen.

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The cost estimate for the Marble Canyon Unit includes a tunnel from the base of the powerplant elevator shaft to the tail water immediately below the dam. This would provide access to white water sportsmen and weekend fishermen.

9. Due to the peaking characteristics of the use of Marble, what is the anticipated rise and fall in the river due to the changing flows caused by the peaking characteristics of the electrical demand?

At the damsite it is estimated that the river stage will rise and fall about fifteen feet during the normal weekday generating cycle. Under average flow conditions, high stages would occur for 12 hours per day, 5 days per week, and low stages the remainder of the time, including all weekend. Because of limited channel storage, these fluctuations are expected to be only slightly attenuated by the time they reach Phantom Ranch, with fluctuations of about 13 feet expected at that point.

10. If the site for Marble Canyon Dam is loose enough to allow leakage, what assurance do we have that the same loose strata will not conduct water away to an underground river or reservoir of such vast size that it would seriously draw down the river for several years?

Although there is not a great wealth of information available regarding the hydrologic characteristics of this region, combining these data does allow us to make certain conclusions regarding reservoir water losses and movement from the Marble site. The essential conclusion is that water would not be permanently lost to another basin or underground reservoir.

In addition to studies by the Bureau of Reclamation, work has been conducted by the U.S. Geological Survey, the Bureau of Indian Affairs, and by State and local interests. The Colorado River establishes the base level for ground water throughout the region. Thus, the base ground-water gradient is toward the river. Further, Marble Canyon damsite is favorably located in regard to the geologic structure. The site lies at the southern portion of a north-plunging (upstream) trough which causes leaky formations to attain higher elevations than the reservoir water surface to the east, west, and south. To the north is Glen Canyon Dam and Reservoir which provided a water barrier in that direction. Thus, the geologic structure precludes the water from escaping to other hydrologic systems.

Some water will obviously go into ground storage. Springs located along the river and within the reservoir area indicates that the ground water is presently contributing to the river. The river is the local ground-water base, and the rock below river level is saturated.

The Redwall limestone will probably be the major factor in bank storage. The balance of the formations which would be exposed to the reservoir are of relatively minor importance owing to their small area of contact and small ground storage capacity or because of low, porosity and permeability. Preliminary estimates indicate that the initial year bank storage at Marble Canyon Reservoir will approximately equal surface storage in the reservoir. In following years, there will be some additional bank storage as the lower porosity rock formations absorb water. Such bank storage, however, will occur only once during the lifetime of the reservoir and will not represent a continuous drain on the river.

11. What is the anticipated time required to fill Bridge, Marble, and the three Upper Basin projects authorized in this program?

Marble Canyon, with a storage capacity of only 363,000 acre-feet, could be filled quite easily the year it is completed to take advantage of the power head. Bridge Canyon reservoir would have a storage capacity of 3,710,000 acre-feet, still very small in relationship to Lake Mead and Lake Powell, the principal regulatory reservoirs on the river. If surplus flows were not available to fill Bridge Canyon Reservoir, it is reasonably certain that provisions could be made to fill it promptly by exchanging storage in either Lake Mead or Lake Powell.

As far as the Upper Basin reservoir associated with the Animas-LaPlata (164,500 acre-feet), Dolores (389,800 acre-feet), and Dallas Creek (164,900 acre-feet) Projects, we would expect them to fill to a usable content the first flood season following completion and to fill to maximum capacity the first series of average years or during the first year of above average runoff following the first year of operation.

12. What would be the anticipated storage capacity of all the eleven Upper Basin projects authorized in the proposed redraft?

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Total storage capacity of eleven Upper Basin projects that would be *conditionally* authorized in the redraft would be about 3,400,000 acre-feet. With your broad background, I am sure you are aware that the extent of Upper Basin water resource development permissive under the Colorado River Compact is controlled by consumptive use of water rather than by reservoir storage per se. Evaporation from these reservoirs would, of course, be a consumptive use chargeable to the respective States of the Upper Basin.

Should you wish to discuss any of these items, please feel free to call on us.

Sincerely yours,

(Sgd) FLOYD E. DOMINY, *Commissioner.*

Mr. REINECKE. I thank the chairman. In this letter from Secretary Udall, he indicated some alternative prices of power veering from 7 to 13 mills. Without quoting the source of these, and that is what I was interested in, are these 7 and 13 mills per kilowatt-hour power prices, are these wholesale prices? Are these preference customer type of prices from these alternative sources or are these retail sources? This is on page 7 of his letter.

Mr. HOLUM. Just one moment, Mr. Reinecke.

Mr. REINECKE. While they are checking that, maybe you could answer this because of the time factor. In the cost allocation you show $85 million for recreation, fish and wildlife. I would appreciate it if you could furnish to me and I think to the committee a breakdown of how that money is to be spent. I am not aware that that has been shown to us before, and particularly are you aware of the proposed amendment that was offered yesterday for the Hualapai Tribe?

Mr. DOMINY. Yes, we have heard of it.

Mr. REINECKE. Does the $85 million proposed in the hearings include the proposed road down the recreation center and the arena?

Mr. DOMINY. Bridge Canyon was not in the Department's proposal.

Mr. REINECKE. Well then, could you get a copy of this amendment and provide to us the cost involved in offering this amendment? If the amendment is adopted it calls for a second road down to the reservoir. I would like to know what that second road would cost.

Mr. DOMINY. If the Chair wishes us to comment on any amendment that is pending, we would be happy to do so.

Mr. REINECKE. I would so ask.

Mr. ASPINALL. Unless there is objection, it is so ordered.

(The information requested follows:)

The following information is limited to comment on the access road provisions of the proposed amendment (new Sec. 303(b)(1)). It is anticipated that the road would originate at Peach Springs and wend its way some 18.4 miles down Peach Springs Canyon to the reservoir near Diamond Creek. Using Arizona State Highway Department standards, including a road width of 40 feet and a maximum grade of 6 percent, reconnaissance level estimates indicate a construction cost of $12,260,000. An access road from the construction townsite to the reservoir near Diamond Creek undoubtedly would be included in any recreation plan for the Bridge Canyon Unit. Sec. 401 of Committee Print No. 19 provides that all costs allocated to recreation at main stream reservoirs will be nonreimbursable. Thus, whether the road is built under provision of Committee Print 19 or under the proposed amendment it would be at Federal expense.

Mr. REINECKE. Thank you. Now, with reference to the other question, do you have an answer to that yet?

Mr. MCCARTHY. That is the wholesale delivery cost.

Mr. DOMINY. That is at load centers. It would not include the distribution.

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Mr. REINECKE. This is the nuclear distribution plant, a range between 7 and 13?

Mr. DOMINY. That is at the load center.

Mr. REINECKE. My understanding of the desalting project, particularly with respect to nuclear reactors where it was a combination of desalting and electrical, we were quoted power prices substantially lower than this. We were down to the 5 to 6 mill range.

Mr. DOMINY. I am sure that is true for baseload power, but this comparison is for power of the same character as that which would be produced at Bridge and Marble.

Mr. REINECKE. But a few minutes ago you said you wouldn't be able to use Marble completely, have a free hand for using it for peaking purpose without washing out the fisherman, is that right?

Mr. DOMINY. I think this is true. We won't be able to use it as much for peaking as would be desirable.

Mr. REINECKE. So there is a compromise?

Mr. DOMINY. Yes.

Mr. REINECKE. Have any criteria been established for the operation of Mead and Powell with or without these intermediate reservoirs? Specifically what I am wondering about is this. We have had trouble with the operation of both reservoirs as we all know. Now to suddenly borrow from somewhere another 4 million acre-feet as we talked about a few minutes ago to fill these reservoirs is going to aggravate some more people, either in the upper or the lower basin.

Mr. DOMINY. Of course, we are still in the very early stages of filling Glen Canyon. As I said a moment ago, Congressman Reinecke, if we get a repetition of the hydrology of record, we should be in a much better position 10 years from now when we want to fill Bridge and Marble. If we get a series of reasonably good years in the 10-year period, we will be in a position to fill them, but no one can predict with certainty, of course.

Mr. REINECKE. The fact that Marble is a run of the river type of operation, it would seem that our operational characteristics from a power standpoint are very limited. We are trying to get at the necessity of operating Marble to satisfy its payout requirements. It pretty well restricts you as to the liberty as to what you can do with the water.

Mr. DOMINY. It is true that Marble will have only the water that is released at Glen. The operation doesn't have to follow the same pattern, however, as the release at Glen, because the reservoir surface can fluctuate at Marble.

Mr. REINECKE. Four feet.

Mr. DOMINY. We expect to fluctuate Marble Reservoir in the order of up to 10 feet. In the case of Bridge Canyon Reservoir, if it were on the river, we would only fluctuate about 4 feet.

Mr. REINECKE. That is right. Thank you. No further questions, Mr. Chairman.

Mr. UDALL. The gentleman from California, Mr. Burton?

Mr. BURTON of California. Is there any departure in the bill, as supported by the administration, from the acreage limitation?

Mr. DOMINY. No, sir. Reclamation law would be adhered to, including the acreage limitation requirement. In the case of the upper

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basin projects, this bill does have in it the provision for the class 1 acreage equivalency. In other words, irrigation water could be delivered to single ownerships of 160 acres of class 1 land or to a larger acreage if it is class 2 or class 3 land. This is in accordance with the Department's general recommendations to the committee concerning this class 1 acreage equivalency. In other words, we recognize that in high mountain projects you frequently don't have class 1 productivity and, therefore, you need a little more than 160 acres in order to have 160 acres equivalent productive ability.

Mr. BURTON of California. Is that a provision that is commonly found in existing law?

Mr. DOMINY. We have that in several projects where similar circumstances have prevailed, and Congress has supported this type of adjustment.

Mr. UDALL. The gentleman from Washington, Mr. Foley?

Mr. FOLEY. Mr. Secretary and Commissioner: To perhaps clarify the record a little bit in view of some of the questions that have been asked by Mr. Tunney and others, you are coming before the committe today to recommend that the investigation and studies now contained in title II of the bill be stricken from the bill and substituted therefor either in this bill or separate legislation that responsibility and study to vest in the Water Commission.

Mr. HOLUM. That is correct.

Mr. FOLEY. And you are not here recommending any changes in the language of the Department's support and the administration's supported National Water Commission Bill as now contained in the bill before this committee.

Mr. HOLUM. No.

Mr. FOLEY. As a matter of fact, without having further studies and field work done, you could not in normal procedures come before this committee at this time to recommend the feasibility study for importation of water from outside the Colorado River Basin, is that correct?

Mr. HOLUM. Well, Chairman Aspinall has, of course, appropriately differentiated between reconnaissance studies and feasibility studies, but we do not have either to the point where we can give you any definitive answer as to the cost.

Mr. FOLEY. My question is this. On the basis of your present information, and considering usual reclamation practice, you do not possess sufficient knowledge at this time to come before this committee and recommend authorization for a feasibility study on importation of water outside the Colorado River Basin, is that not correct?

Mr. HOLUM. If we were talking about the legislation that we discussed with the committee the week before last, where we now have to come before the Congress to get authority to do feasibility studies, we are not at the point that we were with those projects at that time.

Mr. FOLEY. You do not have sufficient information available to you now to recommend a feasibility study for importation of water from outside the Colorado River Basin, is that correct?

Mr. HOLUM. Well, Congressman, I think we have to answer this question very carefully. Congress can decide at any stage that it wants a feasibility study done, without having the information of

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the reconnaissance grade level available to it. It is true in this case we do not have developed what we would normally call reconnaissance level information.

Mr. FOLEY. Isn't it true, Mr. Secretary, that usually requests for feasibility studies under the present law or the actual studies when they did not require authorization were done basically at the direction and out of the administrative decisions of the Department of Interior, the Bureau of Reclamation? Congress has voted a feasibility study. In other words, you come up and recommend it.

Mr. HOLUM. As a normal matter.

Mr. FOLEY. And ask for appropriations for it.

Mr. HOLUM. But there are certainly exceptions to this normal procedure. The Bureau of Reclamation prior to the Federal Water Project Recreation Act, went through the steps of a reconnaissance study and a feasibility study under general investigative authority and looks were taken at each step of the road. As it was discussed this morning in the upper Colorado River project, Congress did authorize and in fact directed the Department to do feasibility studies of certain specific potential participating projects that were identified at this time.

Mr. FOLEY. Mr. Secretary, the reason for my question is this. I do not personally understand how this committee can direct the Secretary to perform by a certain date a feasibility study on importation of water from outside the Colorado River basin, when by the Department's and the Bureau's own admission you do not have sufficient facts available to you now to indicate that this is more feasible than other means of augmenting water such as desalinization, whether modification, and so on.

Mr. HOLUM. No——

Mr. FOLEY. In other words, if we were to direct a feasibility study in this legislation for implementation of water, we would be begging the question as to the feasibility of just one type of water augmentation method when many are available.

Mr. HOLUM. That is absolutely right, Congressman, if the direction were limited to one source of supply. I think both the Congress and the Department are talking about authorizing the feasibility of augmenting the water supply in the Colorado, and not doing feasibility studies on a specific idea for augmenting that supply.

Mr. FOLEY. But this question of legislation as you know does require a feasibility study on importation of water specifically, in title II.

Mr. DOMINY. Well, actually the language in title II, paragraph 2 states, "investigate sources and means of supplying water to meet the current and anticipated water requirements of the Upper and Lower Colorado River Basins including reduction in losses, importations from sources outside the natural drainage basin of the Colorado River system, desalinization, weather modifications, and other means.

Mr. FOLEY. I direct your attention to page 32, Mr. Commissioner, section 203(a):

"The Secretary shall prepare importation plans including proposed allocations of costs specified in section 401 and giving effect to the provisions of section 201 and 220.

Subsection (b). On or before December 31, 1970, the Secretary shall submit a proposed report and findings on said plan to the affected States and federal agencies as required by law.

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Section (c) It is required that they be submitted by the Congress after receiving the reports from the States and Federal agencies required. And the letter of transmittal shall be submitted as a—

Isn't that a feasibility study?

Mr. DOMINY. It also says, "In giving provisions to the effect of sections 201 and 202." So as Mr. Holum said, the way we are interpreting that it would mean that the Secretary would investigate in general all possible augmentations.

Mr. FOLEY. But he is ordered to come up with an importation plan rather than a desalinization plan or a conservation plan or a weather modification plan or any of these other plans.

Mr. HOLUM. Congressman, we are not talking about language developed by the Department. We view, however, and I think that is what the act is attempting to get at, that the studies that ought to be made are of the various methods of augmenting the supply of water to the Colorado River basin to the point that does require some detailed studies where informed decisions can be made as to what is the most economic and the best possible means of augmenting that supply, be it desalting, weather modification, water reclamation, surface water imports, or others. Certainly we can't tell you whether desalting fits in without conducting studies of desalting as one method of augmenting the Colorado River supply to a pretty definitive point. We have to do pretty detailed engineering studies before we get answers that are meaningful. We don't have them today.

Mr. UDALL. The time of the gentleman has expired and there is a rollcall vote in progress in the House which we are both going to miss here.

This concludes the testimony. We thank you for coming. Will you stay there just a moment? The Chair would ask as a part of Chairman Aspinall's request that you give us the estimated cost of a reconnaissance study, that you also give us your best estimate of the kind of study that is required in title II as you read it. I understand these will be rough estimates at this point.

Mr. FOLEY. Reserving the right to object, does the Chair's request include just the costs of doing a reconnaissance study of importation or all the possible means of augmenting water into the Colorado River?

Mr. UDALL. All of the requirements of title II.

Mr. FOLEY. I reserve my right to object. I don't regard that as being a statement of my question. I would ask unanimous consent to amend the Chair's request to include estimates of the cost of doing studies on all matters relating to augmenting water in the Colorado River from all sources and by all methods.

Mr. UDALL. I intended to cover this. I accept the amendments and hearing no objection the request is granted.

(Information will be found on p. 1400.)

We were to also hear today a Mr. Joe Budd to present a statement. Is he in the room? Would you like to have this submitted for the record?

Mr. CAHILL. If you would, please.

Mr. UDALL. Without objection the statement of Mr. Joe Budd will appear in the record at this point.

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(The prepared statement of Mr. Joseph L. Budd follows:)

STATEMENT OF JOSEPH L. BUDD REPRESENTING SOUTHWEST WYOMING DEVELOPMENT COMPANY, ASSISTANT COMMISSIONER UPPER COLORADO RIVER COMMISSION ON H.R. 4671 BEFORE THE SUBCOMMITTEE ON IRRIGATION AND RECLAMATION, COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, HOUSE OF REPRESENTATIVES, MAY 9, 1966

Mr. Chairman and Members of the Committee, I am Joseph L. Budd. I appear here today in several capacities. I represent the Southwest Wyoming Development Company and am an Assistant Commissioner to the Upper Colorado River Commission. My home is near Big Piney, Wyoming, where I own and operate the Budd Hereford Ranch. As a resident of the Green River Basin, I am interested not only in agricultural uses of water, but am aware of the vast oil and gas, trona, coal, oil shale and other mineral reserves that are abundant in the Green River Basin. I also realize that if the Green River Basin in Wyoming is to reach its full agricultural and industrial potential, it must do everything necessary to protect its vital water resources.

The State of Wyoming is a party to two compacts concerning the Colorado River: The Colorado River Compact of 1922 and the Upper Colorado River Compact of 1948. As so aptly stated by the Chairman of the full committee in the hearings last August, the value of the first of these compacts to the Upper Basin "was the stoppage of the operation of the laws of appropriation with respect to the waters of the Colorado River. Otherwise, the Lower Basin States would undoubtedly have put to use most of the water available from the Colorado River before the Upper Basin States could establish their rights to the waters, and the Upper Basin States couldn't have done anything about it."

The value of the second compact was to establish with a reasonable degree of certainty, the amounts of water available to each of the Upper Basin States so that projects could be constructed that would enable each of these states to realize their full potential development at some time in the future. It recognized that all areas in the Upper Basin would not develop at the same rates and provided protection for the slower states by guaranteeing each of the four states a right, in perpetuity, to a stated percentage of available water.

The history of both of these compacts is replete with instances of cooperation between the four Upper Basin States. It was this cooperative attitude that enabled these states, in 1922, to preserve their right to future development. This same attitude of cooperation, in 1948, pervaded the even harder task of apportioning this water among the separate states. It was only by cooperation of the respective Congressional delegations that, in the 1950's, the Colorado River Storage Project Act was passed to facilitate the use of Colorado River water in the Upper Basin States. These able legislators did what they did not merely as representatives of their individual states, but as representatives of the entire Upper Basin, and realized that without unselfish cooperation the entire Upper Basin would suffer.

This same spirit of collective cooperation was present, in August, 1965, when the four member states of the Upper Colorado River Commission, in examining H.R. 4671, realized that in order to assure future development to the Upper Basin, it would be necessary to include in that legislation a conditional authorization of an importation of water into the Colorado River System. They realized that if the Central Arizona Project was to be feasible, it needed water in excess of the Lower Basin compact allocation, and that the only presently available source was from that water apportioned to, but unused by, the Upper Basin States.

The Commission realized that if this water is furnished to the Central Arizona Project, when the time comes that additional Upper Basin reclamation projects are necessary to sustain the development of the Upper Basin States, it will be difficult to obtain Congressional authorization of projects which depend upon water then being used by the Central Arizona Project to insure their feasibility.

Acting upon this premise, the Upper Colorado River Commission at Salt Lake City, Utah, on August 16, 1965, resolved that the four Upper Basin States should not support H. R. 4671 unless there was included in the legislation a conditional authorization of an importation of water into the Colorado River System.

When the interests of interstate cooperation indicated the desirability of a retreat from this stand, and it was decided by negotiators from the various

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states that the most that could be expected was a study of importation, Wyoming relucantly agreed to support the bill, assuming that some the water for the Central Arizona Project would come from water apportioned to Colorado, Utah and Wyoming but not presently being used by these states. Wyoming felt that the support of Colorado and Utah, coupled with the evergrowing demand for water in California, would help promote the proper political climate to effectuate an importation of water soon enough to allow Wyoming's utilization of her full share under the two compacts without an arrestment of her development.

However, Colorado apparently desires to postpone any dependency by her upon importation for at least 20 years and possibly 80 years, depending upon whether one accepts Colorado's own projected growth rate, or the rate projected by the Bureau of Reclamation. Through the proposed authorization of five Colorado projects, Colorado would be not only freed from the burden of future political fights to utilize her full share of water under the two compacts, but she also would be relieved of a large share of her portion of any Mexican Treaty burden, if one exists.

This occurs as follows:

The Colorado River Compact of 1922 grants, to the Upper Basin States, the use, when available, of 7.5 MAF annually. Unfortunately, this amount is unavailable, and, *if* the Upper Basin must share in the Mexican Treaty burden, there could be, according to the Tipton Report, a long-term average of as little as 5.6 MAF available for Upper Basin development. Of this, under the terms of the Upper Colorado River Compact, Colorado is entitled to 51.75% or 2,872,000 acre-feet. At the present time, Colorado depletions amount to 1,782,000 acre-feet. Presently authorized projects will ultimately use an additional 475,000 acre-feet and other probable future depletions are estimated at 567,000. Thus, without considering any of the five Colorado Projects now included in H. R. 4671, Colorado has plans to use 2,824,000 acre-feet of a possible 2,872,000 available. The five projects now included in H. R. 4671 would eventually utilize an additional 383,000 acre-feet, or a total of 3,207,000 acre-feet.

Even if the 200,000 acre-feet listed for future oil shale development and the 130,000 acre-feet listed as probable transmountain diversions are unrealistically high, the total still surpasses the Colorado portion.

In examining the five projects, two of them have already been commented on by the states, and Wyoming raised no objection to these. However, of the other three, two of them (West Divide and San Miguel) were not even among the projected uses supplied this Committee by the Bureau of Reclamation after the August Hearings. Their inclusion in this bill at this time carries the aura of an attempt to search for projects to immediately put to use Colorado's entire share of their apportioned water. It is my feeling that possibly too much of a burden was put upon the Upper Basin to press for importation of water, even when three of the four states of the Upper Basin were dependent upon this importation of water for the full potential development of the apportioned water under the Upper Colorado River Compact. Now that Colorado, with these five projects, can fully utilize more than her entitlement under the Upper Colorado River Compact, the full burden of pressing for an early importation is going to fall squarely upon the shoulders of Wyoming and Utah. This defeats the entire scheme of cooperation that has pervaded throughout the history of the Upper Colorado River Basin. Therefore, in the interest of preserving the future potential development of the Green River Basin, I feel that Wyoming should not support this bill as presently drafted.

Thank you

Mr. UDALL. The subcommittee will stand adjourned until 9:45 tomorrow morning.

(Whereupon at 3:55 p.m. the subcommittee adjourned until 9:45 a.m. Friday, May 13, 1966.)

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LOWER COLORADO RIVER BASIN PROJECT

FRIDAY, MAY 13, 1966

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 9:53 a.m. in room 1324 Longworth House Office Building, the Honorable Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation will come to order for the further consideration of pending business.

The Chair will recognize the gentleman from California, Mr. Hosmer.

Mr. HOSMER. I ask unanimous consent for placement in the record of a tabulation submitted by the staff as to the differences between the bills of last year and this year. The staff has supplied this. I believe it would be appropriate for it to be put in our record at the point where the chairman first made a statement relative to it being acceptable. And I would ask unanimous consent that it be included in the record at that point. (See p. 973.)

Mr. ROGERS of Texas. Without objection, it will be so included in the record immediately after the statement of the chairman on the first day of this portion of the hearings.

Our first witness scheduled this morning is our colleague, the Honorable Byron G. Rogers of the State of Colorado.

Mr. Rogers, we are glad to have you before the subcommittee.

Mr. REINECKE. Mr. Chairman.

Mr. ROGERS of Texas. Mr. Reinecke.

Mr. REINECKE. I would like to ask unanimous consent that a letter from me, with the response from Commissioner Dominy be included in the record of yesterday's proceedings, immediately following the letter from the Secretary of Interior, Mr. Udall.

Mr. ROGERS of Texas. Without objection, it is so ordered and it will be made a part of the record at that point.

We will now be glad to hear from you, Mr. Rogers.

STATEMENT OF HON. BYRON G. ROGERS, A REPRESENTATIVE IN CONGRESS FROM THE FIRST CONGRESSIONAL DISTRICT OF THE STATE OF COLORADO

Mr. ROGERS of Colorado. Mr. Chairman and gentlemen of the committee, for the record my name is Byron G. Rogers, representative of the first congressional district of Colorado, which is the city and the county of Denver.

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I am happy to appear before this committee today to concur with the Governor of the State of Colorado in urging the enactment of Committee Print No. 19, the recommend revision of H.R. 4671 dated April 25, 1966, which is before this committee for consideration. The enactment of this legislation in the proposed form can go a long way toward helping the people of the Colorado River Basin resolve the problems created by rapid population growth and dwindling water supplies.

I believe it is not inappropriate to recall that I have been in the public life of Colorado for a great many years in many capacities. My early experiences were in the Arkansas Valley of Colorado as a county attorney. I broadened the scope of my public experience by becoming a State legislator and later attorney general of the entire State.

It might appear that I have narrowed my interest by becoming congressman for the city and county of Denver, but if this be so, my interest has had to be broadened with newer concepts which recognize that the Denver metropolitan area of which only two-thirds is within Denver proper comprises one-half of the population of the State; is totally interrelated socially, economically, educationally and in most other ways, with the entire State of Colorado and to a certain degree with substantial areas beyond the State boundaries. It is because of my interest in the progress of both eastern and western Colorado that I am much interested in the inclusion in this bill of those provisions which have been worked out by our Governor in collaboration with the Colorado Water Conservation Board for the authorization of five Bureau of Reclamation projects for the development of western Colorado and a concurrent adoption, for the protection of the present and future growth of eastern Colorado, of the clarification of Senate Document No. 80 which is found in section 501(e) of the bill.

Governor Love has ably described to the committee the official position of the State of Colorado on the inclusion of this provision in the bill.

My particular concern over this provision stems from the fact that Green Mountain Reservoir is located on the Blue River, one of the major tributaries of the Colorado River, from which the Denver metropolitan area now derives a part of its water supply. That area must necessarily look to this river for increasingly large amounts of its supply to support its future growth. Denver's rights to the use of this water, created by the people of Denver at a cost of more than $70 million, are closely tied in with the operation of Green Mountain Reservoir under Senate Document No. 80 by reason of the incorporation of certain provisions of that document in that decree of the U.S. District Court for the District of Colorado which defines the rights of both the United States and Denver in the Blue River.

Under the law, the definition of those rights by the court is simply a description of what Denver and the United States, as appropriators, did to create their respective rights. In describing the rights of the United States, therefore, the court, rather than presuming to intrude upon the functions of Congress, merely copied the language of Senate Document No. 80 without interpreting it. Since question exists, not as to any court interpretation, but as to the Congress' purpose in

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creating Green Mountain Reservoir, it is appropriate that only Congress resolve any problem relating to this Federal property which may have arisen out of this congressional document. It is even more appropriate for such a problem to be resolved by the Congress concurrently with the authorization of the Colorado reclamation projects which are a part of the recommended revision of H.R. 4671.

So that the committee may have the full text of Senate Document No. 80 before it for its consideration, I offer a copy of that document to the committee as an exhibit, which the committee may or may not wish to print.

Mr. ASPINALL (presiding). A copy of Document No. 80 will be received for the committee from my colleague. We should have one. We appreciate this very much.

Mr. ROGERS of Colorado. Thank you.

As a former attorney general and former member of the Colorado Legislature, I continue to respect the State policy and statewide beliefs which are expressed by the actions of the duly elected representatives of the people speaking as a legislature. I have been in political life long enough that I do not underestimate the views of those who represent even a relatively small minority because I have often learned much from such minority views. But, after all viewpoints have been aired and an official position has been taken, unanimously in this case, by the elected representatives of the people as well as by their appointed representatives speaking through the Colorado Water Conservation Board, I realize that there must be an end to controversy and that the official actions be adhered to by all.

This matter concerning Senate Document No. 80 affects no other State than Colorado. If it did, as a Member of the National Congress, I would have to exercise my judgment, not only from the local viewpoint but from the viewpoint of national interest as well. Here I have no such problem; the State of Colorado has spoken officially.

In what I have stated above, I have referred to the concurrent adoption of section 501(e) which is necessary to provide that congressional clarification of Senate Document No. 80 which is essential to the protection of eastern Colorado water users. The reason I have used the term "concurrent" is because the State has now officially determined that the development of water users in western Colorado should not, by reason of this portion of Senate Document No. 80, jeopardize the existing and future economy of eastern Colorado which is also dependent upon the use of the waters of the Colorado River. Happily, with the inclusion of section 501(e) in this bill, I can give my wholehearted support to the passage of the bill in its present form.

Mr. Chairman, now I would also like to include a statement by our colleague, Hon. Roy H. McVicker, a Representative of the Second Congressional District of the State of Colorado; and, also, to present a resolution of the membership of the Colorado Water Congress, adopted at its annual meeting on February 10, 1966.

Mr. ASPINALL. Without objection, the statement and the resolution will be made a part of the record at this point.

(The statement of Hon. Roy H. McVicker and the resolution of the membership of the Colorado Water Congress follow:)

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STATEMENT OF THE HONORABLE ROY H. MCVICKER, CONGRESSMAN, SECOND CONGRESSIONAL DISTRICT OF THE STATE OF COLORADO

Mr. Chairman and Gentlemen of the Committee; It is a pleasure to join with my Colleagues from Colorado on matters treated in the recommended revision of H.R. 4671 which are of great concern to me.

In his statement, Congressman Rogers points out that a significant part of the populous Denver Metropolitan area is not within the City of Denver itself although the entire area itself must look to the water resources of the Colorado River for its future development and growth. It is this significant and most rapidly growing part of our State that I represent. In addition, another portion of the area I represent, including the City of Boulder, is within the boundaries of the Northern Colorado Water Conservancy District which is committed to the repayment of the Colorado-Big Thompson Project. That Federal Reclamation Project also looks at the headwaters of the Colorado River for its water supply.

The features of the Bill now before the Committee which protect the rights to those supplies are therefore vitally important to the needs of the expanding population within the area I represent. The particular protection afforded by the clarification of Senate Document No. 80, which appears in Section 501(e) of the Bill, is especially important to the area I represent because it depends in part on the water supply of the Colorado-Big Thompson Project, and in a substantially larger part upon the transmountain water supplies of the City of Denver.

It was in recognition of the importance to the entire state of resolving and putting at rest any misunderstandings concerning the matters treated in Section 501(e) of the Bill that the Colorado State Legislature, in its wisdom, unanimously adopted its Joint Memorial which has been submitted to this Committee. The action of that Legislative Body confirms the action of the Governor and the Colorado Water Conservation Board in treating with this problem which was created, not by the Courts, but by a Congressional Document. I, therefore, urge the Committee, in considering the Bill now before it, to take favorable action on this provision so that it can be enacted into law.

RESOLUTION OF THE MEMBERSHIP OF THE COLORADO WATER CONGRESS ADOPTED AT ITS ANNUAL MEETING OF FEBRUARY 10, 1966

Whereas after long months of devoted and time consuming investigation and negotiations on the resolution of problems confronting the State of Colorado in connection with the proposed authorization of Federal Reclamation projects in the Lower Colorado River Basin, the Colorado Water Conservation Board, on February 8, 1966 adopted an official position for the State of Colorado with respect to such proposed legislation; and

Whereas the Colorado Water Congress desires to support the position of the State of Colorado as adopted by its Water Conservation Board: Now, therefore, be it

Resolved, That the Colorado Water Congress approves and supports the official position of the State of Colorado with respect to the document entitled "Recommended Revision of H.R. 4671" dated February 8, 1966 as expressed by the final action of the Colorado Water Conservation Board taken on February 8, 1966.

I, Robert W. Fischer, duly elected and acting Secretary of the Colorado Water Congress do hereby certify that the above and foregoing is a true, correct and complete copy of a Resolution unanimously adopted by the membership of the Colorado Water Congress at its annual meeting of February 10, 1966.

Dated this 11th day of May, 1966.

ROBERT W. FISCHER.

STATEMENT OF THE HONORABLE FRANK E. EVANS, REPRESENTATIVE, THIRD DISTRICT, COLORADO

Mr. Chairman and Gentlemen of the Committee, I wish to thank the Chairman and the members of this Committee for their patience and concern in the matter now pending before it, H.R. 4671, and in allowing me to present my views on the subject.

The need for an agreement between the Upper and Lower Basin States on the Colorado River was recognized long before 1922 when the Colorado River Com-

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pact was executed. With each year since the signing of this document there has been a growing concern on the part of all users of water from this river system as to the extent to which sufficient supplies would be available for both the Upper and Lower Basin States.

Approximately fifteen years ago the Colorado Water Conservation Board employed the engineering firm of Leeds, Hill and Jewett for the purpose of securing as much accurate information as possible on the depletion of surface water supplies of the State of Colorado west of the Continental Divide. Thereafter, and in 1958, this Board created a statewide advisory committee for the purpose of developing additional information and recommendations concerning the policy of the State of Colorado in regard to the water in the Colorado River. With the assistance of legal and engineering experts a document was published in 1959 covering the future operation of Glen Canyon Reservoir as related to the Colorado River Compact.

Thereafter, and in 1965, the State of Colorado, and other states, employed other engineers to inventory the present and future water resources of the Colorado River System, the report being issued in July of that year and supplied to this Committee.

I am sure that this Committee is well aware of these reports and studies, as well as the court decisions which have been rendered in regard to the use of water in the Colorado River.

It is with this background that H.R. 4671 is now pending before your Committee.

After consultation with Representatives of the Colorado Water Conservation Board, Directors of the Southeastern Colorado Water Conservancy District, and appropriate officials of the cities of Colorado Springs and Pueblo, I wish to inform the Committee of my concurrence in the views stated by our Governor and other representatives from Colorado on prior dates before this Committee.

I am most encouraged that this bill will facilitate the development of additional projects for the conservation and use of water within the State of Colorado. This development will not only be of assistance to the future development of the oil shale industry on the western slope, but will also benefit the growing metropolitan and industrial use of water on the eastern slope.

The future growth and development of Colorado, as is the case with all of the other Upper and Lower Basin States, depends to a great extent upon the availability of more water than is currently produced in the Colorado River system. For this reason I think it is imperative that studies be made of all feasible means by which water can be inported into this vast area. The need for securing additional water for this area is not in question. The only real questions which exist are when and how. It is my strong belief that the "when and how" should be studied and developed now so that the ultimate cost of such a project or projects can be reduced and the additional water secured at a time when most needed.

Again, I wish to commend the Chairman and the Members of this Committee for their time and patience and for their understanding of the critical importance of the provisions of this bill for all states concerned.

Mr. ASPINALL. Thank you very much.

The chairman of the full committee is glad to acknowledge the presence of his personal friend and longtime political associate who is at this meeting today. Thirty-three years ago this September, if I remember correctly, we began our association with each other.

Mr. ROGERS of Colorado. It was 43 years ago, not 33 years. [Laughter.]

Mr. ASPINALL. I have no questions.

I might say something about my colleague's dedication to the great principle of one man, one vote, which accounts for the interpretation of Senate Document No. 80 as written in the print, is that correct?

Mr. ROGERS of Colorado. That is correct. And we hope that interpreted so in the future will solve so many problems.

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

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Mr. SAYLOR. If this committee in its wisdom decided to eliminate the study that you have been referring to here, and would eliminate two or three of the projects in Colorado——

Mr. ASPINALL. If my colleague will yield—Mr. Rogers' statement did not go to that point.

Mr. SAYLOR. I am going to ask him a question, that if we do, would he vote for the bill?

Mr. ROGERS of Colorado. If I get the gentleman's question correctly, there has been added since the hearings heretofore held five projects. These have been known as the Animus-La Plata, Dolores project, Dallas Creek project, West Divide project, and the San Miguel project. Is that what the gentleman has reference to?

Mr. SAYLOR. That, and the study which has been added here just for the basin?

Mr. ROGERS of Colorado. Just the basin?

Mr. SAYLOR. Yes.

Mr. ROGERS of Colorado. Now, you really have two questions in that. If you are going to include the importation—first of all, may I address my answer to the first part dealing with the five projects in Colorado?

Mr. SAYLOR. All right.

Mr. ROGERS of Colorado. As I indicatd in my statement, this is a water policy determined by the State of Colorado, and they have included, and I support what they ask for——

Mr. SAYLOR. That is simple. That is the only question that I have. I disagee with you on the one man, one vote, but you are on the Judiciary Committee and I am not.

Mr. ROGERS of Colorado. I will have you know that we did not make the decision there. It was made across the street, you will remember.

Mr. SAYLOR. That is where we had the opportunity to change it.

Mr. ROGERS of Colorado. What is that?

Mr. SAYLOR. We had the power to change it and did not.

Mr. ROGERS of Colorado. Well, you just did not get enough votes over in the Senate.

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

Mr. JOHNSON. No questions.

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

Mr. HOSMER. No questions.

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

Mr. UDALL. I want to thank my friend and distinguished colleague for the information that he has given on Senate Document No. 80.

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

Mr. SKUBITZ. No questions.

Mr. ASPINALL. The Chair recognizes the gentleman from California. Mr. Tunney.

Mr. TUNNEY. I have no questions.

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

Mr. REINECKE. No questions.

Mr. ROGERS of Colorado. Thank you, sir.

Mr. ASPINALL. Thank you very much.

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(The following statements of Members of Congress are inserted at this point pursuant to permission granted, see p. 1618.)

STATEMENT OF REPRESENTATIVE HENRY S. REUSS OF WISCONSIN

Mr. Chairman, I appreciate this opportunity to present my views to the subcommittee on H.R. 4671 and similar bills providing for a Colorado River Basin Project.

I should like to direct my comments to Title III, which authorizes and directs the construction of dams, reservoirs, powerplants, transmission facilities and related works at Bridge Canyon and Marble Canyon on the Colorado River in the Grand Canyon. Title III further declares that the construction of the dam at Bridge Canyon would be consistent with the Act of February 26, 1919 (40 Stat. 1175), which created Grand Canyon National Park.

I am strongly opposed to construction of the Bridge Canyon and Marble Canyon dams.

The Grand Canyon is one of the great wonders of nature and a priceless asset of all the people of the United States. And enduring goal of this nation, underlying our great National Park System, is the preservation of unique and irreplaceable areas, such as the Grand Canyon, in an unspoiled condition, just as they were created by the great forces of nature.

I hope this Congress will reaffirm its decision to protect that portion of the Grand Canyon already contained in the Grand Canyon National Park, and will extend the Park to include the entire Grand Canyon from Lee's Ferry to Grand Wash Cliffs. The distinguished ranking minority member of the full committee (Mr. Saylor), the gentleman from Michigan (Mr. Dingell) and I have introduced legislation to accomplish this (H.R. 14176, 14177, and 14211).

As an ecological phenomenon, the Grand Canyon must be viewed in its entirety to be fully understood. For that reason as well as for the esthetic and recreational reasons, the entire length of the Canyon ought to be preserved and protected.

Bridge Canyon and Marble Canyon dams would change substantially the magnificent landscape of the Grand Canyon. They would destroy scenic, recreational, and scientific values created by the Colorado River over millions of years.

For 132 of the 280 miles between Lee's Ferry and the Grand Wash Cliffs, they would convert the living river into a dead storage reservoir.

Bridge Canyon dam would back water up the Colorado for about 93 miles. Water levels would be raised in the Grand Canyon National Monument for 39 miles, in the Grand Canyon National Park for 13 miles. At the lower or western end of the Monument water would be 89 feet above the current, normal river level.

The reservoir created by the Marble Canyon dam would extend to the Glen Canyon dam, some 55 miles upstream. Water depths would be 320 feet at the Marble Canyon dam, 100 feet half way to Glen Canyon dam and 32 feet at Lee's Ferry. The dam would inundate a gorge which is an integral part of the Grand Canyon. Even though this area is beyond present Park boundaries, it is equally deserving of protection.

Both reservoirs would wipe out the habitat of wildlife and plants which have existed along the river bank for centuries. They would cover campsites on beaches and sandbars, with no substitute to be found on the sheer walls of the canyon. They would make inaccessible some of the archeological and geological records to be found along the lower walls of the canyon. They would alter or completely destroy many natural scenes of great beauty—such as Redwall Cavern which would end up under 280 feet of water, and Vasey's Paradise which would be 275 feet below the surface.

Marble Canyon dam, moreover, would so tame and control the great Colorado as to virtually end the process by which the Canyon was created and is still being naturally changed. A living river rebuilds its sandbars and dunes and beaches at the same time they are being eroded by wind and water. A living river such as the free-flowing Colorado flushes the debris and boulders which come into it.

If the minimum water flow at Marble Canyon dam were to be only 1000 cubic feet per second, as the Bureau of Reclamation has indicated, the Colorado would no longer be able to perform these natural functions. It is even highly doubt-

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ful that the flow would be adequate to carry boats down the river. Many of the areas of the gorge within the present Park can be reached only by boat and would thus become inaccessible.

As the Bureau of Outdoor Recreation stated unequivocally, no recreational opportuities would be provided by the Marble Canyon and Bridge Canyon reservoirs which are not abundantly available nearby.

Reservoir recreation such as motorboating, waterskiing, and fishing is available at Lake Powell and Lake Mead, immediately above and below Grand Canyon. In addition, there are reservoirs at Flaming Gorge, Navajo, Glen Canyon, Hoover, Davis, Parker, and Imperial dams. But the experience of a boat trip through the Grand Canyon on the swift water of the untamed Colorado cannot be matched elsewhere. It makes up in unique grandeur what it lacks in popularity.

The harmful effects of the Bridge Canyon dam have impelled the Administration to recommend that it not be authorized at this time. But as I have just said, the Marble Canyon dam is equally undesirable.

The people of the United States are being asked to underwrite a project costing between $800 million and $1.8 billion to supply water from the Colorado and possibly other river basins to the arid regions of the Southwest so that they may continue very high growth rates.

If this is to be done, it must be done without destruction or damage to natural resources belonging to all the people.

It is claimed that these hydro-electric dams at Bridge Canyon and Marble Canyon are needed to provide pumping power to lift water over the mountains to parched Arizona, to furnish added electric power for peak demands, and to serve as "cash registers", money-makers to help pay for the entire Colorado River Basin Project.

Yet obviously power can be generated by other means, and existing hydro-electric power can be diverted to furnishing peak rather than base loads. The project should be undertaken only if it can be done without trading in one of our most precious natural resources. Let it not be written in the years ahead that the Grand Canyon was irrevocably desecrated because it was too much trouble to change the reclamation law to allow construction of steam power plants.

It should be up to the proponents of the Colorado River Basin Project to propose a program for carrying it out without sacrificing the Grand Canyon.

Mr. Chairman, I should like to submit an editorial from the Milwaukee Journal on the Bridge Canyon and Marble Canyon dams for the subcommittee's information.

STATEMENT BY CONGRESSMAN WILLIAM S. MOORHEAD

Mr. Chairman, may I express my appreciation for this opportunity to be heard on H.R. 4671 and related bills to authorize the construction, operation and maintenance of the Lower Colorado River Basin project.

I have studied this question and have concluded that it would be a tragedy of the first order for the Congress to authorize this or any other project that would destroy or disfigure the Grand Canyon.

I am sure that your subcommittee has been advised before of Theodore Roosevelt's remark 64 years ago but I think it bears repeating. He said "Leave it as it is. You cannot improve on it. The ages have been at work on it, and man can only mar it."

As one of my constituents put it in a recent letter to me, "the natural beauty and grandeur of the Grand Canyon, Bridge Canyon, and Marble Canyon belong to *all* the people and should be preserved. Surely another way can be found to provide Arizona with water that will not interfere with the Grand Canyon."

And, as another constituent said, this project "would dam sections of the the Grand Canyon, thus destroying geologic historical evidence it has taken eons to carve. The exposed rock extending over the Grand Canyon area has enabled geologists to compile their rock correlations dating from the Pre Cambrian Period (earlier than 500 million years ago). There are few areas of the earth where any such record exists. The Grand Canyon should remain forever a reminder to man of the power and beauty of nature, and man's relatively short existence in relation to it."

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The distinguished columnist Mr. Ralph McGill wrote a most persuasive article recently in opposition to the legislation before you. I ask that it be made a part of the record at this point. I ask also that a New York Times editorial of May 18, 1966 entitled "The High Cost of Arizona" also be made a part of the record.

Another distinguished writer and naturalist, Mr. Joseph Wood Krutch said "The Grand Canyon is at least two things besides spectacle. It is a biological unit and the most revealing single page of earth's history anywhere open on the face of the globe."

Let us keep it that way. I urge you most strongly to reject the proposed Bridge Canyon and Marble Gorge dams and to support instead legislation to include the entire Canyon of the Colorado between Lee's Ferry and Grand Wash Cliffs as part of the Grand Canyon National Park.

STATEMENT OF CONGRESSMAN JOHN W. WYDLER

Mr. Chairman, the Grand Canyon is America's most treasured natural wonder. It is an irreplaceable gift of God to our Nation.

Besides its awesome beauty and spectacle, it is rich in biological and ecological information and the most revealing single page of the earth's history.

And yet, with all the talk by this administration in Washington, D.C., of preserving the natural beauties of our land, it is sad to find that the Grand Canyon is to be adorned and "bottled up" by two gigantic dams. These dams are for the sole purpose of producing power to make money.

It seems strange that while we are asked to remove the billboards from U.S. Highway No. 1, we are asked to desecrate the greatest natural wonder that has been given to our land and our people. I do not believe that we are such a nation of hypocrites as to allow this to happen.

I fully understand and sympathize with the problems of the people of the Southwest. Their need for water is great and they are entitled to help in meeting that need. But I refuse to give them the Grand Canyon. It belongs to us all. It should remain inviolate.

There is much to be said on both sides of the argument growing in this country between the "conservationists" and the proponents of "water engineering." As our population grows, some give will have to take place to meet the needs of the people. Care and reasonable balance can and must, be exercised.

Leading the way in the Federal area is, and will continue to be, the Department of the Interior. This Department suffers from an enormous "conflict of interest." Within it is the Bureau of Reclamation, the Nation's leading proponent of "water engineering" and the National Park Service, whose goal is conservation and recreation.

When the chips are down, however, the "water engineers" take over.

Although it is difficult to establish the administration's position, Mr. Stewart Udall, Secretary of the Interior, has come out for construction of the Bridge Canyon and Marble Gorge Dams in the Grand Canyon. In this he is backed by the Bureau of Reclamation. They are all for these hydroelectric "moneymaker" dams. The National Park Service stands mute.

Worse than that, the Park Service acts as if it were struck dumb at a time when it should be shouting to the heavens. They have been charged publicly with having issued a memo forbidding the giving out of information on these dams and ending with the words "destroy this memo after reading." They have not denied this, nor answered the charge. I am constrained to believe such a memo exists.

It should be—it must be—made public. The National Park Service should be made to testify publicly on this and on their position on these dams. So too should the Bureau of Outdoor Recreation, the Geological Survey, and the Fish and Wildlife Service.

To the conservationists in the East this proposed destruction of the Grand Canyon, aided and abetted by the Department of the Interior, should be a warning of a clear and present danger.

The wildlands of the Grand Canyon are at least as precious as the wetlands off the shorelines in the town of Hempstead. Yet the Department of the Interior and the Secretary of the Interior are not acting to protect the Grand Canyon but rather are active participants in its despoliation.

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I have never been moved by the argument that Federal acquisition and control of our Hempstead and Oyster Bay Wetlands and their domination by the Secretary of the Interior—whoever he may be, now or hereafter—will protect the interests of the people of the town of Hempstead. On the contrary, the elected town officials will respond to the people in the town, when the Secretary must look to interests massive in size and nationwide in scope. Local rule—or ruin—appears to me to be the choice.

Those who harp on the errors of the past, should look forward to the promise of the future. Protection for the wetlands has been publicly signed, sealed and delivered by the town of Hempstead and the State of New York.

The dams in the Grand Canyon must not be built. We in the East have a stake in this as Americans. We also have a stake as taxpayers. Federal dollars will subsidize the project at every turn.

The price of the water to result from the overall project will be subsidized. Much of this water will be used to grow cotton—a surplus item—which is the most subsidized farm product in America. Since the dams will pay no taxes on power revenues, another subsidy results. The low interest on construction capital loans is another subsidy. The list is endless.

In this fight the "conservationists" are clearly right. Their fight is your fight and my fight.

There is much lip service to the cause of conservation and national beauty in Washington at this time. I like to rely on a man who believed in what he said and who proved it by his actions, President Theodore Roosevelt.

He warned our people:

"I want to ask you to do one thing in connection with the Grand Canyon in your own interest and in the interests of the country. Leave it as it is. You cannot improve on it. The ages have been at work on it, and man can only mar it."

To which I add. "Amen."

Mr. ASPINALL. Before we call the next witness, I think that it is appropriate that the record should show that there is, apparently, some misunderstanding by some people relative to the operation of this committee.

Any charges that information has been withheld, or anything like that, is so ridiculous that we should have this information in the record.

This morning I received a letter from Mrs. Elizabeth S. Cosbey of Somerville, Mass., from which I will read this last paragraph:

I would greatly appreciate receiving a copy of the Park Service report on "Effects on Grand Canyon National Park and Monument of the Proposed Colorado River Project," which, I understand is being kept from the public.

These kinds of statements help no individual.

Mrs. Rogers received a letter yesterday, and this was just one of several letters of this type that have been coming in. This letter is signed by Herley Gayman from Los Angeles, and reads:

Dear Congressman Rogers: The farce of your *Grand Canyon* hearings on the sanctioning of dam building projects is that you pack the hearings unfairly. You reject the Government employed technicians who might be against the Bridge and Marble Canyons. Thereby you make our populace the victims of unwanted and obnoxious socially detrimental public works.

Well, some of you have been here for several days. It was explained in the beginning why we did not have room to take care of the people who wanted to get in, but the accusation and the charge that the hearings have been packed, if they have been packed, it is not known to the chairman. He has recognized people in this hearing representing every interest.

These are statements that hurt the process of the legislative branch of the Government in our country. And they are solely in the interest

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of people who make them. But they, also, tend to leave a bitter feeling in the minds of those who are members of this committee, especially those who are in charge of trying to see that everybody gets a fair deal.

I want this in the record because we have been receiving so many of these statements that it shows that there is some kind of consensus, a misunderstanding, which is not good for anybody.

With that in the record, I will let it stand for whatever it is worth.

We will now start hearing certain witnesses that we have this morning.

We have with us our old friend and coworker in the vineyard, as it were, Mr. David Brower, executive director of the Sierra Club.

I understand that Mr. Brower is going to ask permission to put in the statements of Mr. Daniel B. Luten of the Federation of Western Outdoor Clubs; Mr. Michael McCloskey, conservation director, Sierra Club; and Rodger W. Pegues, northwest conservation representative, Federation of Western Outdoor Clubs.

We are glad to have you here today and we will listen to your statement.

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

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

Mr. HOSMER. Does Mr. Brower have a written statement?

Mr. ASPINALL. I think so.

Mr. HOSMER. Is it the 41 pages of material that have been handed to us that the Chair has asked to be put into the record?

Mr. ASPINALL. What do you have?

Mr. BROWER. A statement which I, at least, wish to summarize.

Mr. ASPINALL. Is this a statement that includes all these telegrams and the like?

Mr. BROWER. It includes some documentation.

Mr. ASPINALL. Excerpts of information and all of this?

Mr. BROWER. Yes.

Mr. HOSMER. Mr. Chairman, I am going to object to this and make a point of order against Mr. Brower summarizing the material that, obviously, does not belong in the record. At page 1699 of the hearings of this committee, the opening date, Monday, the chairman stated that "certainly, we should receive no testimony which is repetitious to that already received and before the committee."

These hearings are on language developed by representatives of the Colorado River States since last year. I have examined this 41 pages of mimeographed material and I find it to be redundant with trivia and with fragments of information taken out of context, totally repetitious of the material taken last year, and which ignores completely contributions to the record of witnesses who testified on this subject, and the statement of the chairman that the hearings were to be had on this subject.

Mr. ASPINALL. The gentleman, of course, has the right to object to a great amount of repetitive material. I have not been through this document as yet.

Mr. HOSMER. Mr. Chairman, at page 3 we find one of the seven subdivisions of the document before us which is entitled "Suppression of Information"—the very thing that the chairman was just complaining about coming from other people—and which he indicated was inappropriate for the hearings.

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At page 11 of the statement we find title II, entitled "The case against Marble Canyon Dam and for Grand Canyon."

If that was not gone into 100 percent at the hearings last year, I do not think there has ever been anything more thoroughly gone into. As a consequence, title II is a compilation of trivia.

On page 17, title III, there is an ambiguous title which says, "Correcting the Record". So far as I can see, it is an argument with all of the proponents as to the Colorado basin project.

And then on page 22, another ambiguous title, "Further Corrections" and again, full of innuendoes against the Interior Department and against anybody else who is for this project.

Now we go on to some more—as a matter of fact, I think that Mr. Brower took every piece of paper on his desk and has thrown them into this.

And then title V—on page 23, entitled "An outstanding Conservationist's views". And this section of this compendium is a reiteration of some opinions and viewpoints of one Dr. Ira N. Gabrielson, known as "Mr. Conservation." If there is anybody in this country who is "Mr. Conservation," I think it is the gentleman who occupies the chair now.

Mr. BURTON of Utah. Will you yield?

Mr. HOSMER. In just a moment I will yield.

On page 26, title VI, entitled "A complete record as the court sees it"—it has nothing to do with a court case in about this project at all. These several pages of dramatic exposé are referring to some case up in New York.

Title VII, on page 35, entitled "A perspective for decision," contains nothing whatsoever bearing on the issue to be heard by the committee. It is another one of these long lists of general trivia.

As a consequence, Mr. Chairman, when you take the 41 pages of nonrelevant material, when you consider the cost to the Government to put this in these hearing books, I think that my objection is even further of importance.

Mr. ASPINALL. The gentleman from Utah?

Mr. HOSMER. I yield to somebody down there.

Mr. BURTON of Utah. You yielded to me, Mr. Hosmer.

Turning back to page 21 of this statement, I notice that it contains a colloquy between Mr. Brower and former Senator Barry Goldwater. And the thrust of the comments here seem to to be that Senator Goldwater is against the dams. He quotes him to that extent. I wonder if that is fair, when if you turn to page 695 of this hearing record, Senator Goldwater appeared before the committee in support of the project last August.

Mr. HOSMER. I will say to the gentleman that when I mentioned that this statement is redundant with fragments of information taken out of context, I had particular reference to page 21, in which Mr. Brower quotes part of the McCall article. I am sure the chairman would regard that as trivia. And when Mr. Brower takes out of context statements like that of former Senator Goldwater indicating some objection to Marble Canyon, I believe that it is in that category, when, in truth and fact, the full article indicates exactly the contrary.

I think that, saying the least, this is a very sorry foundation for an oral summary.

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Mr. BURTON of Utah. If you will yield further—if you will read the full testimony offered by Senator Barry Goldwater, starting on page 695 of the hearings of last year, you will recognize the fact that he states that he loves the river, he has gone down it a number of times—that he is a great admirer of the canyons, but that the needs of the people come first.

Mr. HOSMER. That is exactly correct.

Mr. ASPINALL. Would you be willing to have the statement placed before the staff, Mr. Brower, and have the staff take out the repetitive material, and leave that which is not repetitive for the record, and place the balance of it in the file?

Mr. SAYLOR. Mr. Chairman——

Mr. ASPINALL. I have asked a question.

Mr. SAYLOR. I would like to make a statement.

Mr. ASPINALL. The Chair is asking Mr. Brower to answer at this time.

Mr. SAYLOR. I would advise him not to answer the question until I have had a chance to make a statement, Mr. Chairman.

Mr. ASPINALL. Who is running the committee?

Mr. SAYLOR. You are running the committee.

Mr. ASPINALL. All right, let him answer the question and then you can make your statement.

Mr. SAYLOR. That is your prerogative. You have permitted every member to make any statement that they desire, but when I want to make a statement——

Mr. ASPINALL. You can make a statement as soon as Mr. Brower says that he does not want, or does want, to answer the question.

What is it that you want to say, Mr. Brower?

Mr. BROWER. I should appreciate having the statement inserted in the record as presented, as I have done my best to avoid any repetition of material given before. This is new material.

Mr. ASPINALL. With that statement from the gentleman, the gentleman from Pennsylvania is recognized.

Mr. SAYLOR. Mr. Chairman, I have sat here and watched witnesses put in repetitive material in complete violation of everything the chairman and Mr. Rogers asked for in the beginning of this hearing, and I have made no objection to it whatsoever, but the first time a witness appears who is opposed to this legislation, objection is raised that they are putting in material which, in the opinion of one of the members, is repetitive. If this is the attitude that is to be carried on, let us clear it up right now.

Mr. ASPINALL. The Chair would suggest that Mr. Brower continue with his statement, leaving out any parts that are repetitive.

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

Is that the ruling?

Mr. ASPINALL. The gentleman from Pennsylvania is correct. We have allowed repetitive material to go into the record heretofore, and——

Mr. HOSMER. May I suggest, Mr. Chairman, that I have no agreement with the gentleman from Pennsylvania relative to allowing repetitive information to come into the record, or nonrelevant information to come into the record.

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I am happy to appear before this committee today to concur with the Governor of the State of Colorado in urging the enactment of Committee Print No. 19, the recommend revision of H.R. 4671 dated April 25, 1966, which is before this committee for consideration. The enactment of this legislation in the proposed form can go a long way toward helping the people of the Colorado River Basin resolve the problems created by rapid population growth and dwindling water supplies.

I believe it is not inappropriate to recall that I have been in the public life of Colorado for a great many years in many capacities. My early experiences were in the Arkansas Valley of Colorado as a county attorney. I broadened the scope of my public experience by becoming a State legislator and later attorney general of the entire State.

It might appear that I have narrowed my interest by becoming congressman for the city and county of Denver, but if this be so, my interest has had to be broadened with newer concepts which recognize that the Denver metropolitan area of which only two-thirds is within Denver proper comprises one-half of the population of the State; is totally interrelated socially, economically, educationally and in most other ways, with the entire State of Colorado and to a certain degree with substantial areas beyond the State boundaries. It is because of my interest in the progress of both eastern and western Colorado that I am much interested in the inclusion in this bill of those provisions which have been worked out by our Governor in collaboration with the Colorado Water Conservation Board for the authorization of five Bureau of Reclamation projects for the development of western Colorado and a concurrent adoption, for the protection of the present and future growth of eastern Colorado, of the clarification of Senate Document No. 80 which is found in section 501(e) of the bill.

Governor Love has ably described to the committee the official position of the State of Colorado on the inclusion of this provision in the bill.

My particular concern over this provision stems from the fact that Green Mountain Reservoir is located on the Blue River, one of the major tributaries of the Colorado River, from which the Denver metropolitan area now derives a part of its water supply. That area must necessarily look to this river for increasingly large amounts of its supply to support its future growth. Denver's rights to the use of this water, created by the people of Denver at a cost of more than $70 million, are closely tied in with the operation of Green Mountain Reservoir under Senate Document No. 80 by reason of the incorporation of certain provisions of that document in that decree of the U.S. District Court for the District of Colorado which defines the rights of both the United States and Denver in the Blue River.

Under the law, the definition of those rights by the court is simply a description of what Denver and the United States, as appropriators, did to create their respective rights. In describing the rights of the United States, therefore, the court, rather than presuming to intrude upon the functions of Congress, merely copied the language of Senate Document No. 80 without interpreting it. Since question exists, not as to any court interpretation, but as to the Congress' purpose in

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creating Green Mountain Reservoir, it is appropriate that only Congress resolve any problem relating to this Federal property which may have arisen out of this congressional document. It is even more appropriate for such a problem to be resolved by the Congress concurrently with the authorization of the Colorado reclamation projects which are a part of the recommended revision of H.R. 4671.

So that the committee may have the full text of Senate Document No. 80 before it for its consideration, I offer a copy of that document to the committee as an exhibit, which the committee may or may not wish to print.

Mr. ASPINALL (presiding). A copy of Document No. 80 will be received for the committee from my colleague. We should have one. We appreciate this very much.

Mr. ROGERS of Colorado. Thank you.

As a former attorney general and former member of the Colorado Legislature, I continue to respect the State policy and statewide beliefs which are expressed by the actions of the duly elected representatives of the people speaking as a legislature. I have been in political life long enough that I do not underestimate the views of those who represent even a relatively small minority because I have often learned much from such minority views. But, after all viewpoints have been aired and an official position has been taken, unanimously in this case, by the elected representatives of the people as well as by their appointed representatives speaking through the Colorado Water Conservation Board, I realize that there must be an end to controversy and that the official actions be adhered to by all.

This matter concerning Senate Document No. 80 affects no other State than Colorado. If it did, as a Member of the National Congress, I would have to exercise my judgment, not only from the local viewpoint but from the viewpoint of national interest as well. Here I have no such problem; the State of Colorado has spoken officially.

In what I have stated above, I have referred to the concurrent adoption of section 501(e) which is necessary to provide that congressional clarification of Senate Document No. 80 which is essential to the protection of eastern Colorado water users. The reason I have used the term "concurrent" is because the State has now officially determined that the development of water users in western Colorado should not, by reason of this portion of Senate Document No. 80, jeopardize the existing and future economy of eastern Colorado which is also dependent upon the use of the waters of the Colorado River. Happily, with the inclusion of section 501(e) in this bill, I can give my wholehearted support to the passage of the bill in its present form.

Mr. Chairman, now I would also like to include a statement by our colleague, Hon. Roy H. McVicker, a Representative of the Second Congressional District of the State of Colorado; and, also, to present a resolution of the membership of the Colorado Water Congress, adopted at its annual meeting on February 10, 1966.

Mr. ASPINALL. Without objection, the statement and the resolution will be made a part of the record at this point.

(The statement of Hon. Roy H. McVicker and the resolution of the membership of the Colorado Water Congress follow:)

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He sat here, as he said, and let it go in. That is his business to object to it when he does not want it to go into the record. It is my business to object to it when I do not want it to go into the record. And I think that I have the right to make this kind of an objection.

Mr. ASPINALL. The Chair has ruled that the witness may proceed.

Mr. BURTON of Utah. A point of information.

Would the Chair allow us to interrupt Mr. Brower as he proceeds through his statement on thing that we feel are out of context.

Mr. ASPINALL. We will follow the regular order of procedure.

Mr. BURTON of Utah. Thank you, Mr. Chairman.

Mr. ASPINALL. Please proceed.

Mr. BROWER. Am I understand that you want me to read every word?

Mr. ASPINALL. Yes, that is right.

STATEMENT OF DAVID BROWER, EXECUTIVE DIRECTOR, SIERRA CLUB

Mr. BROWER. Mr. Chairman, I want you to understand that in preparing this testimony I have used the same methods of preparing documents for inclusion, that I have used before this committee many times.

Mr. ASPINALL. Mr. Brower, you have many telegrams, you have many letters and so forth in your statement, that are repetitive. There is objection to having those placed in the record. You will have to follow the rules.

I have asked that the staff, which is a nonpartisan staff, be permitted to strike from your statement anything that they consider to be repetitive. And you are allowed to accept that. And that part which is repeitive will be put into the files.

Insofar as that is concerned, it does not cost so much to have it placed in the files as to have it placed in the record.

It is up to you.

Mr. BROWER. Let me revise my remarks, then. I could not, in the balance of the day, read my entire statement. I will be glad to have the staff take out what is believed to be repetitive.

Mr. ASPINALL. It is my understanding that you will be recognized for nonrepetitive material and your repetitive material will be placed in the files, whatever it may be.

You may make your oral presentation.

Mr. BROWER. Thank you, Mr. Chairman.

I would say that the gentleman from California has already summarized my statement, though I would not quite agree with some of his adjectives. But we did attempt, or I have attempted, to discuss the matter of suppression of information by the Department of the Interior, not this committee.

The case against Marble Canyon is one that has not been argued so far as I know. The scenic resource damage that would be done, and some of the other aspects, including the siltation rates which have not been discussed in the hearings or in the testimony.

The Park Service report on Marble Canyon Dam consists of three sentences in the appendix on the Southwest Water Plan, and I think that material should be augmented.

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That part relating to the correction of the record relates to our book on Grand Canyon, which I think was misunderstood. I attempted to correct that misunderstanding.

I have, also, attempted to correct the misapprehension of some people that the article by Prof. Richard Bradley, of Colorado Springs, in Reader's Digest, entitled "Ruins of the Grand Canyon," was a compilation of inaccuracies—and I think that is covered by an exchange of correspondence I have included in the documents.

The views of Dr. Gabrielson represented at the so-called Grand Canyon workshop conducted by Readers' Digest, and attended by a good many representatives of the press and others—Dr. Gabrielson's views, I think, are quite significant here inasmuch as it was one of the best statements made at the workshops.

The record of the court case, which is covered in one of the later sections, has a good many thing in it that are applicable to the attempt that this committee is making to get a complete record.

This is a case of the scenic Hudson versus the Federal Power Commission and Consolodiated Edison Co. The complete case would be good to have in the committee's files, but this is a boiling down of some of the very significant comments in it which will have bearing on what would happen on the Colorado River if the Federal Power Commission were to attempt to grant a permit to the State of Arizona or some other agency to build a dam there, should this committee decide not to do so.

Finally, in my conclusion, though I am sure that Mr. Hosmer is correct that some of the kinds of things I have talked about here have been said before, in general philosophy, this is a better development than I have put together before. And I think it makes a fairly good conclusion.

I think that it is a fair summary of the criteria for decision in a great controversy such as we have here.

I do not wish to read any of my testimony because we do have other witnesses coming whose material, I think, will be quite significant to the committee and it wil be a great deal newer in concept perhaps than some of the thing I myself have had to say.

Wishing to place the statements of others who were intending to be here in the record, I would like to offer as if read the statement of Mr. Michael McCloskey, conservation director of the Sierra Club.

Mr. ASPINALL. Is he present in the room?

Mr. BROWER. He is not present.

Mr. ASPINALL. It will be presented for the record but not as if read.

Mr. HOSMER. Have you seen the statement?

Mr. ASPINALL. Yes.

Mr. HOSMER. I have all of the same objections to the McCloskey statement that I have to the Brower compilation. Since he is not here, I would ask the Chair to apply to the McCloskey statement the same procedure that was applied to the Brower statement; namely, the culling out by the staff of any material which is repetitious.

Mr. ASPINALL. Even if it appears just in the record, as so many of the statements have I think that the staff can go over it. But I do not see that the staff should go over a two-page statement. I wish that the gentleman would withdraw his objections.

Mr. HOSMER. Out of courtesy to the Chair, I will withdraw my objection. I still do not believe that it should go in the record.

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Mr. ASPINALL. Very well.

Mr. BROWER. I may complicate this a little too much by doing this, but what I should like to do here is to read part of Mr. McCloskey's statement that has just been received.

Mr. ASPINALL. As part of your own testimony?

Mr. BROWER. All right.

Mr. ASPINALL. Then it will be taken out of the McCloskey statement and made a part of your statement.

Mr. BROWER. It will be.

Mr. HOSMER. Well, where will you be reading from?

Mr. BROWER. This is something that I just received last night to augment Mr. McCloskey's statement, and I wish to add this.

Mr. HOSMER. Is it something that the committee has never had in writing before?

Mr. BROWER. It is a proposal of an amendment.

Mr. HOSMER. Has this been submitted to the committee in accordance with the ruling that the testimony is supposed to be submitted 24 hours in advance?

Mr. BROWER. This has been submitted to me as of last night. I got it air special.

Mr. HOSMER. I object.

Mr. ASPINALL. The objection is sustained.

If it is not in your statement or in Mr. McCloskey's statement, then you perhaps had better give it to somebody else and make it a part of their statement.

Mr. BROWER. All right.

I would resume, then, by asking, also, to present for the record the statement of D. B. Luten, vice president for California of the Federation of Western Outdoor Clubs and the statement of Mr. Rodger W. Pegues, northwest conservation representative of the organization.

Mr. HOSMER. I make the same objection to the inclusion of these two statements, as to the McCloskey statement, and I ask the unanimous consent to withdraw my general objection in difference to the Chairman's personal wishes.

Mr. ASPINALL. Thank you very much.

It will be made, or they will be made, a part of the record.

(COMMITTEE NOTE.—Although Mr. Brower's statement includes material directed to the same arguments presented last year, the staff found no specific repetition of material placed in last year's hearing record.)

(The prepared statements of Mr. Brower, Michael McCloskey, D. B. Luten, and Rodger W. Pegues follow:)

WATER FOR ARIZONA AND AN UNSPOILED GRAND CANYON, TOO

A compendium of statements and documents presented as new to the record of hearings and important to the Congress with respect to hearings on H.R. 4671, held May 9, before the Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, U.S. House of Representatives, Washington, D.C.

(By David Brower, Executive Director, Sierra Club accompanied by Sierra Club staff members)

Mr. Chairman, in attempting to learn how the Sierra Club could be most helpful to your proceedings, once we had learned of the schedule of these hearings I telegraphed you as follows:

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[Western Union telegram]

Hon. WAYNE N. ASPINALL,

Chairman, House Committee on Interior and Insular Affairs, Washington, D.C.

On April 26 Sid McFarland discussed with our Jeff Ingram items pertaining to the Colorado hearings starting May 9. We understand that testimony will be allowed on new matters in Titles 2, 5, and 6; also on the effect of the diversion on operation of Grand Canyon dams and on payout of municipal and industrial water supply.

We have found several experts with new material to offer the Committee to help complete the record, and we would like to help make the record for the full Committee as complete and current as possible. We wish to urge these experts to submit statements and requests to testify, hoping you will accept this evidence. Pertinent areas of new information are:

1. Power generation by nuclear energy
2. Alternatives to the dams
3. Economic feasibility of the dams
4. Geological problems of the dams and reservoirs
5. Archeological importance of the areas to be impounded
6. Ecological damage in Grand Canyon if the dams are built
7. Amendments we would propose

Several Federal Agency Reports are not accessibly in the record. Can this information—some new and some not—be introduced to assure a full record? The last 8 months have seen important data made public; moreover, there is a serious matter of the suppression of opinions of government agencies other than the Bureau of Reclamation, such as Outdoor Recreation, Geological Survey, Park Service, Indian Affairs, and Bureau of Mines. Experts in these agencies ought to be allowed to speak freely on this tremendously significant national issue and we believe that your Committee can insist that these Bureaus be allowed their candor in the national interest.

Please excuse this cold form of enquiry, but the deadline is upon us and time is short to let the volunteers know what will be acceptable.

Kindest regards.

DAVID BROWER,
Executive Director, Sierra Club.

Your reply stated:

"DAVID BROWER,
"*Executive Director, Sierra Club, San Francisco, Calif.:*

"Re your telegram regarding hearings on H.R. 4671 my suggestion is that witnesses submit testimony in accordance with committee announcement with the understanding that committee will determine whether material is new and appropriate for the record.

"WAYNE N. ASPINALL,
"*Member of Congress,*
Chairman, Committee on Interior and Insular Affairs."

What follows, with other statements already presented for your advance consideration by some of the experts we could reach in time, constitutes our attempt to comply with your wishes. The presentation is in seven parts, and I hope most of the overlap has been avoided, although there is still within the testimony some reiteration, useful reiteration I trust.

I. INTERIOR'S SUPPRESSION OF INFORMATION

(By David Brower)

I hope that sometime in the course of your investigations you will have a chance to go see on the South Rim of Grand Canyon, the monument to John Wesley Powell. He was the first man to travel down the Colorado River. His trip was dramatic and adventurous. His career was more important. I don't want to dwell on it but I would point out that he was the first director of the United States Geological Survey. For a period of about 10 years, he had more power, according to Wallace Stegner's biography of him, than the President of the United States then had with respect to public lands. One of his great contributions to this country and to government was his effort to bring science to

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government. He wanted to get the technicians and the people from the various branches of science to help advise the Congress and the public as a whole. Nearly a century ago he founded the Cosmos Club to aid this specific purpose.

My question—a blunt one—is where is this kind of advice today? We hear a great silence. Back in the Upper Colorado River Storage Project battle there was a Geological Survey report which documented a most serious flaw in the Upper Colorado Project. The study demonstrated that there would be a progressively greater incremental loss of water from the hold-over river storage planned in the Project—gross overengineering. It was an important document. It was withheld until the Project had been authorized. Then the report was released. This is easy to document.

In more recent events, when we were trying to help save Rainbow Bridge, even as the Upper Colorado Storage Project required by law that it be saved. Two successive Secretaries of the Interior did what they could to have it saved. The Bureau of Reclamation lobbied against them. It was not saved. The geological danger to the structure was appraised on a very quick trip by the Bureau of Reclamation's geologists. With help from—informal help it had to be—from Geological Survey geologists, we phrased a letter to the Director and to the cognizant Assistant Secretary trying to get answers to the questions which we knew were good questions. The reply was evasive and covered none of the issues.

I know that in the attempt to get checks on engineering data on the Colorado River Storage Project we did not or could not, after an initial effort, go to any government engineers formally. There seemed to be nobody in government who would speak against it. I received much advice at that point from a man whose name I can now give because he's dead. This was Walter Huber, then President of the American Society of Civil Engineers. He helped me check the errors I found in the Bureau of Reclamation's data and computations.

In most of this there was an ominous silence on the part of the National Park Service. I'm not blaming the Park Service. It did what it could, as demonstrated in the following letter from Richard M. Leonard, who was then President of the Sierra Club, to Secretary Stewart L. Udall. The letter is dated May 2, 1966.

"Re Grand Canyon National Park

"Dear Mr. Secretary: It has come to my attention that the National Park Service has felt obliged to inform its personnel that since The Secretary, as a matter of policy, has approved the general purpose of the Southwest Water Plan, such a policy decision is binding upon Park Service personnel, and they may not distribute literature or otherwise engage in official conduct that contravenes The Secretary's policy.

"I was President of the Sierra Club during 1953 and 1954 during a part of the great battle to protect the National Park System in connection with Echo Park Dam and Dinosaur National Monument. I wrote to the Secretary of Interior at that time, and he fully agreed with me, and so instructed the National Park Service, that in spite of the 'policy' decision of the Secretary of the Interior with respect to the pending legislation submitted by the Bureau of Reclamation, the National Park Service still had a duty under the National Park Act of 1916 to make every effort to protect the integrity of the National Park System. The National Park Service was therefore expressly authorized by the Secretary of the Interior to cooperate with testimony, photographic material, technical data, and other assistance to protect the National Park System *until* Congress itself might decide the matter by a change in the statutory obligations of the National Park Service as set forth in the basic legislation of the Service.

"It would therefore be appropriate and helpful to provide similar instructions to the National Park Service in connection with the present concern over the portions of the Southwest Water Plan that will adversely affect areas under the jurisdiction of the National Park Service.

"I have long admired your fine support for Conservation, and your logic as a lawyer. I do hope that you will be able to clear up this misunderstanding as to the statutory obligation of the National Park Service to protect the areas under its jurisdiction.

"Sincerely,

"RICHARD M. LEONARD,
"*President, Conservation Law Society of America.*"

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The National Park Service, in the present situation, has been effectively silenced. I protested this and other silences in a wire I sent to Secretary Udall March 30 from the *Reader's Digest* workshop at Grand Canyon. You will recall that the Bureau of the Budget had expressed the Administration's position that Bridge Canyon Dam not be built at this time, but that there be an opportunity, in view of the President's interest in natural beauty, for a full evaluation by others of the effects of the proposed Bridge Canyon Dam. Although the President made this clear, the Bureau of Reclamation, which intruded its very expensive exhibit at the workshop, continued to advocate Bridge Canyon Dam.

My wire to Secretary Udall explains the problem.

"In view of the Bureau of the Budget's elimination or deferral of the Bridge Canyon Dam pending further study of its impact on a scenic resource of international significance, we believe the public has a right to insist that you direct all cognizant interior agencies and not just the Bureau of Reclamation freely to inform the press, the Congress, and an independent study team of the facts and interpretations of those facts pertinent to the Grand Canyon controversy."

We have seen a National Park Service memo forbidding distribution of material critical of Bridge Canyon Dam, even though the Administration itself does not now support that dam. The National Park Service memo contains a paragraph directing that the memo be destroyed once it has been read.

We can too easily infer that similar instructions govern other Interior agencies—the Bureau of Outdoor Recreation, the Geological Survey, the Fish and Wildlife Service, the Bureau of Mines, the Bureau of Indian Affairs. We are confident that you, yourself, are unaware of this denial of the public's right to know. We urge you to inform this meeting of national press representatives, conservationists, and other interested lay citizens assembled from many states, before the meeting disperses tomorrow, what steps you can take to bring about full disclosure of information important to the controversy over the Grand Canyon dams and their grave threat to the national park system.

The National Park Service memo I referred to was from the Acting Regional Director, Southeast Region to Superintendents, Southeast Region on the subject of Southwest Water Plan, dated October 28, 1965. It says in full:

DEPARTMENT OF THE INTERIOR,
NATIONAL PARK SERVICE,
SOUTHEAST REGION,
Richmond, Va., October 28, 1965.

In reply refer to:
A3615 SER(PA).
Southeast Regional Office Informational 65–224.
Memorandum.
To: Superintendents, Southeast Region.
From: Acting Regional Director, Southeast Region.
Subject: Southwest Water Plan.

We quote below in its entirety a memorandum which we have received from the Director relative to complaints which have been filed with the Office of the Secretary. This matter should be brought to the attention of all employees, especially those who have public contact duties, to assure ourselves that no one in the Southeast Region would undertake the type of adverse action which is the subject of Mr. Hartzog's memorandum.

"Recently, a complaint was filed with the Office of the Secretary to the effect that one of our employees was passing out literature published by the Sierra Club in opposition to the Bridge Canyon Dam, one of the structures in the Southwest Water Plan. Investigation confirmed this fact. This is a most disturbing development because it indicates that our employees may not understand a proper course of conduct concerning such policy decisions.

"The Secretary, as a matter of policy, has approved the Southwest Water Plan, including the Bridge Canyon Dam. Moreover, he has recommended the same to the President.

"This Service was given an opportunity to make its comments on this project, including the controversial dams. We did so, representing our views in the strongest terms possible. Our views were carefully considered. They did not prevail.

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"Each of you should take appropriate action to see that the employees in your Region are advised that a policy decision in this matter, having been made by the Secretary, it is binding upon them in their official capacities. They may not distribute literature in the areas of the National Park System, or otherwise engage in official conduct that contravenes the Secretary's policy."

This memorandum is informational and may be destroyed when it has been called to the attention of all concerned.

s/Raymond O. Mulvany
RAYMOND O. MULVANY.

All that I have said has been discouraging to the conservation groups. The lay citizens at this hearing who are trying to protect Grand Canyon National Park and Monument—the Grand Canyon as a whole—should not have to be here. We have on the federal payroll scientists of all branches, all disciplines who could supply essential information to the Congress. They were not there last August and I don't think they are here now and free to speak. If you were to ask now for the Bureau of Reclamation people—givers and receivers—to stand up, and for the other Interior agencies who should be talking but aren't, you would get your own answer to what has happened.

On April 29, 1966, not having heard from Secretary Udall, I addressed him again:

"Dear Stewart, As a conservationist who has supported you strongly and wants to improve that support, I am impelled to write another of my 'important letters,' but this one as urgent as they come.

"I am convinced that nothing you have done, and nothing else you are hoping to do for conservation, can offset the damage that will ensue if you let Grand Canyon go down the drain, and with it everything that has meaning in the National Park idea.

"The Conservation Foundation's News Analysis for April 15 underlines, by implication, a critical point. The headline reads, 'Udall put on notice that war on water pollution must not be "smothered" in transfer to Interior.' Senator Ribicoff has previously noted: 'the point bothering me and others' is the fact that in Interior there are other bureaus 'whose own constituencies are comprised of some of the nation's most flagrant polluters—mines, pulp and paper, oil and gas, to name a few.' Congressman John Blatnik and Robert Jones echoed the apprehension

"You reassured them, 'One of my objectives will be to avoid the kind of criticism heard this morning. * * * From now on you're not going to have to chase people down in some bureau' to get answers to pollution questions.

"I wish you could reassure the conservationists and press, hundreds of them, who wonder how free from suppression Interior Information is, an apprehension expressed in my wire to you from Grand Canyon on March 30 and expressed also in Professor William C. Bradley's letter to you from Texas April 25 (see enclosures). The question seems even more vital in the context of Congressman John Moss's bill which seeks to minimize secrecy in government.

"I tried to reach you by telephone before sending the wire. I have never had trouble getting the word through when something was urgent in the years gone by. But nothing worked this time, nor was the wire acknowledged, even though the press was waiting for your reply.

"It will do this Administration no good to attempt to complete the National Park System in 1972 if Grand Canyon's integrity, and the Park System's with it, is destroyed in 1966. A Secretary of the Interior could hardly win a blacker mark than the man who let this happen—even if there were compelling arguments in favor of such severe impairment. None of the Bureau of Reclamation's rationalizations constitutes any such argument. I believe that this statement would be attested to by many experts within the government if you would do your best to make them absolutely free to speak the truth as they see it.

"Please respond. So far as I can see it, your conservation career is at stake, and our parks and wilderness too. They have had your best. They still need it.

"Sincerely,

"DAVID BROWER, *Executive Director.*"

I enclosed a further copy of the unanswered wire together with Professor William Bradley's very significant letter, which reads:

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[The University of Texas letterhead]

APRIL 25, 1966.

Hon. STEWART L. UDALL,
Secretary of the Interior,
Washington, D.C.

DEAR MR. UDALL: A short time ago David Brower, Executive Director of the Sierra Club, sent you a communication expressing grave concern that certain Interior agencies are not free to express their professional opinions in the Grand Canyon controversy. As an interested private citizen I should like to echo the same concern.

As a professional geologist I was invited to defend the preservation of the Grand Canyon in its dam-free condition. I was happy to do this but at the same time I was well aware that there are eminent geologists in the U.S. Geological Survey who could have done it better than I, but who could not speak out because they belonged to the Department of the Interior. I know this because I talked with some of them. There are geologically cogent reasons for not building the Grand Canyon dams; why weren't the men who know these reasons best allowed to speak? They were not even in attendence at the recent Grand Canyon hearings, although Bureau of Reclamation men were there.

When one agency of the Government becomes so powerful that it can effectively suppress the opinions of other professional agencies, if the latter are not in agreement, it is cause for grave concern to small citizens who feel they have vanishingly little influence in the government.

Respectfully submitted.

WILLIAM C. BRADLEY,

Associate Professor of Geology, University of Colorado
(Visiting at University of Texas).

One big hope in the conservation organizations with which I work closely is that somehow the other agencies can be unmuzzled. We certainly want to hear the Bureau of Reclamation's views. We just as certainly want to hear the others. If there should be more hearings like this, we hope that the other cognizant bureaus will be just as abundantly represented, with just as fine exhibits as those the Bureau of Reclamation can afford. We still feel that there are good alternatives to these dams that will cost the public less—even cost Arizona less—and supply more water to Arizona. We have assiduously reviewed the case for the defense of Grand Canyon and the National Park System. We have sought out people who are experts on nuclear engineering atomic physics, on the use of fossil fuels, on power and water economics, on scenic resources who are independent of any government agency and who can speak freely. We would like to find more and have them here—but our budget is a small one—a continuing deficit for many years, and no federal borrowing power to rescue us.

We still like Theodore Roosevelt's admonition about Grand Canyon, "Leave it as it is. The ages have been at work on it. Man can only mar it."

II. THE CASE AGAINST MARBLE CANYON DAM—AND *FOR* GRAND CANYON

Even if the Bureau of Reclamation's proposed Marble Canyon dam had nothing to do with Grand Canyon or with Grand Canyon National Park, it could not be justified as wise long-range resource development for many reasons, chief of which are these:

(1) It would provide water for one use only—development of costly hydropower—and in the process would waste a predictable amount of water through reservoir evaporation and an unpredictable amount through seepage in a reservior basin the geology of which is inadequately known. What is known augurs ill, as Professor William Bradley has indicated.

(2) Its hydropower function is not economically feasible but has been made to appear justifiable by omission of facts and by rationalizations:

(*a*) The present cost of power from alternative sources has not been accurately presented and should be impartially evaluated by other than the dam-building bureau.

(*b*) Cost trends of Marble and alternate power—fossils-fired or nuclear—during the presumed payout period have not been adequately presented.

(*c*) Conservationists' objections to the high cost of Marble power have been countered with allegations that it is feasible because it will be used

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for peaking purposes—something no private electrical companies would now undertake.

(*d*) Interest and tax subsidies are not clearly presented.

(3) While alleging that the reservoir will be operated for peaking power—meaning that the water would be released in surges—the Bureau now makes no provision in its cost calculation for a reregulating reservior immediately downstream. This omission creates a downstream hazard.

(4) The addition of each new generating facility downstream from the Upper Basin will add to the economic weight of the argument that the Upper Basin's share of the Colorado should be allowed to run through the downstream generators to produce revenue (for further imports and diversions, chiefly for industrial and domestic use) rather than be diverted upstream for agriculture (particularly with agricultural lands now being retired from production owing to surpluses).

Whether or not the revenue claimed for these dams now presupposes this downstream commitment of water, it can be presumed that enormous pressure for just such use will develop once the generators are in—especially if, for reasons shown above, payout is prolonged.

(5) The Bureau of Reclamation's Basin Account device, in which income from power users in one region is siphoned away to subsidize water users in another, puts too great a concentration of power in a Bureau that already dominates in its Department.

(6) Marble Gorge is a major scenic resource as well as a presumably feasible place to put a dam. Future Americans may needs the scenic resource for several centuries before they are required, by the silting up of reservoirs now existing, to build the dam. It does not take much imagination to conceive of technological developments that could permanently preclude need for the dam. Whether dedicated by Congress or not, major scenic canyon resources should be at the bottom of the damsite list, not the top. We should leave a few dam-building decisions to the future.

The effect on Grand Canyon

(1) Marble Gorge is an integral part of the Grand Canyon as a whole, a geological entity, world famous and unequaled, that begins at Lees Ferry and extends to the Grand Wash Cliffs, below the head of Lake Mead. It stands to reason that if there is any conceivable means, even at added cost, of preserving the unmanipulated and unmechanized scenic, wilderness, wildlife, and recreational resources, then this should be done.

(2) Construction of the Marble Canyon dam, and operation of it for peaking power, would drastically affect the river regimen downstream in Grand Canyon National Park and Monument. Glen Canyon dam, it is is true, has already made a major change, but the flow from tributaries below Glen is enough to make the Colorado run the color it was named for whenever the weather takes a turn. This remnant of natural fluctuation is still important to the park. Its obliteration would be a severe impairment.

(3) Marble Canyon Dam could prevent access to the river below it and thus essentially render a large part of the Grand Canyon floor inaccessible. The Bureau has promised to provide access for boats, but the Bureau also promised to protect Rainbow Bridge—then lobbied against and helped defeat appropriations that would build the protection required by law and previously agreed to by the Bureau. The promise cannot safely be believed.

(4) Whatever public access to the canyon, by river, the Bureau elected to let the public enjoy would be rendered hazardous by the periodic flushing of the channel that peaking-power production would necessitate. The water would be turned on when peaking power was needed, and releases would be negligible in between peaks. A traveler choosing a campsite near water, at low flow, would be in peril. The Bureau has demonstrated an insensitivity to recreational release needs at Flaming Gorge, curtailing use for Lodore Canyon within Dinosaur National Monument, and could safely be assumed to be more considerate in Grand Canyon. Discouraging recreational use of the river in both places would diminish the number who could defend them out of first-hand knowledge. This is where the leadership of the defense of wild canyons come from, as the Bureau well knows.

(5) Once the defense of the Grand Canyon within the national park proper has been vitiated, the Bureau would be free to carry out its presently unheralded but previously well promoted plan to build the Kanab diversion, diverting all but the barest minimum flow from Marble Gorge through a tunnel and dropping the Colorado into a powerhouse at Kanab Creek. Adits for the tunnel would add

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further to the despoiling of Grand Canyon already accomplished by reducing the Colorado flow to a vestige of what had been the natural flow, with disastrous ecological effects.

(6) Either before or after the drastic impairment of the park the Kanab diversion would bring about, the Bureau could count on having weakened the Park System defense enough to proceed with Bridge Canyon dam and reservoir, extending from the headwaters of Lake Mead to the tailwater of the Kanab Creek powerhouse, together with the Coconino Project on the Little Colorado River, without which Bridge Canyon would not be feasible. The destruction of the values Grand Canyon was set aside for would be complete and the stage set for Echo Park and Split Mountain dams, plus the several others the Bureau and the Corps of Engineers has planned for National Park System areas, and any attempt to now save Wild Rivers, such as is now espoused by the President, the Secretary of the Interior, and organized conservationists, would be rendered meaningless.

(7) The principal exhibits in Marble Gorge itself—accessible now to many river travelers and surely to be accessible to many more as river-travel technique improves—would be inundated. Marble Gorge should instead be given protection equal to national-park protection.

(8) The probable silt life of the Grand Canyon dam is relevant to consideration of what is done in Marble Gorge.

Present records indicate that some 50,000 acre-feet of sediment enter the Colorado annually between Lake Powell and Lake Mead. (Twice that much is now intercepted by Lake Powell.) This would fill the Marble and Bridge reservoirs in 70 years. However, the Bureau plans a built-in rescue operation—to further silt-retention dams on the Paria and Little Colorado rivers, respectively, which can themselves intercept silt for a further 50 years—provided the silt-carrying floods agree to restrict themselves to historic limits. The carrying capacity of a river varies as the *sixth power* of the river's velocity; accordingly, all bets would be off if there should be such floods as attested to by geologic, if not historic, evidence in the Colorado Basin.

Moral: the 400–800 billion ton coal reserve in the Upper Basin States is a far longer-lasting source of energy than damsites on the silty Colorado.

Documentation for Paragraph 8 comes from:

(*a*) Pacific Southwest Water Plan, Report, January 1964, USBR:

	Acre-feet capacity
Coconino (Little Colorado)	2,100,000
Bridge	3,710,000
Paria	98,000
Marble	363,000
Total	6,270,000

(*b*) Walter Huber, then President of the American Society of Civil Engineers, special advisor to Eisenhower in a statement to me: "One third of the sediment going into Lake Mead comes from the Little Colorado." This was before Glen Canyon dam was built.

(*c*) House Document 364, 83d Congress; page 106 (1954): 100,000 acre-feet of sediment is carried by the Colorado above Glen Canyon damsite. "A total capacity of 20 million acre-feet would be provided in project reservoirs Upper Colorado River Storage Project to accommodate the sediment that would be deposited in a period of 200 years.

In conclusion, it is in the national interest to preserve the Colorado as a wild river, from the tailwater of Glen Canyon dam to the headwaters of Lake Mead, and to give the canyon walls the best scenic protection America can devise for the world-renowned scenic resource this country is so fortunate as to possess. Power needs can be met more economically from other sources now and in the foreseeable future. Water needs can be met better by direct diversion to the point of need, either at the expense of the water user if the diversion is really worth the effort or by other means of subsidy than hydropower sales if the diversion is really worth it but present users cannot yet meet the cost and it is to the nation's advantage to help out.

III. CORRECTING THE RECORD

In the recurrent mention of a mere 13 miles of national park that would be inundated, there is a major lack of understanding about Grand Canyon National

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Monument. As the chairman well knows, national monuments are created under the authority granted in the Antiquities Act of 1906, in which the President was authorized to set aside certain important places, they could be of scientific interest and later on they were brought in for scenic importance. The President—several presidents, in fact—acted in time to save important places; in due course Congress could complete its own deliberations and give these areas the added protection of National Park status, meaning that Congress countersigned the promissory note to the future. Nine of our great national parks came by the National Monument route. By strange coincidence, things that are scientifically important and valuable for geological purposes are also quite beautiful to look at. That is true of the Grand Canyon. I'm glad that we are getting a clearer and clearer understanding on the entity of the Grand Canyon which does begin at Lees Ferry and does go to the Grand Wash Cliffs—an extraordinary, world famous resource, all 280 miles of it, the length of it seen by thousands of people every day who jet over it. The present plan of the Bureau of Reclamation is to see that all but 104 miles of those 280 are still water and we know from our experience with the tenacity of that Bureau that it still probably holds secret hopes for the Kanab Diversion. Secretary Udall, in giving his first announcement of the Southwest water plan, spoke of the development of the power at Marble and at Bridge and *at any feasible site between* [emphasis supplied]. There is a 1700-foot drop in the river and that would tempt any competent reclamationist.

I would like to speak a little bit more of the living river and its importance. I think that probbably the greatest number of visitors to Grand Canyon spend least time there. If you stand on the rim any day, when the jet trails are right, you'll see the Grand Canyon lies under one of the main air routes. You can count 50 flights a day. Figure 100 passengers in each flight and you have a lot of people who see the whole Canyon. I don't think this is the best way to look at Grand Canyon, but a lot of people will see it that way and it's big enough to be spectacular from 30,000 feet. The place really to see it, as Senator Goldwater described well in his recent article in *McCall's Magazine*—the real experience is when you're down on the living river itself. There's something about it I can't give you in words, you have to experience it. You yourself may never experience it. I think maybe a good many of you will always hope there's a chance to experience it some day, or if not, that your children can. This can be one of the great challenges left in the world, to ride that extraordinarily beautiful river in that extraordinary canyon, to see, still alive, as much as possible the tool that created Grand Canyon.

From the Rim or from a jet the River does not look very imposing. At one of the outlooks I once heard someone say, "I guess the river's dried up." There was not enough to see but that thin line of water built that Canyon. I think that we ought to leave it a chance to go improving Canyon. I think the river can enhance it better than anything else man can suggest.

One of my principal concerns here is to make an important point. I don't think there's a person in the Sierra Club, in any conservation organization I know of, who wants to see Arizona cut short of its water. I personally would like to see Arizona get more water out of the Colorado than it is getting under the best arrangement it was able to work out with my native state. And I mean that. I think that California has other sources of water. We're right on an ocean; we have our Northern California streams. Arizona primarily has the Colorado and an overdrawn water table. My own concern is that California is going to run out of air long before it runs out of water.

What we need—I renew the plea—is to hear all the experts in government, not just the selected ones. I would like to see well publicized, with as many training aids as you see here from the Bureau of Reclamation, a real analysis of the alternative sources of revenue that can pay for this project. The Bureau of Reclamation gets cheap money; it pays no taxes. If you take those two differences and put them into the calculation over a pay out period, it makes an enormous difference in the comparative cost of power. I'm not here to explain this but somebody should be explaining this very carefully to Congress—agencies that are not intimidated.

The coal reserve is a much longer lasting source of energy in the basin states—the upper basin states—than the very shortlived reservoir sites on the silty Colorado. There are, depending on the estimate, between 400 and 800 billion tons . . . in that coal reserve and then we go to the oil shale reserves. Nuclear fuel

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is almost limitless. But the Colorado River carries enough silt, 150,000 acre feet of silt per year, to fill up any conceivable reservoir in a century or two or three. There are Americans to come, down into the future, who are probably going to need reservoirs too. I don't think we need to rush to build all the dams we can now because we've got the dam habit.

Let me refer once again to *Time and the River Flowing: Grand Canyon,* the Sierra Club book before you. I was the editor of the book and know pretty well what is in it. I hope very much you will study it before you vote against Grand Canyon.

In the August hearings an erroneous interpretation was placed in the record which we tried to correct then and wish to correct now. Our letter of September 13, 1965, constitutes this correction:

SAN FRANCISCO, *September 13, 1965.*

Congressman MORRIS K. UDALL,
House of Representatives,
Washington, D.C.

DEAR CONGRESSMAN UDALL: At the hearings on H.R. 4671, you made certain comments about the book *Time and the River Flowing: Grand Canyon.* We believe we can demonstrate to your satisfaction that some of these comments were based on misunderstanding or misinformation, and we think you may wish to modify your statements accordingly in the record of the hearings.

Your statement that the book is misleading because it describes and pictures portions of the Grand Canyon that would not be directly affected by construction of Bridge Canyon and Marble Gorge dams reflects misunderstanding of the book's purpose. That purpose is to show that Canyon *as a whole and as it is,* and to make people want to keep it—all of it—as it is. We are confident you will not find anything in the book, explicit or implied, to justify the contention that the book purports to show only how the Canyon would be damaged by construction of the dams.

The Grand Canyon is a geological and topographical unit, and the whole suffers whenever any part is damaged. On this basis, we feel that a book whose avowed purpose was simply to survey potential damage would be warranted in extending its scope beyond the immediate environs of the dam and reservoir sites. But this is hypothetical; our book's purpose is not merely to survey potential damage but to treat the entire Canyon as it is today and the range of experiences that are available in it today.

It is apparent that you had a misconception about the book, but unless you can point to evidence that the book encourages such misconceptions, it hardly seems fair to call the book misleading. We know of no one else who was misled.

With your permission, we would like to discuss some of the specific language in your statement, " 'Time and the River Flowing,' An analysis by Representative Morris K. Udall of Francois Leydet's book on the Grand Canyon of the Colorado."

On page 1, paragraph 1, you say that *Time and the River Flowing* was published by the Sierra Club "in support of its legislative interests." It is true that all Sierra Club publications serve a conservation purpose, directly or indirectly, otherwise we would not publish them. Conservation is the club's "business." But the conservation purposes of the club and its publications are sought primarily through education, and to describe them as "legislative interests" seem to us a prejudicial oversimplification.

Having accused the book of making a case "against a 'straw man' project that doesn't exist," you then say that the "book contains 79 pictures which purport to show scenes in the Grand Canyon which will be altered or destroyed by the construction of these dams." This is a straw man with a vengeance. On what basis do you assert that the 79 pictures "purport to show scenes in the Grand Canyon which will be altered or destroyed"? As has already been mentioned, the purpose of the book is not simply to survey potential damage but to portray the Canyon as a whole and as it is. We do not believe you can find language in the book to justify an assertion that the pictures—other than those of Lake Mead and Glen Canyon—"purport to show scenes * * * which will be altered or destroyed."

You state that "in this entire volume one finds only 12 pictures of areas which would be inundated by these new lakes—six at Marble and six at Bridge." But your own analysis of the pictures does not bear out this contention. You list ten pictures that would be radically affected by Marble Gorge dam (numbers 12, 13, 14, 15, 16, 19, 20, 21, 26, & 77), and 16 that would be affected by Bridge Canyon dam (numbers 1, 5, 9, 10, 11, 41, 42, 53 [Egret], 56, 61, 63, 65, 66, 67, 68, & 72).

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We do not feel that the number of pictures portraying potentially damaged scenes is relevant to the book's purpose, which is to depict the Canyon as a whole and as it is. We should like to point out, however, in the interests of accuracy, that the number of such scenes is considerably greater than was indicated by your statement at the committee hearings.

You said you hoped readers of the book "will understand that the truly magnificent scenes shown here are in no way endangered by this Project. "In view of the foregoing, surely this statement should be qualified in some way. Many of the scenes would not be endangered; on the other hand, many other scenes would.

On page 3, commenting on picture 5, you say that "the implication is that this scene would be flooded out by the reservoir." Where do you find such an implication? No adversary of the dams, to the best of our knowledge, has ever suggested that the Canyon (or even the inner gorge) would be flooded from rim to rim by the proposed reservoirs. This preposterous idea is attributed to adversaries of the dams by their proponents, who seem to take pleasure in demolishing an argument that no one ever made. We should have thought you would credit the Sierra Club with too much intelligence to think the Canyon would (or could) be filled to the brim, and credit it with enough honesty and common sense not to charge the Bureau of Reclamation with planning a desecration on a scale we known to be physically impossible. The planned destruction, in our opinion, is bad enough; we need not exaggerate.

Commenting on photograph 10, you minimize the importance of the scene at river level and talk instead about the view from the rim. (The same rim-versus-river bias occurs in many of your other comments also.) We believe that a river-level traverse is the supreme experience that the Canyon affords, and that this experience should not be foreclosed to all men for all time. We therefore believe that the inundation or alteration of the river-level environment is of paramount importance.

Referring to photograph 11, you say that "exactly the same kind of photograph could be taken along the edge of the reservoir once the project was constructed." We beg to differ. Bridge reservoir's shoreline, about 200 feet higher, would lap against sheer rock walls and talus slopes—until the talus slumped into the reservoir as it is doing at Lake Powell. Even if its fluctuations were held to a minimum, a reservoir would not create a sandbar hospitable to flora, fauna, and campers "exactly the same" as the living river's natural riverbank.

Of picture 20, you said that "the increased water level would alter this low-angle scene but not obliterate it." The camera position is about 300 feet below the surface of Marble Gorge reservoir. This particular scene would not be merely altered, but would be obliterated.

You note that Vasey's Paradise (photo 21) would be inundated. But as we recall, there was no indication of this in the copy of the book that you submitted as an exhibit for the committee's file. An overlay should show that the entire picture area would be submerged. If your staff will study your comments on the pictures in conjunction with the exhibit copy of *Time and the River Flowing*, we believe they will find that there are a good many pictures lacking overlays in the exhibit copy that you have acknowledged would be inundated.

Commenting on a number of pictures taken below Marble Gorge damsite and above Bridge Canyon reservoir site, you say the scenes would not be affected. We dispute this statement. It is true that the scenes would not be inundated, but we believe it is totally untenable to argue that these scenes would not be radically altered. The streamside environment was created, is altered, and is constantly renewed by the ebb and flow of the living river. Along an even more regulated river, the forces of rebuilding could not keep pace with the forces of wind and water erosion. Sandbars, beaches, dunes and other riverside phenomena would be seriously impaired or disappear entirely in areas of the Grand Canyon supposedly protected by national park status. We believe this comment applies particularly to scenes in photographs you have numbered 23, 24, 25, 27, 28, & 32, and to a number of other pictures to a lesser extent.

In a number of cases—photographs 1, 15, 41, 42, 65, & 77—you did not know the exact location but assumed correctly that the scenes would be inundated. We wish that your staff (or the Bureau of Reclamation?) had felt free to apply to us for any information they lacked. We would have been glad to cooperate.

As for photograph 53 (the egret), you say the location is not known and you make no assumption one way or the other. The location is known to us. It is at Mile 166.5, where, according to our information, Bridge Canyon reservoir would be more than 120 feet deep. The scene would be submerged.

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You say of the Fern Glen photograph, number 67, that "it is possible that this portion of the canyon wall would be inundated." According to our information, the scene definitely would be inundated.

Of picture after picture, you note correctly that it is far removed from the dam and reservoir sites. Very true, and for that very reason we find it hard to see how you could sincerely believe that the book's purpose was to show only areas of potential damage. Surely you credit us with knowing that the Kaibab Plateau, at least, would not be flooded? (See comments on photographs 31 & 47.) If you do credit us with reasonable knowledge of the Canyon but persist in saying our book is misleading, then there would seem to be only one conclusion that we can draw: that you are accusing us of trying to perpetrate a gigantic and stupidly transparent hoax. We don't like to think that you consider the Sierra Club either ignorant or dishonest, but there doesn't seem to be any other inference that can reasonably be drawn from your statement.

We believe it likely that you were too pressed for time to consider all the implications of the statement you submitted regarding *Time and the River Flowing*. And it is our hope that when these implications are called to your attention, you will see fit to modify your statement for the record. We realize too, of course, that you were much too busy to check all of the facts that were presented to you. Factual errors (as we see them) have been called to your attention so that they may be corrected (if they require correction in your judgment). Our letter is not written in an angry or argumentative spirit, but in a friendly attempt to spare you the embarrassment of going on record with statements that, in some cases, we believe to be demonstrably untrue.

Your service to the cause of conservation is well known to us, and it is with deep regret that we find ourselves adversaries instead of allies in this particular instance. We trust that we will be allies much more often than adversaries in the future, as we have in the past, and anticipate with confidence your valuable leadership and support of conservation causes.

Sincerely,

DAVID BROWER,
Executive Director.
HUGH NASH,
Publications Manager.

Nowhere do we suggest the Canyon will be flooded out, which is the wording that the Bureau likes to use. There is no suggestion of it in the book—either in my own foreword or anything François Leydet said, or in any of the quotes, or any of the legends of the photographs. From that book you will, however, get an idea of some of the textures the river has sculptured, alongside the river itself, of the living things along the river, of the very heartland of the river and its ecological integrity. This is what we tried to reveal in the book. I only wish we had revealed it better.

The Sierra Club wants to publish a further book, one that concentrates on the living river and what its importance is to the Greater Grand Canyon National Park we hope you will consider and establish. We want to show Marble Canyon's scenic resource. In his *McCall's* article Senator Barry Goldwater said, "Marble Canyon is exactly what a Canyon should be." At the Reader's Digest Grand Canyon Workshop I asked the Senator, "Aren't you glad that we agree with you?"

He replied, "I am," which reply brought laughter and applause. He went on, "I do think Marble Canyon is extremely important, that's why I've never pushed for a dam in that particular reach."

IV. FURTHER CORRECTIONS

At this same Grand Canyon workshop, sponsored by Reader's Digest as a public service, the Sierra Club released two important documents which the Congress should have before it. One was a February 2, 1966 letter from Reclamation Commissioner Floyd Dominy to Reader's Digest, easily inferred to be an attempt to block republication of the Audubon Magazine article, "Ruin for Grand Canyon." Mr. Dominy's letter and enclosure were expertly replied to on March 16 by Professor Richard Bradley, author of the article. The letters follow:

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[Distributed by Sierra Club]

MARCH 16, 1966.

MR. FLOYD DOMINY,
Commissioner, Bureau of Reclamation, U.S. Department of the Interior, Washington, D.C.

DEAR MR. DOMINY: Your letter to Miss Margaret Young of the *Reader's Digest*, criticizing my article "Ruin for Grand Canyon!" which appeared in *Audubon Magazine* recently, came of course to my attention. So also did the telephone conversation you (or one of your staff) had with her. They came to my attention when Miss Young called upon me to defend my statements in my article which you referred to as "known errors or misstatements" and "errors of fact and reasoning." Quite properly the *Reader's Digest* would not wish to publish erroneous material.

I can fully understand your desire to avoid the adverse publicity that such an article in the *Reader's Digest* might bring to the Bureau. And I would certainly expect you to defend your project against those who disagree with your idea of what constitutes the highest use for Grand Canyon. But I was astonished that you, in your official position as Commissioner of Reclamation with all the prestige and public responsibility that position carries, were willing to make some of the statements you made. You must have assumed that Miss Young would simply accept your word against mine on the basis of your high office. It was a pretty long gamble, considering that your own personal reputation was to some extent at stake.

To begin with, you (or one of your staff members) told her that Shiprock steam power was not 5.8 mill/kwh, as I had written in the article, but 6.8—the extra mill to cover the cost of transmission. This, of course, would have materially weakened the economic argument I was making against building dams in Grand Canyon. However, it was simply not true. Mr. Ottis Peterson of the Bureau retracted the statement himself a few days later.

Next, you objected to my reference to Marble Gorge as being in Grand Canyon. Your letter reads as follows: "According to the Board of Geographic Names, there is no Marble Gorge of the Grand Canyon, but simply Marble Canyon, which is upstream from Grand Canyon." Your aim, I presume—aside from discrediting your critic, was to remove Marble Canyon Dam from contention and hence from the article. On checking with the Board of Geographic Names, Miss Young found that the present name *is* "Marble Canyon", as you said, but that until very recently (1960) it had been "Marble Gorge", which you did not mention. "Marble Gorge", as you know, is commonly used (see, for example, the *Encyclopedia Britannica*, the writings of Dellenbaugh, or the 1924 U.S. Geological Survey Report by LaRue on the Marble Gorge damsite). So it isn't something I made up to sell the article. However, much more interesting than the name is the fact that LaRue, the *Encyclopedia Britannica*, several other refernces, *and* the Board of Geographic Names (*your reference*) all say that Marble Canyon *is* a part of Grand Canyon. So once again, your statement was simply not true.

Then on page 2 of your letter to Miss Young, you objected to my raising "the ghost of the Kanab Diversion Project which was proposed decades ago and has long since been abandoned." Long since? How long since? In 1961 the City of Los Angeles was seeking authorization for such a project. As I recall, Los Angeles even proposed contracting with the Bureau of Reclamation to make feasibility studies. And only shortly before that (1957) Senator Goldwater proposed enlarging the park to the north, and the Bureau of Reclamation objected, saying this enlargement would tend to preclude further consideration of the Kanab Diversion Project. These events are in the last decade—*not* decades ago!

You say you have no plans for such a project, and I am willing to believe you, but ghosts do have a habit of coming to life suddenly, as the defunct Echo Park Dam did in 1959. Moreover, as we all well know, succeeding commissioners do not always subscribe to the policies and statements of their predecessors.

But to resume. In your letter, you opened the discussion of Bridge Canyon Dam with the statement "* * * it should be remembered that it is not in the current administrative program we support." (Having presumably knocked Marble Canyon out of the article on the grounds that it is not in Grand Canyon, you were evidently proposing to eliminate Bridge Canyon as not being in your current plan—even though it does happen to be in all the other authorizations bills before Congress.) You then conclude the letter by saying: "* * * there is

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no substitute at all for the Bridge Canyon site." Your two statements left Miss Young wondering whether the Bureau was advocating the dam or not.

We may pass over the validity of the comparison between Bridge Canyon Dam and Hetch Hetchy Dam—the next "error in fact" you point to in your letter. There are obviously some differences, but there are just as obviously some similarities. Whether the similarities should be emphasized (as I believe) or the differences (as you do) is a matter of opinion rather than fact. Anyhow, we both know what the National Park Service said about the effect the reservoir would have on park values.

On the bottom of page 2 of the letter you give your justification for invading Grand Canyon National *Monument.* This is one of the most remarkable arguments of all. You refer to, and enclose a copy of, a letter written in 1933 by Horace Albright (the National Park Service Director at that time) to Elwood Mead (the Reclamation Commissioner). What is remarkable, in the first place, is that you should rely on a statement by a National Park Service Director for interpretation of federal law, rather than on the opinion of the Solicitor of the Department. But what is even more extraordinary is that you should use this *1933* letter as an enclosure, and completely ignore the amendment of the Federal Power Act of *1935.* The purpose of the amendment to the Federal Power Act was to protect national parks and monuments—all of them, not just the ones then existing—from the threat implicit in the Albright letter.

As you remember, the fight at Echo Park was largely over the question of the degree of protection a national monument should enjoy. The outcome, I thought, was unambiguous, even though in that case, unlike this one, the proclamation contained a specific reference to a reclamation project.

On page 3 of your letter you claimed that my comparison between steam and hydroplants overlooked the flexibility of the latter for meeting sudden load changes. It did not overlook this. A discussion of other ways of meeting load changes occupies the following several paragraphs of the same article.

On the same page you say that I inferred in my article that building multiple-purpose dams "is a precedent in national policy which should not be permitted to happen." Again, the historical background for building multiple-purpose dams is given in the following paragraphs of the same article. I never inferred it was a precedent. I did suggest that it was time to think of some other way of raising development funds.

On page 4 of your letter you referred to Flaming Gorge Dam as a "substitute" for Echo Park Dam. By the Bureau's own ground rules this is impossible. For several years conservationists tried to suggest substitutes for Echo Park, and the Bureau ruled them all out, specifying that any substitute for Echo Park had to store as much water, produce as much power, evaporate at little water as Echo Park, and, moreover, could not be any dam already included in the basin plan. See, for example, Mr. Tudor's statement at the 1954 House Hearings on this project. Flaming Gorge was in the plan from the beginning, and therefore by your own definition was no substitute. Echo Park was simply eliminated—as it could have been in the beginning, and as the Grand Canyon Dams now can be.

I could say more but this is doubtless sufficient. As I said earlier, I think you went too far.

The rest of this letter has to do with a suggestion which I hope you will seriously consider. I think we have reached the point in this controversy, as we did at Echo Park, where the conservationists are beginning to make themselves heard. I think you still have the upper hand. But the reaction against the dams is becoming self-sustaining. I believe I can see this in various ways. The success of the Pennington movie, the ease with which conservationists are able to raise money to place full-page ads in newspapers, the sympathetic press coverage the conservationists are now getting—all of these things are beginning to have an effect. You may win the fight, but it will be a hard one and a bitter one. Perhaps you are willing to see it through on this basis, with all the adverse publicity it will bring to the Bureau and to you. But I wonder if there really isn't another way.

A high source in the Interior Department recently said that steam power is in the picture for the Bureau. It is coming. It will be here before long. Moreover, we already know that peaking power can be obtained without Grand Canyon—from the Pacific Northwest hydroplants, for example, in exchange for Southwest steam power. If this is true, and I have no reason yet to doubt it, you don't really need the Grand Canyon Dams. You can devise a plan without them. If you do this *now,* you will long be remembered as an imaginative Com-

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missioner who was responsive to the wishes of all the people—the Arizonans who want water, the easterners and "misguided zealots" who want some untouched parks, the Congressmen who want reclamation projects in their districts. You would enjoy a unique position among Commissioners.

If you fight it out to the bitter end, you may win or you may lose. If you win, I do not think you will be remembered kindly by a large segment of the population. Perhaps you do not care about that. But if you lose, it will certainly be a great personal loss for you, and it may even end Secretary Udall's effectiveness. People will have come to doubt the wisdom of the most vigorous Secretary they have had since Ickes. Dexheimer chose to fight it out; he lost and his name is almost forgotten only 10 years later. Perhaps it would have been anyhow. I do not know. The point is, you still have the time to choose. You can look at the straws in the wind and decide. Congressmen are beginning to hear about the Grand Canyon Dams. If you come up with an imaginative innovation that will make them unnecessary, my guess is that it will receive acclaim.

In any event the decision is yours. I wish you luck.

Sincerely yours,

RICHARD C. BRADLEY.

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D.C., February 2, 1966.

In reply refer to: 140

Miss MARGARET C. YOUNG,
The Reader's Digest, New York, N.Y.

DEAR MISS YOUNG: We appreciate very much the opportunity afforded by your telephone call and follow up letter to comment on Richard C. Bradley's article in *Audubon* for January-February, 1966 entitled "Ruin For the Grand Canyon?"

The title is appropriately posed as a question for it is a matter of opinion whether the proposed Bridge Canyon dam would ruin the Grand Canyon just as it is a matter of opinion as to whether Glen Canyon was ruined by the construction of Glen Canyon Dam, as Frank L. Griffin, Jr., author of the preceding article in the same issue of *Audubon*, contends. The hundreds of thousands of people who now visit there annually as contrasted with the few thousand or so who formerly floated down the river, evidently do not think so, judging from their comments and their announced intention to return again and again.

However, your inquiry to me concerned the facts set forth in Mr. Bradley's article and this reply will be restricted to known errors or misstatements.

On page 35, he states that "one would be in Marble Gorge", referring to the Marble Canyon damsite as a part of the Grand Canyon. According to the Board on Geographic Names, there is no Marble Gorge of the Grand Canyon but simply Marble Canyon, which is upstream from the Grand Canyon. The accompanying picture on Page 35 infers that Marble Canyon reservoir would flood out this entire canyon. Actually, the water will hardly reach the top of the talus slopes in the inner canyon. At the damsite, fully half of the inner canyon wall and all of the outer canyon, seen in the background in the picture, will be unaffected. In no sense will either the Marble Canyon or the Grand Canyon be flooded out.

On Page 37, Mr. Bradley states that Marble Canyon (not Gorge) dam, "would hold the great river by the throat, alternately releasing and choking off its flow in response to daily, weekly and monthly fluctuations in the electric power demands of the southwest."

Until Glen Canyon dam was built upstream, the river was subject to far greater fluctuations ranging from a relative trickle by a meandering stream of mud in periods of low flow to a roaring river with depths of 50 to 75 and more feet through some narrow sections of the canyon when the late spring snowmelt from the high mountains of the Colorado drainage basin was at its peak. What is so different nature's regulation of the river and its regulation for the benefit of man?

Also on Page 37, Mr. Bradley raises the ghost of the Kanab Creek Diversion project which was proposed several decades ago and has long since been abandoned. There has been no recent investigation of this diversion nor does the Bureau of Reclamation plan one. As a matter of fact, the Marble Canyon turbines are planned to be of such capacity as to take the entire flow of the Colorado River. We would not do this if the Kanab Creek diversion were to be further

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considered. Thus one way to insure a continued flow of Colorado River water through the Grand Canyon is to build Marble Canyon dam as presently planned.

In any discussion of Bridge Canyon dam it should be remembered that it is not in the current administration program which we support. However, for the record, we offer the following observations.

On Page 37 Mr. Bradley compares the proposed Bridge Canyon project with Hetch Hetchy reservoir in Yosemite National Park. The comparison is not valid. There was no prior reservation for reclamation on water conservation development in the Yosemite Park authorization as there was in the Grand Canyon National Park legislation. Furthermore, Hetch Hetchy dam and reservoir are totally within Yosemite National Park while Bridge Canyon dam would be built just above the headwaters of Lake Mead, 81 miles downstream from the nearest boundary of Grand Canyon National Park. There is wide fluctuation of Hetch Hetchy reservoir while we anticipate the Bridge Canyon reservoir would be kept within a six-foot maximum variation in level.

The "peripheral invasion" of Grand Canyon National Park by Bridge Canyon reservoir, as Mr. Bradley quotes Secretary Udall, would be exactly that, a 13-mile backup of water alongside the park where the Colorado River forms the park boundary.

On Page 38, Mr. Bradley asserts that "there is absolutely nothing in the proclamation creating this (Grand Canyon National) monument in 1932, that would permit any reclamation project whatsoever." He is correct in that there is no mention of reclamation development but he fails to mention two things. One is that the proclamation noted that the monument is subject to the same public land withdrawals for other purposes that predate the proclamation. One of these relates to future reclamation development.

The other is a letter from Director of the National Park Service, Horace M. Albright to the Commissioner of Reclamation on January 11, 1933, in which the former states that "As I see it, the Bridge Canyon project is in no way affected by the Grand Canyon National Monument proclamation * * *. The power withdrawals are intact * * *. As I see it, there is no possible way for anyone to interfere with the development of the Bridge Canyon project provided it receives the approval of the Secretary of the Interior." A copy of this letter is attached.

Mr. Bradley, on Page 38, makes a great point of the fact that Arizona will not get any water from Grand Canyon, by which we presume he means directly out of Bridge Canyon reservoir. This is correct but he infers that this is a precendent in national policy which should not be permitted to happen. The building to multipurpose dams independent of Reclamation projects and the use of revenue from their hydropower operations has been authorized in the past and even more so in recent years. Mr. Bradley is absolutely correct in characterizing these multipurpose dams as cash registers as far as hydropower operations are concerned. Without this policy many Reclamation projects could not have been built without being a greater burden on the taxpayers.

On Page 38, Mr. Bradley has attempted to devise a basis of comparison for power from Marble Canyon and Bridge Canyon and that of power from a steam plant. In doing this he has neglected one of the most important aspects of hydro generators, as compared to steam. That is the much greater ability of hydro generation to meet sudden changes in load. The great need for such generation in today's large interconnected systems was most dramatically indicated in the November 9, 1965 Northeast blackout. One of the major factors in extending the duration of the Northeast outage was the inability of steam plants to rapidly increase generation.

Mr. Bradley, on Page 40, belittles the contention that hydropower will always be economically valuable because of its adaptability for use as peaking power. The pro and con arguments are very technical and involved but let it suffice to say that private utilities would hardly be pouring hundreds of millions of dollars into pumpback storage plants which utilize artifically pumped and stored water for generation of electricity during peak hours of need if they did not believe that such plants would be in operation for a long, long time.

Mr. Bradley, on Page 40, asks "Why must the Central Arizona Project look economically feasible to Congress." The question is absurd on its face. It is obvious that Congress is not going to authorize something which will be an additional tax burden for you and me and Mr. Bradley unless, as required by national policy, it is economically feasible and capable of paying its own way including those phases which require repayment of the government investment.

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On page 41, Mr. Bradley compares the Bridge Canyon dam argument to that which occurred a decade ago when Echo Park dam was proposed in Dinosaur National Monument as a part of the Colorado River Storage project and Flaming Gorge dam was later substituted for it. The Flaming Gorge site is much less economical than the Echo Park site would have been and the people of the Upper Basin and the Nation are paying more and getting less as a result.

But the real problem is that there is no substitute at all for the Bridge Canyon site. It is the last available "cash register" to help the people of the Lower Colorado River bear the burden of necessary future water development which clearly will be tremendously expensive. The only alternative, and this is one which we would also oppose, would be potential sites on the Colorado River within Grand Canyon National Park itself which some utilities have mentioned as possibilities for single purpose hydro development.

These are some of the errors of fact and of reasoning that we have been able to single out in Mr. Bradley's article. I hope you will consider them carefully in weighing its use in a magazine as highly regarded as is the *Reader's Digest*. Again, we express our appreciation for the opportunity you have given us to comment on the article before republication.

Sincerely yours,

s/ FLOYD E. DOMINY, *Commissioner.*

DEPARTMENT OF THE INTERIOR,
NATIONAL PARK SERVICE,
Washington, January 11, 1933.

Dr. ELWOOD MEAD,
Commissioner, Reclamation Service.

DEAR DOCTOR MEAD: Mr. E. B. Dobler and Mr. Wirth conferred with me this morning about the effect of the Grand Canyon National Monument proclamation recently signed by the President on the proposed Bridge Canyon Power Development Project.

I pointed out that the act of June 10, 1920 (41 Stat. 1063), which opens all national parks and national monuments to power development would apply to the Grand Canyon National Monument for the reason that the repealing act of March 3, 1921 (41 Stat. 1353) only prohibited the development of power in the parks and monuments that existed at that time. It specifically stated in the act of March 3, 1921, that it would only apply to existing parks and monuments. The national parks and additions to parks authorized since March 3, 1921, have been set up by laws which specifically state that the power act of June 10, 1920 shall not apply to the lands thereby given park status. In order to close a national monument created since March 3, 1921, to power development it would have to be done by law and the Grand Canyon National Monument proclamation could not possibly have the effect of interfering with, delaying or rendering impracticable the Bridge Canyon Project unless Congress enacted a law especially prohibiting power development in this new national monument.

As I see it, the Bridge Canyon Project is in no way affected by the Grand Canyon National Monument proclamation and the area insofar as power development is concerned is under the jurisdiction of the Federal Power Commission—so far as the granting of power licenses is concerned. The power withdrawals are intact. We have had in mind all the time the Bridge Canyon Project. While I did not handle this personally I am absolutely certain that the men who did handle it for me kept the project in mind in formulating the Grand Canyon National Monument plan.

As I see it, there is no possible way for anyone to interfere with the development of the Bridge Canyon project provided it receives the approval of the Secretary of the Interior. The approval of the Secretary would carry with it not only the authority of the Reclamation Service but also of the Park Service. As a matter of fact, in view of the inapplicability of the act of March 3, 1921 to this monument there can be no necessity for the Reclamation Service seeking the approval of the Park Service on this project.

Sincerely yours,

HORACE M. ALBRIGHT, *Director.*

V. AN OUTSTANDING CONSERVATIONIST'S VIEW

At that same Grand Canyon Workshop there was an extremely valuable contribution by Dr. Ira N. Gabrielson, generally recognized as Mr. Conservation in this country. None is respected more. He said: "I was supposed to talk about

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wildlife today, but I'm going to talk about wild places, because I've been interested in both all of my life. And in addition, the Park Service has much more up-to-date information on the wildlife that is in the canyon today than I do. I have visited it many times. It does have any interesting forms of animal life available as well as many interesting forms of plant life and plant communities. But I want to talk about the wild places that are shrinking in this country.

"We have over my lifetime we have seen them shrink tremendously. They are still shrinking. We have tried to save some of them. The National Park Service or the national park system in the country was set up over many years—the first one going back to about 1872—in an effort to save some of the superb scenic and natural wonders of this country. And it has succeeded to some extent. This proposal to build these dams would invade one of these areas and I am sorry to say that it isn't the first time that such proposals have been made to invade this and other areas. Nor it is not the only current proposal by the Bureau of Reclamation to invade some of the wild areas that have been set aside for preservation.

"I have no quarrel with engineers. They are engineers and good ones I guess. But I have a quarrel with some of their philosophy. I have never seen an engineer yet whether he was really a road builder, a dam builder or a levee builder or what, that could look at a piece of land without wondering what in hell he could do to change it. And this is inherent in the species. And a lot of this stuff that we are up against seems to be of that character.

"I served a lot of time in the government service. I know how bureaus operate. I was a little amused to hear the proponents of these dams feeling injured because they weren't given a prominent place on the program. I know the Bureau of Reclamation and the reclamation advocates have been running excursions out there to educate Congressmen and other people for quite a while but I've never been invited to be on one. And I haven't heard any conservationist recall or say that he's been invited. (This brought applause.)

"So, I think the gentlemen who feel aggrieved haven't too much of a case. I'd like to be a lawyer for the other side if they want to take it into some court.

"This proposal is not a reclamation project. I would like to tell you that I lived in the West for nearly 20 years. I had a lot of sympathy with reclamation of land. This has nothing to do with land reclamation. It is pure and simple hydroelectric dam project. And there are plenty of places where we can build hydroelectric dams without invading these parks. Efforts are constantly being made to chisel into the park. And if the American people don't stand up and fight to save them, there won't be any left. They might just as well go out and build a dam clear up to the rim of the canyon and have it over with if they don't stop it somewhere. This is the way I feel about it. I know a lot of other conservationists feel the same way about it.

"And it's time we did take a look at it from something other than an engineering standpoint and the kind of figures that they can produce. America is more than engineering projects, as good as they are and as necessary as they are. We have other things of value. And I have never seen an engineering organization yet that had any concept of and interest in the other values that are present in any landscape in the country. This is what we are up against.

"Engineers can plan, they can plan dams and they can do a very good job of it. But I don't think the engineering profession or the political backers they have are necessarily competent to plan what we do with the whole landscape of America or how we live. This is my basic philosophy. I lived in the government a long time, sometimes on the side of the reclamation service, sometimes against them. And I'm going to continue to be that way. When there is a project that is good, I'm going to be for it. But I think this project has no merit to it whatever when it comes to invading one of the most magnificent spectacles there is in the world. I've traveled quite a lot. I haven't seen everything in the world, but I have never seen a spectacle equal to that that you can see at the rim. And this rim right here in front of this hotel. Let's keep it that way."

VI. A COMPLETE RECORD, AS THE COURT SEES IT

A landmark conservation decision in the courts, one hailed editorially across the country, has elements that are indirectly pertinent to the present contest, and I include excerpts of value to your record from the findings of the U.S. Court of Appeals in the case decided December 29, 1965, *Scenic Hudson* v. *The Federal*

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Power Commission and Consolidated Edison Company on the Storm King controversy on the Hudson River.

I do not believe the Congress would wish to be less assiduous in completing its record on a matter of so grave importance as is now before you than the Congress has wished the Federal Power Commission to be, with the Court in clear agreement, as shown in what follows.

The Storm King project has aroused grave concern among conservationist groups, adversely affected municipalities and various state and federal legislative units and administrative agencies.[1]

To be licensed by the Commission a prospective project must meet the statutory test of being "best adapted to a comprehensive plan for improving or developing a waterway," . . . .

Section 313(b) of the Federal Power Act, 16 U.S.C. Sec. 825 *l* (b) reads:

"(b) Any party to a proceeding under this chapter aggrieved by an order issued by the Commission in such proceeding may obtain a review of such order in the United States court of appeals for any circuit wherein the licensee or public utility to which the order relates is located * * *."

The Commission takes a narrow view of the meaning of "aggrieved party" under the Act.

In the present case, the Commission heard oral argument on November 17, 1964, on the various exceptions to the Examiner's report. On January 7, 1965 the testimony of Mr. Alexander Lurkis, as to the feasibility of an alternative to the project, the use of gas turbines, was offered to the Commission by Hilltop Cooperative of Queens, a taxpayer and consumer group. The petition to intervene and present this new evidence was rejected on January 13, 1965 as not "timely." It was more than two months after the offer of this testimony, on March 9, 1965, that the Commission issued a license to Consolidated Edison. When Mr. Lurkis's testimony was subsequently reoffered by the petitioners on April 8, 1965, it was rejected because it represented "at best" a "disagreement between experts." On the other hand, we have found in the record no meaningful evidence which contradicts the proffered testimony supporting the gas turbine alternative.

Mr. Lurkis is a consulting engineer of thirty-nine years' experience. He has served as Chief Engineer of the New York City Bureau of Gas and Electric, in charge of a staff of 400, and as Senior Engineer of the New York City Transit Authority, where he supervised the design and construction of power plants.[2] The New York Joint Legislative Committee on Natural Resources,[3] after holding hearings on the Storm King project on November 19 and 20, 1964, summarized Mr. Lurkis's testimony as follows:

"Mr. Alexander Lurkis * * * presented a detailed proposal for using gas turbines. This, he claimed, would meet the alleged peaking need of Con Ed and result in a saving for its customers of $132,000,000. The Committee has learned that similar gas turbine installations are now in use or proposed for use by a number of progressive electric utilities throughout the nation. In addition to meeting the alleged peak power needs and saving money for the ratepayer, the gas turbines proposed by Mr. Lurkis would have the following advantages:

"(1) Permit the company greater flexibility in meeting the power needs of its service area. Admittedly, technological developments in power production

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[1] For bills introduced in Congress for the purpose of preserving the Hudson River and adjacent areas see House Introduction No. H.R. 3012, 3918; Senate Introduction No. S. 1386. Hearings were held on May 10 and 11, 1965 before the House of Representatives Subcommittee on Fisheries and Wildlife Conservation. House of Representatives, 89th Cong., 1st Sess., on Hudson River Spawning Grounds.

The New York Joint Legislative Committee on Natural Resources held hearings on November 19 and 20, 1964. See Preliminary Report of the Joint Legislative Committee on Natural Resources, *On the Hudson River Valley and the Consolidated Edison Company Storm King Mountain Project* (issued February 16, 1965) (hereinafter cited *"Preliminary Report"*).

The Fish and Wildlife Service of the Department of the Interior and the New York State Conservation Department have expressed concern about the effect of the project on the fish life of the Hudson. See Part IV *infra*.

Numerous conservationist groups have interested themselves in the project, and many of them filed formal petitions to intervene before the Commission.

[2] Mr. Lurkis has made numerous studies of utility adequacy including a survey of "blackouts" in New York during 1959 and 1961, which resulted in revisions of the Consolidated Edison system. He is a member of many professional associations and has published numerous articles and presented many papers on electrical engineering subjects.

[3] A total of 107 witnesses were heard; the large majority objected to the project.

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are changing and improving this field at such a rapid rate that it may well be entirely revolutionized in 10 to 15 years. There are obvious advantages in the gas turbine installations. Small installations can be added as needed to meet demand. This, in contrast to a single, giant, permanent installation such as Con Ed proposes at Storm King Mountain, which would tie the technology and investment of one company to a method of power production that might be obsolete in a few years.

"(2) Keep the power production facilities within New York City. This would not only avoid the desecration of the Hudson Gorge and Highlands, but, also, would eliminate the great swathe of destruction down through Putnam and Westchester Counties and their beautiful suburban communities." *Preliminary Report* at 6.

The Committee report, issued on February 16, 1965, three weeks before the license to Consolidated Edison was granted, concluded:

"The whole situation involved in the Consolidated Edison Storm King Mountain project, and the protection of the Hudson River and its shores, requires further and extensive study and investigation.

* * * * * * *

"This Committee goes on record as opposing Con Ed's application until there has been adequate study of the points indicated in this report." *Preliminary Report* at 8.

Mr. Lurkis's analysis was based on an intensive study of the Consolidated Edison system, and of its peaking needs projected year by year over a fifteen year period. He was prepared to make an economic comparison of a gas turbine system (including capital and fuel operating costs) and the Storm King pumped storage plant. Moreover, he was prepared to answer Consolidated Edison's objections to gas turbines by indicating:

(1) that gas turbines could meet Consolidated Edison's reserve needs;

(2) that the blackouts of 1959 and 1961 were caused by breakdowns in distribution, not by a lack of power;

(3) that gas turbines would avoid the hazards of weather damage to high transmission lines involved in the Storm King project;

(4) that since 3 kilowatts of power must be generated by steam plants in New York City in order to get 2 kilowatts of power from the Storm King project, gas turbines would be even more useful than the project in reducing air pollution;

(5) that noise from the turbines would be at acceptable industrial levels.

Other benefits envisioned from gas turbines were higher reliability, increased system flexibility, and possible savings in transmission line investment.[4]

Aside from self-serving general statements by officials of Consolidated Edison, the only testimony in the record bearing on the gas turbine alternative was offered by Ellery R. Fosdick. Fosdick's hastily prepared presentation considered turbines driven by steam and liquid fuel as well as gas; his direct testimony occupied less than ten pages of the record.[5] Fosdick's testimony was too scanty to meet the requirement of a full consideration of alternatives. Indeed, under the circumstances, we must conclude that there was no significant attempt to develop evidence as to the gas turbine alternative; at least, there is no such evidence in the record.

Especially in a case of this type, where public interest and concern is so great, the Commission's refusal to receive the Lurkis testimony, as well as proffered information on fish protection devices and underground transmission facilities, exhibits a disregard of the statute and of judicial mandates instructing the Commission to probe all feasible alternatives.

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[4] Citing *Federal Power Comm'n* v. *Transcontinental Gas Corp.*, 365 U.S. 1 (1961) the Commission asserts that "serious policy questions" would be raised by the use of gas, for the generation of electrical energy. But the serious questions alluded to do not excuse the Commission's failure to develop and hear pertinent evidence on the alternative. As to the use of gas, the Supreme Court held in *Transcontinental* that "a flexible balancing process, in the course of which all factors are weighed prior to final determination," is needed in each case. *Id.* at 23

[5] Fosdick conceded that he had no firsthand knowledge of the Consolidated Edison system or its requirements. He had been unable to make a study of the economics of alternative methods of generating peaking power, nor had he made an examination of New York City power needs. His testimony on air pollution, which was favorable to Consolidated Edison, was addressed to a question on the "burning of kerosene" and not of natural gas, a nonpollutant.

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The Federal Power Commission argues that having intervened "petitioners cannot impose an affirmative burden on the Commission." But, as we have pointed out, Congress gave the Federal Power Commission a specific planning responsibility. See Federal Power Act Section 10(a), 16 U.S.C. 803(a). The totality of a project's immediate and long-range effects, and not merely the engineering and navigation aspects, are to be considered in a licensing proceeding. As Commissioner Ross said in his dissent:

"I do feel the public is entitled to know on the record that no stone has been left unturned. How much better it would be if the public is clearly advised under oath and cross examination that there truly is no alternative? The thread running through this case has been that the applicant is entitled to a license upon making a prima facie case. My own personal regulatory philosophy compels me to reject this approach. This Commission of its own motion, should always seek to insure that a full and adequate record is presented to it. A regulatory commission can insure continuing confidence in its decisions only when it has used its staff and its own expertise in manner not possible for the uninformed and poorly financed public. With our intimate knowledge of other systems and to a lesser extent of their plans, it should be possible to resolve all doubts as to alternative sources. This may have been done but the record doesn't speak. Let it do so."

In this case, as in many others, the Commission has claimed to be the representative of the public interest. This role does not permit it to act as an umpire blandly calling balls and strikes for adversaries appearing before it; the right of the public must receive active and affirmative protection at the hands of the Commission.

This court cannot and should not attempt to substitute its judgment for that of the Commission. But we must decide whether the Commission has correctly discharged its duties, including the proper fulfillment of its planning function in deciding that the "licensing of the project would be in the overall public interest." The Commisison must see to it that the record is complete. The Commission has an affirmative duty to inquire into and consider all relevant facts.

In Michigan *Consolidated Gas Co.* v. *Federal Power Comm'n*, *supra* at 224, the Court of Appeals of the District of Columbia, in criticizing the Federal Power Commission for refusing to consider an alternative and for failing to take the initiative in seeking information, observed:

"Even assuming that under the Commission's rules Panhandle's rejection of the settlement rendered the proposal ineffective *as a settlement*, it could not, and we believe should not, have precluded the Commission from considering the proposal *on its merits*. Indeed, *the proposal appears prima facie to have merit enough to have required the Commission at some stage of the proceeding to consider it on its own initiative as an alternative to total abandonment.*" (Emphasis added.)

On rehearing the court added:

"In viewing the public interest, the Commission's vision is not to be limited to the horizons of the private parties to the proceeding.

Where, as here, a regulatory agency has ignored factors which are relevant to the public interest, the scope of judicial review is sufficiently broad to order their consideration. These limits are not to be confused with the narrower ones governing review of an agency's conclusions reached upon proper consideration of the relevant factors." *Id.* at 226.

Judge Frank, in response to a submission similar to the one made here, said:

"This is a somewhat surprising contention, to be contrasted with the following views of Commissioner Aitchison of the Interstate Commerce Commission concerning the obligations of administrative agencies: '* * * The agency does not do its duty when it merely decides upon a poor or nonrepresentative record. As the sole representative of the public, which is a third party in these proceedings, the agency owes the duty to investigate all the pertinent facts, and to see that they are adduced when the parties have not put them in * * *. The agency must always act upon the record made, and if that is not sufficient, it should see the record is supplemented before it acts. It must always preserve the elements of fair play, but it is not fair play for it to create an injustice, instead of remedying one, by omitting to inform itself and by acting ignorantly when intelligent action is possible * * *.'"

Isbrandtsen Co. v. *United States*, 96 F. Supp. 883, 892 (S.D.N.Y. 1951), affirmed by an equally divided court, 342 U.S. 950 (1952).

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And Dean Landis said:

"For (the administrative) process to be successful in a particular field, it is imperative that controversies be decided as 'rightly' as possible, independently of the formal record the parties themselves produce. The ultimate test of the administrative is the policy that it formulates; not the fairness as between the parties of the disposition of a controversy on a record of their own making." Landis, *The Administrative Process* 39 (1938).

In addition to the Commission's failure to receive or develop evidence concerning the gas turbine alternative, there are other instances where the Commission should have acted affirmatively in order to make a complete record.

The Commission neither investigated the use of interconnected power as a possible alternative to the Storm King project, nor required Consolidated Edison to supply such information. The record sets forth Consolidated Edison's interconnection with a vast network of other utilities, but the Commission dismissed this alternative by noting that "Con Edison is relying fully upon such interconnections in estimating its future available capacity." However, only ten pages later in its opinion the Commission conceded:

"Of significant importance, in our opinion, is the absence in the record, or the inadequacy, of information in regard to Con Edison's future interconnection plans; its plans, if any, for upgrading existing transmission lines to higher voltages; and of its existing transmission line grid in this general area and its future plans."

If interconnecting power can replace the Storm King project in December, why was it not considered as a permanent alternative?

Commissioner Ross in his dissent said:

"In my opinion, the only true alternative that would likely be as economic as the proposed project would be purchased peaking power. There are two possibly differing sources; one would be purchasing pumped storage or normal hydro peaking which may be in the process of development in New England; or secondly, purchasing steam peaking power from new large scale thermal stations in Pennsylvania or in Appalachia."

If there is no evidence in the record to indicate that either the Commission or Consolidated Edison ever seriously considered this alternative.[6] Nor is there any evidence that a combination of devices, for example, gas turbine and interconnections, were considered. Indeed, the Commission stated in its brief that it is "of doubtful relevance to the present case whether there are practical alternatives to an appropriate use of water power by which Con Ed could meet its anticipated needs for peaking power with generally comparable economy." The failure of the Commission to inform itself of these alternatives cannot be reconciled with its planning responsibility under the Federal Power Act.

On remand, the Commission should take the whole fisheries question into consideration before deciding whether the Storm King project is to be licensed.

The Commission should reexamine all questions on which we have found the record insufficient and all related matters. The Commission's renewed proceedings must include as a basic concern the preservation of natural beauty and of national historic shrines, keeping in mind that, in our affluent society, the cost of a project is only one of several factors to be considered. The record as it comes to us fails markedly to make out a case for the Storm King project on, among other matters, costs, public convenience and necessity, and absence of reasonable alternatives. Of course, the Commission should make every effort to expedite the new proceedings.

Petitioners' application, pursuant to Federal Power Act 313(b), 16 U.S.C. 825 1 (b), to adduce additional evidence concerning alternatives to the Storm King project and the cost and practicality of underground transmission facilities is granted.

The licensing order of March 9 and the two orders of May 6 are set aside, and the case remanded for further proceedings.

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[6] At page 39 of the record Mr. M. L. Waring, senior vice president of Consolidated Edison, described the interconnection system but failed to answer the question: "Would this not be an economical substitute for the pumped storage project?" In later testimony to a similar question he responded: "Yes, (other sources of power) are available, but not in sufficient quantity."

But there was no evidence introduced as to the amount of power available.

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VII. A PERSPECTIVE FOR DECISION

There is far more at stake in this hearing than the question of getting more water to the Lower Basin States. What you gentlemen do here, what the House does, what the Congress as a whole does, are going to be vitally important to the future of America. The big question is how far a special region, for its own benefit, should change the shape and meaning of something important to the whole nation, indeed to the world.

Implicit in this contest is the question of what conservation really means, and what growth means—unending growth of desires for material things—of the burden of man's soaring population on the earth.

I hope you will permit me to add a few suggestions for the broad perspective, the one I hope you will use as you look from these narrow walls out upon the face of America as it is and as it should be.

The First White House Conference on Conservation, the conference of governors called in 1908 by President Theodore Roosevelt, was held soon after the word "conservation" was invented. The idea of conservation, of course, antedated the word by a good half century. Strangely enough, the only concern about preserving natural beauty voiced at that conference came in a statement made from the floor. J. Horace MacFarland was not on the program, but his statement has been cited again and again, and most of the others have been forgotten.

By the time the Second White House Conference on Conservation was called by President John F. Kennedy a remarkable change had taken place. As I remember it, all the speeches on the program were concerned in some way with the preservation of natural beauty, and the only strictly utilitarian speech, dealing with the orderly exploitation of commodity resources, came from the floor. I forget what the man said.

But we hear his type of speech often enough. Somehow in the course of such speeches, whether the speaker be in favor of logging something, or damming it, or digging it out or paving it, or eroding away its living soil, or adding pollutants to the air and water around it and junk to the landscape—in the course of his speech the man will profess that he too is a conservationist, a conservationist, however, who knows that conservation consists of wise use.

There, I allege, his creative thinking stops. He is content with his cliché. It's not all his fault, because Webster hasn't done much better in defining conservation. I will maintain that the "wise use" definition will not serve our civilization well until we have a much clearer understanding of what wisdom consists of. The dollar doesn't measure it.

Up until the last few years, with the exception of a few notable people like Marsh, Muir, Roosevelt, Leopold, Marshall, and Zahniser, many of us have fallen victim to a Conventional Wisdom about natural resources that is based on short-range predictions projected from a sadly inadequately base.

Our perspective on what technology can do for us, and to us, is a limited perspective indeed. What man and technology have done is so spectacular that it preempts our attention; it lets us forget the most important element of all in what makes natural beauty something worth conferring about.

That important element is life, the life force, an unbroken living chain that extends back from each of us to the beginning of life on earth some two billion years ago. That force, in those two billion years, has produced a miraculous complexity of living things, each dependent upon the others as much as a cell of one part of our body is dependent on the cells of other parts. That life force has produced organic wholeness, and Robinson Jeffers has said we should "love that, not man apart from that."

Do we? Not enough, I'm afraid.

We have done too much to take that organic wholeness apart, tinkering with it and losing the parts, simplifying it without even asking how dangerous to us it may be to simplify it. An example of what I mean by simplification is what happens when we take a natural piece of land, with all the variety of species that form the natural community we can see on the surface and an unknown number below the surface, and change this so as to produce a single crop of corn or tobacco or sugar cane or Douglas fir. Instead of the natural balance we simplify the biology to that of a single species without really knowing what we are doing to the land over the long run—judging from a base period of experimentation of a century or more.

We and our new toy, technology, have done more to disrupt natural things in our own lifetimes than was distrupted by all the living things, including

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man, in all previous history. Yet we freely predict that we can go on the way we're going, doubling our numbers every 30 or 40 years, doubling our appetite for natural resources every decade, holding ourselves before the world as a model for all others. Yet if the appetite of the rest of the world for using up resources equalled ours, the drain on resources would be multiplied almost twenty-fold while we watch.

We can go on this way, we think, worshipping growth, confusing it with progress, and get away with it.

I would like to state that we can't, that if we think we can because Science will save us, we haven't been listening carefully enough to the scientists who confess their own limitations. I would like to persuade you to agree with me and to sign you up in the good war, the war against myth. We need a battle of words for the earth that will rebuild the respect for the earth our forbears had and our children need the chance to have.

Out of this battle, I hope, will come a new understanding of what conservations means. We will see it not just as a word to pay lip service to, or as a dull thing that's no fun, or a shelf of books in the library talking about benefit-cost ratios, resource budgets, and input and output of energy, all flavored with Smokey the Bear and a distaste for forest fires. We will see conservation instead as an attitude in everything we do, as an ethic, as conscience in our behvior toward our environment and all the living things that up until now shared it with us. Toward the life force that built into our own organism the ability to survive in our environment, and made that environment beautiful.

We need to worry about the broad meaning of beauty. You may recall that when President Johnson called the White House Conference on Natural Beauty there was widespread concern about the limit of its scope. Addressing himself to that limitation the editor of the New York Times said on May 23, 1965:

"Man-Made Beauty or Ugliness

"The White House Conference on Natural Beauty which opens tomorrow is slightly misnamed.

"Since the emphasis of virtually all the planned panel discussions is on rectifying or at least concealing the ugliness which human beings have created in their environment, it might more properly be called a Conference on Man-Made Beauty. There is little or nothing on the agenda indicating concern about the national parks, the wilderness areas or the other great open spaces where natural beauty can still be enjoyed.

"From the program, one would never guess that there are sharp and bitter controversies now ranging over proposals to build dams in the Grand Canyon, to drown millions of acres of Alaska by a huge dam project, to pollute the St. Croix River in Minnesota or to invade the primitive beauty of the Allagash River area in Maine, one of the last truly wild rivers in the eastern United States. A conference which apparently is going to ignore so many current struggles to preserve natural beauty in this country seems rather restricted in outlook."

I believe that in the Sierra Club membership—the 39,000 of us in all fifty states and a dozen foreign countries—there would be almost total agreement with the New York Times editorial. I think that our concern would be shared with almost equal unanimity by the forty other national organizations, and their millions of members, joined informally in the Natural Resources Council of America. This concern about what's happeninng to natural beauty, as opposed to man-made beauty, is becoming world-wide. Surely it has led to much of the program of the International Union for Conservation, with which the Sierra Club is also affiliated.

That same concern showed up prominently, from many quarters, at the California Conference on Natural Beauty, held early in Jauary.

And not a moment too soon. We are learning at long last that a booming growth is no blessing at all. We would like very much to give back to New York the problem of being Number 1 in population. We suspect that New York doesn't want it back. For one thing, New York State's biggest city has just gone through the embarrassment of going to its state capital for $600,000,000 in relief so that New York City can begin to balance its budget. The bigger the city gets, the more buildings, the more throughways and cars, somehow the worse off the city is financially. Newspaper strikes, a transit strike a severe water shortage—all these are a result, I think, of too much growth, of growth that is faster than man's ability to organize for it. When this sort of thing happens in an individual we call it cancer.

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For all that, the urge to grow just be growing, instead growing to meet a need and then letting up, is still abroad in the land. The State of Illinois twitted New York City abouts its troubles in a full page ad in the New York Times two weeks ago. "New York Will Probably Have a Typhoon Next," the add said. And went on to suggest that various industries should move to Illinois, where things weren't so crowded and overused. I think Illinois doesn't know when it is well off.

I have recently seen a book published late last year, Raymond Dasmann's *The Destruction of California.* I don't like what it has to say about my native state, but I know it's true. We grew too much. We've logged and smogged California, we're filling its finest bay, we've mined its gold and now are mining its soil and air; our streams are being spoiled, our mimeographed subdivisions coalesce into slurbs, we have declared war on our terrain and our environment, hardly realizing that after the first quick benefits for a few there will be lasting deprivation for all.

We have taken a fairly good creature, Man, who in the course of developing learned to stand upright, and have given him a smaller and smaller plot to stand on. As fast as we can we are taking away even his visual rights, a chance to stand, or even to walk on his own two good feet, and to like what he looks upon when he looks at a horizon.

To return to the book, in our own small way we are in the publishing business in the Sierra Club. Is there anyone here who would like to volunteer to write a similar book—"The Destruction of America"?

I'd much rather see the Sierra Club publish different books, about the preservation of America and what makes it beautiful.

But which way are we trending? What was America like in your own inventory of recollections? What was it like in the days you have read about? How fast has the change been, and what will happen if this same rate of change is extended on into the future, this same urge to grow, grow, grow, to place more and more emphasis on what man can superimpose upon this land, and less and less on what God left here?

How boldly can we extend our thinking? How big our plan, the creative genius in each of us—the genius that is the really crucial resource?

Not blind opposition to progress, we say in our slogan, but opposition to blind progress. Man has a capability of making self-fulfilling predictions. Our own predictions can be as accurate as we want them to be. Can they be big enough to include, while there is still time, an assurance that America will remain uniquely beautiful? Can our plans include, for all the states and for the world as well, an unimpaired National Park System? I earnestly hope so. Our organization would like to do everything it can to help this come about, using as well as we can our 74 years' experience in knowing how vital national parks can be for everyone.

We hope to spread around the world a special appreciation of goal expressed by Adlai Stevenson not long ago about the fragile craft we share?

One of Adlai Stevenson's remarks seems particularly appropriate as a summary. "We travel together," he said, "passengers on a little space ship, dependent on its vulnerable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work and, I will say, the love we give our fragile craft."

Our parks and wilderness are fragile craft. The world knows that they have been easy to love.

So they have been. So they can be. But only if you help keep it that way.

Testimony Offered on H.R. 4671 by Michael McCloskey, Conservation Director, Sierra Club

Amendment to H.R. 4671 to Delete Bridge Canyon and Marble Canyon Dams

In my preceding remarks, I summarized the values that parts of the Grand Canyon, outside of the present park, have for park purposes. Both the Bridge Canyon and Marble Canyon dams would destroy much of these values—values which are part of the heritage we are obligated to pass on to mankind to come. It is unconscionable for us to sacrifice these values to current customs of economic and political feasibility. The task of responsible planners is to find other

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methods of making the Central Arizona Project feasible economically and politically.

Other witnesses, who also believe these values are preeminent, have argued that the dams are both unnecessary and uneconomic. If, as Jeffrey Ingram argues, the dams are unnecessary as so-called cash registers, then Section 302 of Title III of the authorizing legislation (H.R. 4671) should be stricken. Section 302 authorizes the construction of both Bridge Canyon and Marble Canyon dams and the Coconino and Paria River silt detention reservoirs upstream. As a result of his study, Ingram concludes that the Central Arizona "Project without the dams can pay itself out, and further, that the Development Fund would be left with a substantial positive balance at the end of the pay-out period." He presents revised payout schedules supporting this contention.

Even if Ingram's suggestion of financial feasibility without the mainstem dams were not accepted, the testimony of Alan Carlin shows that the dams are not economically justified. He bases this contention on studies showing that nuclear power plants at load centers can provide cheaper peaking power than can the dams. As such plants would be an alternative that costs less, the dams accordingly lack a favorable ratio of benefits to costs. If Carlin's contentions are correct, it is clear that the legislation as now drafted is not in proper form for approval, as two of the principal projects lack favorable benefit-cost ratios. Thus, the whole question of the economics of the Grand Canyon dams must be subjected to further study. In view of the weak economic justification for the dams, it would seem appropriate at this time to begin an investigation of alternate methods of obtaining funds for solving water problems on a national level. This could be one of the tasks of a national water commission.

STATEMENT ON H.R. 4671 BY D. B. LUTEN FOR THE FEDERATION OF WESTERN OUTDOOR CLUBS

Mr. Chairman and Gentlemen of the Committee, my name is Daniel B. Luten and my home is in Berkeley, California. I am speaking today on behalf of the Federation of Western Outdoor Clubs in order to extend into some new and relevant areas my testimony of last August before this Committee.

First, I wish to bring to your attention some consequences of the growth of electricity generation. Commonly, this is taken as 7%/year. Seven percent per year leads to a doubling each ten years, a four-fold increase each 20 years, an 8-fold increase of each 30 years, a 10-fold increase each 33 years, or a 1000-fold each century. Mr. Floyd Dominy has suggested that growth in the Southwest is nearer 13%/year. This has the consequence of halving the time required for a two-fold growth. I will stay with the 7% as a more conservative view of the future.

Hydropower facilities have been efficient generators for many decades. When water is dropped through such a generator as much as 93% of its potential energy may be converted to electrical energy. Hydropower facilities are built on the site, in the field, and field assembly costs in our economy are steadily increasing. Further, best sites tend to be used first. However, so many uncertainties of scale and remoteness enter that we may as well, and it suffices for my purpose, consider hydroenergy cost to be constant in our time.

Thermal power plants convert latent energy, the heat of reaction of a fuel, to electricity. In the past, they have been inefficient. James Watt did not invent the steam engine, but he standardized and improved it and thereby brought its efficiency up to 4.5%. Since his time efficiencies have steadily risen but now they have come close to a ceiling in the range of 35–40%, a ceiling imposed by thermodynamics and the limits of our materials to withstand extreme temperatures. The prospects for further increases are generally conceded to be slim. I am unfamiliar with the history of thermal power plant costs, but quite recently they have diminished. This, I suspect, is due mostly to the competition, to the struggle for a place in the sun, by nuclear power and to the resistance, the pricing counterattack of a threatened equipment supply industry. This industry, that is, has suddenly become sharply competitive. I doubt if the struggle will last much longer, doubt if prices per kilowatt will go much lower than now.

This adds up to the simple proposition that hydropower costs have been roughly constant, while thermal power costs have been declining over the past generation, may decline a bit more, but should then become stable.

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Let me bring in two more elements: In considering the cost of electrical generation, two views must always be taken. Before building, one forecasts costs and builds only if it seems likely that returns will pay operating costs and also amortize capital investment. After building the problem is quite different. If the forecast was wrong the plant cannot be returned to the manufacturer just because it doesn's make money. The question becomes: does it more than pay operating costs? If it does, it will be run even if the income is not enough to amortize investment.

The second element is that, because of the enormous growth of the industry, hydropower sites were at one time abundant in contrast with power demands and thermal power capability; now, they are scarce.

Now, let me turn back to the matter of growth and point out some consequences. Of our present power generating facilities, half have been built within the last ten years, ¾ within the past 20 years, ⅞ within the past 30 years. The 30-year old steam plants are small and inefficient. Whether they are amortized is not important. Because they consume much fuel to generate a kwh, they are run only to meet peak loads and, accordingly, utilities would prefer to buy energy from, say, a hydro plant built for peaking load generation. It is the operating costs of these old plants which determine the price for peaking energy.

In contrast, looking backward from the year 1995, our present generating equipment will then be only ⅛ of the total and will, of course, be 30 years and more in age. Another ⅛ will be 20–30 years old, a quarter 10–20 years old, and half of the equipment then will be less than ten years old. All except a portion of what exists today will be of high and uniform efficiency, 90+% for hydropower, 35–40% for thermal power.

The utilities companies' decision on what to do about peaking demand will change as a result of these circumstances. Rather than a choice between an old *inefficient*, high cost steam plant or purchased peaking hydroenergy, the choice will be between an old but *efficient* steam plan or purchased peaking hydroenergy. Whether to run or not to run the older steam plant will be dependent, not on any amortization schedules, but rather on its costs of operation (fuel plus wages and administration and maintenance). This cost will be in the range of 2–3 mills.

If utility companies could program additions to their generating equipment so as always to depend on the Bureau of Reclamations hydroplant capacity for the last bit of peaking energy, I think they would do so. But thirty years from now, at a time when these dams should be making large repayments of construction costs and when new thermal power construction will be in units of a million kw or more, these dams will have become minor components of the power system. The Bureau's peaking energy will be welcome, perhaps, for a few months before each new such increment comes on stream, but will be an outcast for a year afterward.

The situation is summed up diagrammatically in the attached figure.

The conclusion is that a utility company would be foolish to write a long term fixed price contract with the Bureau for peaking energy and, in consequence, that a private investor, even given the Bureau's interest rate and amortization schedules, would be foolish to invest money in such dams.

As an appendix, it is already being suggested that these hydropower facilities will come to be used in a new fashion, for "superpeaking". Very well; but note that at Glen Canyon, for example, the generating capacity, 900,000 kw, is matched to the amount of water in the stream in anticipation of the power plant running for perhaps 4000 hours per year, that is, for about half of the year (1 year=8760 hours). (If it is wished to provide superpeaking power for perhaps only 500 hours per year, the generators will have to be increased 8-fold to 7.2 million kw. So please be prepared to have Mr. Dominy present a request for new penstocks, generators and transmission lines when he is driven into the superpeaking business.

Superpeaking will have accessory consequences: the outflow from Glen Canyon's generators, 170,000 second-feet, will exceed all but one recorded flood of the River and may rejuvenate the stream below the Dam. This is in some respects desirable. On the upper side of the Dam, a small tide would result, a drop of level of two inches per hour. Will the National Recreation Area, then, have to supply tide tables based on American household electricity consumption patterns?

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The other side of this coin, of this economic issue, is that of course Arizona wants this water for its continued growth and we have no agreed way of providing it for them. We seem as a nation to have painted ourselves into an unenviable corner where, we are no longer masters of our destiny. Instead, we who now live in a full land are the victims of statutory constraints erected two generations ago to meet the problems of an empty land. They will not work in a full land and the longer we try to put up with them, the tighter they will rub.

It is a curious thing that we have never let water become property. Our western land once, also, was not property but we have let it become property. Our water we have kept in a special category. It is a curious thing that these most conservative of Americans, the Arizona farmers and their supporters, much prefer this socialistic arrangement to one in which water is a commodity for which a price in the River could be exacted. The answer is, of course, that the Government divested itself of ownership of the land before it had come to be of value and so investors were able to exact a full share of its increases in value. But water is already of value and here the Government is still in ownership and so those who are economically minded would have the Government continue to give it away. I would suggest that if we believe in the institution of property, then some governmental agency should sell this water and receive some fraction of its worth. Arizona would be the better for it.

Arizona says its growth will be stopped without this water and that it cannot afford to pay for it. Arizona means, of course, that its agricultural practices would be greatly changed if Arizona farmers had to pay all the costs for this water. But Arizona is mostly concerned for its growth and its growths will be urban. Arizona's urban population, which might be six million by the end of this century, can pay for this water and never know it. Five cents a day per capita would certainly cover it.

Let me finish on these matters by referring to a current paper by Sternberg, a paper relating to Brazil, a poor land. Sternberg cites Louis Koenig, who said in 1956 that use of irrigation water in the arid lands of the 20th century is not an appropriate but rather a marginal use of that valuable resource. Wilson, in 1960 and 1964, noted that in Tucson 46.1% of water went to agriculture and that it generated only 7.2% of the basic income of the region. In Albuquerque, 18% of the water went to agriculture and it generated only 0.2% of the basic income. Wollman in 1962 said "Contribution of the Rio Grande Basin to GNP would be about $50 for each acre-foot used in agriculture. . . It would be between $3000 and $4000 for each acre-foot used in industry." If these conclusions are obvious in Brazil, they should be inescapable in the United States. Or is it because we are so rich that we can fly in the face of all reason and still prosper?

Next, turning to the crux of my discussion, it is being said currently that it would be better to have lakes in the Grand Canyon than a river because then a hundred thousand could motorboat and water ski up through these wonders compared to the thousand who now see them. Again, I have been hearing comments that the Grand Canyon is the exclusive purview of an elite, a privileged class of willful men who mean to keep it for themselves. These, I presume, are the river rats of the Sierra Club. Let me note that the River has been used as a route for a century now and with ever increasing frequency, that the conservation groups have become materially involved in all of this since the Echo Park controversy within this last decade, that they knew nothing then, and admit it, of what was in and has been lost in Glen Canyon. Their book title was "The Place No One Knew", and they would, today, I think, gladly trade off Echo Park to retrieve Glen Canyon. They have not led the way into the Grand Canyon and are in fact, Johnny-come-latelys. In contrast, Georgie White, a one hundred pound woman and the Hatch Brothers are the images of the current river runners. This is not a sanctum of conservationists. It is open to you if you wish to go down the River. You don't even have to have the several thousand dollars for a fiberglass boat, boat trailer, a hundred horsepower of outboards, the water skis, and the liquor locker to sustain you in your boredom. I will wager you that a careful study will show less money spent per capita annually on recreation by those who run the River than by the motorboaters of Lake Mead. Give up this false image of entrenched privilege. This is not the controversy.

In a democratic society, a one man-one vote society, it is difficult to argue matters of quality. But surely issues of quality are real and they do not nec-

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essarily imply hierarchical distinctions of merit or status. To start in, let me ask you this: if you had enough of a rare and wonderful wine to serve a thousand persons, would you prefer to mix this with vin ordinaire so that a hundred thousand might savor its quality?

If you will insist that recreation is all of equal quality, then you have only moved from one horn of a dilemma to the other. If you equate the instant-recreation experience of motorboating up a lake in the Grand Canyon to the time-consuming, consciousness-intensifying experience of following down the River, then must you not equate the motorboating to a similar time spent in an automobile driving through the marvelous scenery of the Southwest, but also through the burned out slums of Watts? If you demand instant access to any corner of the Nation, how can you justify your votes for the Wilderness Bill? If you demand a universe of scenery for each citizen how can you prefer the actual presence in all regions of all persons, an impossibility, to the exquisite pleasure of sitting in your own backyard, beer in hand, while television treats you to the full pleasures of the world?

The facts are inescapable: recreation benefit, distinct from use, stems from experiencing the reality of the world, and experiencing it in its full flavor and diversity, not softened, not homogenized. It is the diversity, the toughness, the challenge of this world, which has made us human. If we destroy it, our humanity will go with it. This is why we need a Grand Canyon. Lake Mead is fine, but the existence of Lake Mead is the strongest argument for having no more lakes in that region. It was already enough and Lake Powell added little to it. Lake Powell is a mistake, both because Lake Mead already existed but also because Glen Canyon was lost, and Glen Canyon was diverse. There was nothing like it on this earth. The earth, and man as well, are the poorer for its disappearance. Lakes in the Grand Canyon will only confirm this mistake and testify that our policy makers could not learn by experience.

Aldous Huxley in Brave New World, required reading for all planners, for all who wish for Utopias, says, "that the purpose of life was not the maintenance of well-being, but some intensification and refining of consciousness, some enlargement of knowledge."

Henry Thoreau said, "I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived. I did not wish to live what was not life, living is so dear * * *" The stature of both of these men grows steadily, grows by the year.

Next, let me turn to a current comment. This is an excerpt from a recent letter from Sylvia Tone who lives in Yachats, Oregon, to Philip Pennington, whose pictures of Glen Canyon reveal the diversity of its beauty. She said, "Last spring I made the mistake of taking the boat trip on Lake Powell up what were once Aztec and Bridge Canyons and walked to Rainbow. We were herded along by the guides like a bunch of sheep, not allowed to leave the trail or to go to the little cottonwood tree and spring under the Bridge. I was *more* than depressed, and told my friends Powell was a dead world. Deadness is the only word that describes it. Not a flower or a leaf or tree or little lizard, and being old and emotional and sick at heart, I cried."

Mr. Dominy extols the importance of Hoover Dam in World War II and I do not dispute this. But let me note that a price is paid at the same time. During the Korean War I became disturbed by the mixed up reporting which said American troops on the highways were being ambushed by Koreans in the thickets. This I knew instinctly was wrong because I knew that American boys grew up squirrel gun in hand and with eyes which could trail an Indian across bare rock. Quite obviously Americans were ambushing Korean farmers in regimented formation on the roads, and some correspondents were sadly confused. In fact, it took a little time before I realized that these American troops were kids brought up on the asphalt of Brooklyn, that American troops knew nothing of the American landscape, that rural Americans had become urban Americans, that unplanned, diverse, perhaps inefficient, open America had become planned, efficient, crowded, regimented * * * and terribly vulnerable.

Note also a similar theme in the current issue of Harper's Magazine.

Continually since then I have become more concerned. And my final question, gentlemen, is do you wish, is it your purpose, that we should become a nation of sheep? These dams are on that highway.

You must find another cash register for the Central Arizona Project. Whether it be extension of the Bureau's activity into pumped storage, where siting is a

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minor problem, whether to cross the boundary into thermal power in the Southwest as in the Southeast, or whether to admit that water is a valuable property and to let it into the market place. If you cannot, then you must admit that we are not the masters of our destiny.

Background of speaker: A.B. Dartmouth College, Ph.D. (chemistry) University of California, Berkeley. Chemist, research chemist, development supervisor for Shell Oil and Shell Development Companies, Martinez and Emeryville, California, 1935–1961. Techincal adviser to Chief, Natural Resources Section, GHQ SCAP (civil administration of Occupied Japan), Tokyo, 1948–1950. Lecturer, Dept. of Geography, University of California, 1962—present, in field of natural resources and population.

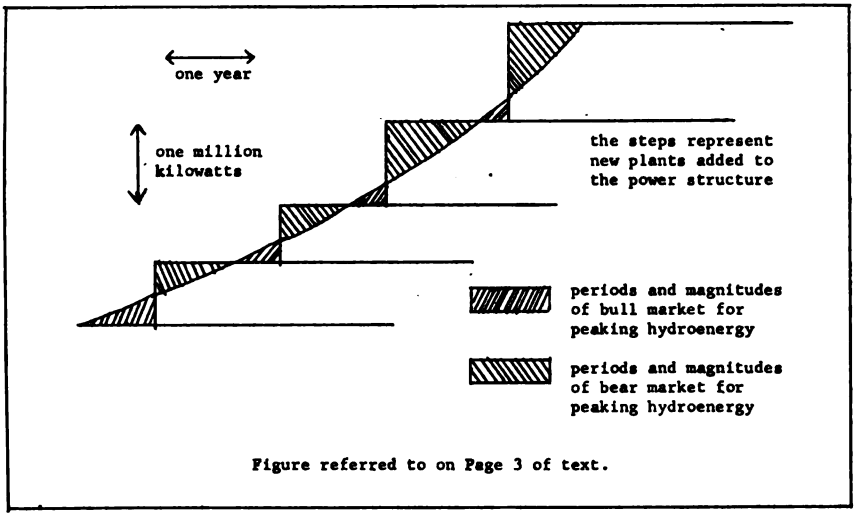

Figure referred to on Page 3 of text.

Testimony Offered on H.R. 4671 by Rodger W. Pegues, Northwest Conservation Representative, Federation of Western Outdoor Clubs

Can the Pacific Northwest supply water to the Southwest?

We oppose most emphatically the revised Title II of H.R. 4671, in adding to the importation of upwards of 8.5 million acre feet of water into the Colorado River system. The bill leaves many things unstated, but let's bring them into the open.

First, diversion will come from the Columbia River. There simply isn't enough water available in the Snake River, and British Columbia is not gong to agree to export its water in the forseeable future. Ottawa may be willing to talk about it, but control lies with the Province. Therefore, if there is to be importation, it must come from the Columbia. Second, the diversion cannot come from below The Dalles. The expense of transfer back over the Cascade Mountains would run the cost per acre foot so high as to make the project ludicrous. In order to obtain a semblance of feasibility, the water will be diverted as far up the Columbia as possible. Third, the diversion cannot possibly come from below the Portland-Vancouver area. The amount to be diverted, especially in a dry cycle, would result in a seawater invasion of the lower river, and there is not much point in diverting seawater to the Colorado. Fourth, we place little faith in the determinations by the Bureau of Reclamation of the feasibility of water transfer. Nor do the analyses by impartial scholars here agree with the Bureau's feasibility studies. As the Bureau is an active proponent, even a vigorous advocate, of the Southwest Water Plan, it is not reasonable to consider it an impartial judge in this matter. Fifth, the guarantee of prior rights in perpetuity to the states of origin does nothing to relieve the shortage in the Southwest. The effect of the guarantee would have to be tested in the courts.

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In the meantime, the economy of several states will have become tied to the importation of a given amount of water. We are not Utopians, and we cannot imagine future Congresses allowing the economy of those states to be destroyed or seriously injured by the withdrawal of a substantial portion of that water. No future Congress can be bound by this Congress if it enacts this bill.

Finally, there appears to be a misconception about the water situation in the Northwest. The Columbia River is not going to waste, and the water flowing there is far from ample for the existing needs, let along future demands. To begin with, there is wide variability in the annual runoff. A slight decrease of snow pack, a slight increase in speed of runoff would—right now—result in a cutback in power to aluminum plants and a consequent loss of production and employment. A major drought, such as that now being experienced in the Northeast, could mean disaster to industry, farms, and the fisheries of the Columbia. The Northeast, incidentally, normally has a *greater* annual rainfall than the state of Washington. Based on the records of 85 years, probability analysis suggests that low yearly runoff at The Dalles, *without upstream depletions*, would be: in 100 years, 72 million acre-feet; in 150 years, 66 million acre-feet; in 200 years, 64 million acre-feet. And we all know these lows could begin next year and continue for three, four, or five years thereafter. Depletion above The Dalles is now 9 million acre feet. This is expected to increase to about 16 million acre feet in the next few decades. During a dry period, this would result in a runoff at The Dalles of 50 million acre feet. The result to the lower Columbia—*even without diversion*—would be as follows: (1) inadequate flows for hydro plants with consequent loss of energy and thereby a production shutdown; (2) temperature increase caused by a flow inadequate to cool water from the Hanford nuclear reactors, and by solar heating and reservoirs; (3) a substantial increase in concentration of pollutants, (4) reduction in dissolved oxygen; (5) increase in algae; and (6) further intrusion of seawater into the estuaries.

The anadromous fisheries of the Columbia, of vital importance to the economy in Oregon, Washington, and even Alaska, carry a large part of the southeast Alaska trawl catches of Columbia River salmon, which face destruction.

What is this all about? Why are we reshaping the face of the earth? Basically we seek with this bill to insure plentiful and cheap water to the farmers of the Southwest, because this is our basic problem in the Southwest or in this nation. Before we spend billions on projects such as these, perhaps we had better spend a few thousands on determining just what our national water problems really are and what methods of solution to those problems are best suited to our national interest.

Mr. BROWER. I would like to submit for the committee files, a document which, I think, will be relevant, entitled "Nuclear Energy the Natural Environment," which is a statement which was presented at the Federation of Western Outdoor Clubs in Seattle on the 23d of April by Mr. Kenneth Davis, whom I am sure the chairman knows was formerly the director of the Reactor Division of the Atomic Energy Commission, who is presently vice President of Decla Corp., and president of the Atomic Industrial Forum.

Mr. Davis is one of the many who contributes advice to the Sierra Club to enable it to go into fields which are beyond its own ordinary competence, which is, primarily, a concern for the nation's scenic resources.

Mr. HOSMER. I must object to that admission, even for the files, as you term it. It is no more than a speech which somebody made someplace. If the witness thinks it is relevant to what he wants to get before the committee, that is one thing. But it is not subject to any evaluation by the committee and I do not think that the committee rules permit, nor, in fairness to the membership, is it possible to accept an ex parte statement, made someplace else, at some other time, at some other forum, for some other purpose, and for some other reason, and for some other motive.

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Mr. ASPINALL. The objection has been made.

Is there any further request?

Mr. BROWER. No further request except that I should like to introuce briefly the two people who are following me, who are members f the staff, Mr. Hugh Nash, editor of the Sierra Club Bulletin, and Ir. Jeffrey Ingram, Southwest conservation representative, Sierra lub.

Mr. ASPINALL. Do they have statements?

Mr. BROWER. They both have statements.

Mr. Nash has a statement and a submission for the file and Mr. ngram is presenting an analysis of the economics of the project and ow the central Arizona project can go forward without either of the rand Canyon dams.

Mr. ASPINALL. This is new material?

It was not in the last hearings? And is no part of it?

Mr. BROWER. This is new material.

Mr. HOSMER. Might I ask this, Were not some witnesses brought ere by Mr. Brower last year, and they went into, very deeply, the conomics of this proposal, specifically to the point of calculations that ie project could pay out without building these dams?

I do not see how this would be anything but repetitious.

Mr. ASPINALL. Well, Mr. Nash, you may proceed.

TATEMENT OF HUGH NASH, EDITOR, SIERRA CLUB BULLETIN

Mr. NASH. Thank you, Mr. Chairman.

My name is Hugh Nash. I am editor of the Sierra Club Bulletin, nd a resident of Sausalito, Calif. The latest of my 8 or 10 visits to ie Grand Canyon was 6 weeks ago. At that time, I tried in the ew days available to see as much as I could of the canyon from its eginning at Lees Ferry to its end at Grand Wash Cliffs.

One result of my recent trip is the May issue of the Sierra Club ulletin, which is entirely devoted to the controversy over proposals build hydroelectric dams in Lower Granite Gorge and Marble orge of the Grand Canyon. With your permission, Mr. Chairman, would like to have the editorial matter from this issue of the bulletin ncluded in the record of these hearings as if read. It constitutes my wn writing in behalf of the club's position.

Mr. ASPINALL. We will prohibit any inclusion of this but it may be eceived for the files of the committee.

Mr. HOSMER. I object to receiving it for the files on the same ground iat I objected to receiving the statements of the others, as previously ientioned.

Mr. ASPINALL. Well, Mr. Hosmer, this happens to be published iaterial and I think that it can go into our files.

You may proceed. It will be placed in the file.

(The material referred to, editorial matter from the bulletin will e found in the files of the committee.)

Mr. NASH. Thank you.

A number of photographs by Commissioner of Reclamation Floyd Dominy were published in the record of this committee's hearings on H.R. 4671 last August. The Sierra Club would be glad to furnish

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any of the photographs used in the May bulletin or other suitable photographs if the committee would like to publish them in the record of these hearings.

Mr. ASPINALL. Thank you for that offer, Mr. Nash.

Mr. NASH. If I may, I will present now a brief oral statement summarizing several of the major points covered in the May bulletin.

Mr. HOSMER. I must renew my objection as to summarizing material that the Chair has just ruled is not appropriate for the purpose of the record.

Mr. ASPINALL. I understand that Mr. Nash makes this his own statement, so we will permit it.

Mr. UDALL. He is the editor of the bulletin.

Mr. ASPINALL. That is right.

Mr. NASH. Millions of citizens who have no idea of the location of Bridge Canyon and Marble Gorge damsites would rise to the defense of Grand Canyon, America's most famous scenic resource and nature sanctuary, if they knew it was threatened. Uncomfortably well aware of this, most proponents of the dams do whatever they can to gloss over or obscure the fact that the damsites are on the main stem of the Colorado River within the inner gorge of the Grand Canyon itself. Some protagonists go so far as to deny that Marble Gorge is a part of the Grand Canyon. Their claim is refuted by Arizona's Barry Goldwater, who writes in the March McCall's that Lees Ferry is "where Marble Canyon really starts and where, for my money, the Grand Canyon does also." The Encylopedia Britannica says of the Grand Canyon that "it extends in a winding course from the head of Marble Gorge, near the northern boundary of Arizona to Grand Wash Cliffs, near the Nevada line, a distance of about 280 miles." On my recent trip, I was able to get sweeping views of Marble Gorge from Echo Cliffs on the east and from the Kaibab Plateau on the west, and from points along the rim both above and below the damsite. Everything I saw confirmed the obvious physical fact that Marble Gorge is an integral part of the Grand Canyon—a fact that can be confirmed by anyone who will take the trouble to consult a topographical map of the area.

Any impairment of Marble Gorge is an impairment of the Grand Canyon, of which it is a part.

Bridge Canyon and Marble Gorge Dams would create more than 130 miles of slack-water reservoirs in the Grand Canyon. The damage that such reservoirs would do, flooding wildlife habitat and disrupting the ecology of the river, is obvious. Less obvious, perhaps, is the damage that Marble Gorge Dam would inflict on Grand Canyon National Park, downstream, where the law provides that scenery and natural and historic objects are to be preserved "unimpaired for the enjoyment of future generations."

Plant and animals life along the Colorado depends for its existence on sandbars, beaches, and dunes created by the alternating high- and low-water stages of a living river. A tamed and regimented river could not rebuild riverbank habitat within the national park as fast as it would be degraded by wind and water erosion. Flash floods wash boulders and debris down to the Colorado from every side canyon, tending to block its channel. A living river can flush out these obstacles at periodic high-water stages, but a captive river cannot. A dam at Marble Gorge would tend to choke the main-stem channel.

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downstream, in the national park, and make river travel all but impossible.

The Colorado, architect and life giver of the Grand Canyon, is paramount among the "natural objects" to be protected by law in Grand Canyon National Park. And since many of the park's finest attractions are only accessible from the river, the elimination of river travel would destroy park values that were to be preserved intact for the enjoyment of future generations. Whether such spots suffer physical damage or not, they certainly cannot be enjoyed if they cannot be reached. Marble Gorge Dam, no less than Bridge Canyon Dam, would be injurious to Grand Canyon National Park, would undermine the principle of park protection, would constitute a precedent jeopardizing the entire national park system, and would make a mockery of the administration's protestations of devotion to natural beauty.

At hearings last August, the Sierra Club presented a documented case against Bridge Canyon and Marble Gorge Dams on legal, economic, and practical grounds. We remain convinced that the dams would be totally without justification even if there were no conservation issues at stake.

Finally, because of their relevance to the subject of this hearing, I would like to say a few words in support of bills introduced by Congressmen Saylor, Dingell, and Reuss to include the entire Grand Canyon within an enlarged national park.

Mr. HOSMER. I am going to have to object to this comment about a bill that is not before this committee. This committee is not receiving testimony on that bill and, therefore, he cannot give testimony on it. It is redundant and extraneous and immaterial.

Mr. ASPINALL. No. Inasmuch as it is the bill of one of our colleagues, the Chair will receive it.

Mr. NASH. Thank you, Mr. Chairman.

Joseph Wood Krutch tells us that "the Canyon is at least two things besides spectacle. It is a geological unit and the most revealing single page of earth's history anywhere open on the face of the globe." This priceless page should be preserved in its entirety for its scientific and educational values. Its message should not be distorted or obliterated by unnecessary dams that would falsify the geological record. The highest and best use that we can make of the Grand Canyon is to keep it as it is—to let the Colorado River continue perfecting the masterpiece that it has labored on for millions of years. If we sacrifice the Grand Canyon and all that it means, as a temporary and dubious expedient, a footnote will be added to the history it reveals. The footnote will tell of a society that talked about greatness but didn't know the meaning of the word.

Thank you, Mr. Chairman.

Mr. ASPINALL. Who is the other gentleman there with you now?

Mr. BROWER. Mr. Ingram.

Mr. ASPINALL. Do you have a statement, Mr. Ingram?

Mr. INGRAM. It is an analysis of how it would be possible to pay out the projects in this bill.

Mr. ASPINALL. Do you have a statement that you want to make?

Mr. INGRAM. I have a statement which I have prepared, and I have a brief of it here.

Mr. HOSMER. Have you submitted it to the committee?

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Mr. INGRAM. Yes.

Mr. ASPINALL. All right.

Mr. HOSMER. I am going to renew my objection to material which is redundant and repetitive.

Mr. ASPINALL. The Chair overrules that. It is permitted; and, Mr. Ingram, you may make your statement. Your statement will be placed in the record. Give your oral statement.

Mr. INGRAM. Pardon me?

Mr. ASPINALL. You may proceed.

STATEMENT OF JEFFREY INGRAM, SOUTHWEST CONSERVATION REPRESENTATIVE, SIERRA CLUB

Mr. INGRAM. Mr. Chairman and members of the committee, for some months I have been working and worrying over this material. I was very pleased yesterday to have the Commissioner of the Bureau of Reclamation commend me for having done something which was "theoretically possible." I felt a little bit as if I had received my diploma.

I would like briefly to summarize what I have done in a series of steps.

First of all, I assumed that neither dam was built in the Grand Canyon, that no money was spent for them and no revenue was received from them. I then assumed that the revenues from Hoover, Parker, and Davis Dams were used, instead, to pay off the municipal and industrial costs of the Central Arizona Unit.

If you did not build either dam you would have to buy power to pump the water for the Central Arizona Project from an outside source or from some other source. I did the calculations on this, and subtracted, where applicable, the extra costs of buying the pumping power outside the Central Arizona Unit.

Mr. Dominy has testified that if you build these two dams, approximately 100,000 acre-feet per year of water will be evaporated. This is a firm supply of water. I assume then that this water could be sold, and I sold it at the rate that the Bureau of Reclamation has used for municipal and industrial use at $50 per acre-foot.

The method that I used in my calculations was briefly set forth in my testimony, and I have here an appendix to that testimony which if I could I would like to have added to my statement. It presents the method that I went through, plus the details year by year of how the net operating revenues for the various studies were arrived at.

Mr. ASPINALL. I understand that this is the table that you have attached?

Mr. INGRAM. This is a new one. I thought perhaps an amplification might help so I prepared those three pages and the charts.

Mr. HOSMER. Reserving the right to object.

Mr. ASPINALL. You have reserved the right to object.

Mr. INGRAM. With the figures that appear.

Mr. ASPINALL. Just a minute. The gentleman has a right to object and I think he has the floor at this time. The gentleman from California reserved the right to object.

Mr. HOSMER. I withdraw my objection on the basis that the Chair has already ruled against me on the main testimony and, therefore, *it would be* futile to renew the objection.

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Mr. ASPINALL. Thank you very much. It will be made a part of the record.

Mr. INGRAM. With the operating figures that are in the table in the appendix, I prepared charts. The charts are reproduced in the back of my original testimony. I would like to stress right here that these charts that I have prepared, use the figures from the Bureau of Reclamation consolidated payout studies that were given in the testimony opposite page 235 and page 127 in the hearings before the subcommittee last summer and fall.

There are two payout charts in the back—payout study No. 1 and payout study No. 2, because there are uncertainties. We are talking about a period which ends 60 years from now, and this is a long time for exact predictions as to what is going to happen. So I computed the "best case" and the "worst case."

In the worst case I assumed a rate for pumping power of 5 mills per kilowatt-hour. This is a little less than 2 mills per kilowatt-hour more than the Bureau is taking into account in its payout schedule presented last fall.

In the best case I used 3 mills per kilowatt-hour as the cost of the pumping power. This is actually a small amount less than what the Bureau used and, consequently, I spent a little less for pumping in my best case.

The other factor is this question of the water that would be lost from behind the dams if they were built. In my worst case I did not use any revenues from this water. And in the best case I applied the revenues from this water to the whole payout period.

(Chart is included with prepared statement.)

This chart shows what happens to the development fund with these two variables, but let me say, first, that in both the best case and the worst case there is still enough money to buy the pumping power. There is still enough money to pay off the central Arizona project, and enough revenue accrues even beyond that, so that there is a substantial amount in the development fund; $360 million accrues to the fund in the worst case, where pumping power costs 5 mills per kilowott-hour, and no water is sold. The best case I present accrues $807 million. This is based on buying pumping power at 3 mills per kilowatt-hour, and selling water that would be evaporated from reservoirs.

I would like to make a comparison, if I can, between my best case and the case that the Bureau presented last fall. I assume that the Bureau presented their best case, I do not know. They seem to think so. But I just assume that they have presented their best case.

(Chart is included with prepared statement.)

With the second chart, the status of the development fund is presented in the case where you leave out the dams, and the case where you leave the dams in.

In the third column I was looking at what might happen if you imported water into the Colorado River Basin, so that the upper basin could receive an extra 2.5 million acre-feet.

I started with 1995, because before that there is no accrual to the development fund. If you do not build the Grand Canyon dams, the first point to note is that money accrued to the development fund accrues 9 years earlier than if you do build the Grand Canyon dams, so that you have for some 9 years extra money coming in. And when you finally do get money with dams, you would have $300 million in the

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development fund without them. Furthermore, as you go down the chart and compare the two columns of figures it is not until 2021 that the development fund with the dams—and let me stress that this is both Bridge and Marble Dams—actually accrues enough money so that there will be more in the fund than if you had not built the dams.

I would like to point out, that it may also be that these two dams together might produce more money for the development fund than the project without the dams. But if you do not build the dams, and I think this is somewhat more important, you gain more of what is most needed, and that is water.

Thank you, Mr. Chairman.

(Mr. Ingram's prepared statement follows:)

STUDY OF THE EFFECT OF ACCELERATING THE PAY-OUT OF THE MUNICIPAL AND INDUSTRIAL COSTS: LOWER COLORADO RIVER BASIN PROJECT

(Testimony offered on H.R. 4671 by Jeffrey Ingram, Southwest Conservation Representative, Sierra Club)

SUMMARY

Many arguments have been made for deleting the Grand Canyon dams from the Colorado River Basin Project. The purpose of this study is to answer the questions: If the dams are deleted, what would be the effect on the ability of the Project to pay itself out, and what would be the effect on the Lower Colorado River Basin Development Fund, the heart of this legislation? The study answers these questions by showing that the Project without the dams can pay itself out, and further, that the Development Fund would be left with a substantial positive balance at the end of the pay-out period.

Basis of the study

The study offered here is based upon two sections of the April 25, 1966, revision of H.R. 4671, authorizing the Colorado River Basin Project. These sections are 403–c–2, which would credit revenues from Hoover, Davis, and Parker dams to the Lower Colorado River Basin Development Fund, and section 403–e–1, which would allow the Development Fund to help pay off costs allocated to the municipal and industrial water supply.

This study applies the revenues from the three dams listed above to the municipal and industrial costs of the Central Arizona unit of the Project, and demonstrates that the authorized features would be feasible without the Grand Canyon dams. The effect on the Development Fund is also exhibited.

A calculation of the pay-out of this Project without the Grand Canyon dams must take two items into account. The first of these is the cost of power to pump the water. The second of these is the possibility of selling the water which would be evaporated from the reservoirs behind the Grand Canyon dams if they were built. Since both of these items can well be the subject of debate, I have made my calculations for the "worst" case (Pay-out Study I, see attached sheet) and the "best" case (Pay-out Study II, see attached sheet), and then I have provided approximations for other sets of conditions.

Discussion of the conditions for pay-out if Grand Canyon dams are not built

(1) Pumping power: If the Grand Canyon dams are not built, the power to pump water must be bought outside the Project. There are, of course, no set figures for the cost of this power, but five, four, or three mills/kilowatt-hour seem to cover the range. This is an average cost over the span of the Project pay-out. For Pay-out Study I, my "worst" case, five mills/kwh was used for the computation. This represents an additional cost of $3.352 million/year. For Pay-out Study II, my "best" case, three mills/kwh was used.

(2) Extra revenue from sale of "lost" water: Further, if the Grand Canyon dams are not built, the water that would have been evaporated or lost in seepage from the reservoirs would flow on downstream. The amount of this water is estimated to be 100,000 acre-feet/year. Taking transport losses into account, and selling the water for municipal and industrial uses at the rate given in last year's hearings before this Subcommittee, revene of $4.250 million/year would *be realized.* For Study I, the worst case, I omitted the revenue from sale of this *water; for Study* II, the best case, I included it.

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Method and conclusions

In order to carry out the computations for the two Pay-out Studies, I started with the costs and revenues as provided in the 1965 hearings before this Subcommittee on H.R. 4671. The basic documents utilized were the Consolidated Pay-out Studies opposite pages 127 and 235. Using the figures given there, I have made my caluculations taking into account conditions 1 and 2 as discussed above.

The computations were then carried out for determining the number of years necessary to pay off the municipal and industrial costs, adding in revenues from Hoover, Parker, and Davis dams as they became available. Once this accelerated pay-out of the municipal and industrial costs was completed, all revenues were credited to the Development Fund, allowing the irrigation costs to be paid off, and leaving—in both the worst and the best cases—a large positive balance in the Development Fund at the end of the pay-out period. (Pay-out Studies I and II are attached at the end of this report.)

It is important here to stress this basic conclusion of these studies: The Project pays itself out without the Grand Canyon dams.

Now since the Project is in any case feasible without the dams, the next question to deal with is the effect on the Development Fund of this method of paying out the Project. Table A shows this effect for the different conditions of my study.

COLORADO RIVER BASIN PROJECT WITHOUT GRAND CANYON DAMS

TABLE A.—*Status of development fund to show the effect of (1) the cost of power to pump water; (2) marketing the 100,000 acre-feet lost if the Grand Canyon dams are built*

[In millions of dollars at end of payout period]

	Cost of pumping water (mills per kilowatt hour)		
	3	4	5
With sale of the 100,000 acre-feet	$807	$691	$580
Without sale of the 100,000 acre-feet	538	419	316

NOTE.—Except for the $316 and $807 figures, which are taken from payout studies I and II, respectively, the numbers are approximate.

Comparison of Lower Colorado River Basin Development Fund with and without the Grand Canyon dams

I assume that the Department of the Interior presented its best case in the 1965 hearings, and therefore for this comparison I will use the results of my Pay-out Study II. There are three points of comparison:

1. If the dams are not built, then money will be available in the Development Fund in 1995, while if the dams are built, the Fund receives no money until 2004.

2. If the dams are not built, more money is available in the Fund than if the dams are built for almost the entire pay-out period, up until 2021. That is, there is more money for investment in other waterworks earlier and longer without, of course, the risk attendant on the dams, which would have to operate in the power market, which is competitive for the seller, as opposed to the water market, which is competitive for the buyer.

3. If the dams are not built, the Fund totals $104 million less at the end of 53 years than if the dams are built, which is to say that $1200 million is spent on the dams for a comparative advantage of $100 million.

Although not directly connected with the Development Fund, it is worth noting that if the dams are not built, then during the next few years, when the Project is being started, the Federal Government will have to expend much less money for construction and interest funds (over $750 million), and the drain on tax revenues will be greatly lessened.

In summary, if the Grand Canyon dams are not built, the authorized Arizona units will be paid for and substantial amounts of money will accrue to the Development Fund. Admittedly, there is a risk of losing some of what these dams are supposed to provide: money;—but more importantly, there is the certainty of gaining what is most needed: water.

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APPENDIX

Sources of data.—1965 Hearings on H.R. 4671 before Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House of Representatives.

Supplemental Information Report on Central Arizona Project, a report of the Department of the Interior; also other documents on the Pacific Southwest Water Plan.

Federal Power Commission, *National Power Survey, 1964.*

Background of author.—B.S. in Mathematics, Massachusetts Institute of Technology; graduate work in mathematics at University of New Mexico. Formerly employed by Los Alamos Scientific Laboratory, New Mexico, on Project Rover.

LOWER COLORADO RIVER BASIN PROJECT, WITHOUT GRAND CANYON DAMS

Payout study I

[In $1,000]

Year of study	Year	Power—Net operating revenue	Municipal and industrial			Irrigation		Development fund balance
			Net operating revenue	Interest at 3.222 percent	Unpaid balance	Net operating revenue	Unpaid balance	
1	1973	0	0	1,178	145,893	0	220,108	0
2	1974		0	4,701	156,744	0	249,527	
3	1975		3,316	5,050	215,873	1	271,343	
4	1976		3,461	6,955	219,367	5	271,338	
5	1977		4,957	7,068	221,478	0		
6	1978		5,215	7,136	223,399			
7	1979		5,486	7,198	225,111			
8	1980		5,737	7,253	226,627			
9	1981		6,017	7,302	227,912			
10	1982		6,289	7,343	228,966			
11	1983		6,560	7,377	229,783			
12	1984		6,830	7,404	230,357			
13	1985		7,082	7,422	230,697			
14	1986		7,361	7,433	230,769			
15	1987		7,652	7,435	230,552			
16	1988		7,943	7,428	230,037			
17	1989		8,224	7,412	229,225			
18	1990		8,504	7,386	228,107			
19	1991	12,800	8,719	7,350	213,938			
20	1992		8,912	6,893	199,119			
21	1993		9,127	6,416	183,608			
22	1994		9,339	5,916	167,385			
23	1995		9,538	5,393	150,440			
24	1996		9,735	4,847	132,752			
25	1997		9,959	4,277	114,270			
26	1998		10,176	3,682	94,976			
27	1999		10,382	3,060	74,854			
28	2000		10,590	2,412	53,876			
29	2001		10,531	1,736	32,281			
30	2002		10,489	1,040	10,032			0
31	2003		10,433	323	0			12,878
32	2004	12,800	10,391	0				36,069
33	2005	16,400	10,339					62,808
34	2006		10,281					89,489
35	2007		10,249					116,138
36	2008		10,193					142,731
37	2009		10,151					169,282
38	2010		10,093					195,775
39	2011		10,042					222,217
40	2012		9,993					248,610
41	2013		9,929					274,939
42	2014		9,898					301,237
43	2015		9,841					327,478
44	2016		9,789					353,667
45	2017		9,742					379,809
46	2018		9,694					405,903
47	2019		9,647					431,950
48	2020		9,569					457,919
49	2021		9,519				271,338	483,838
50	2022	16,400	9,472				211,338	449,710
51	2023	16,400	9,418				141,338	405,528
52	2024	16,400	9,387				71,338	361,315
53	2025	16,400	9,332	0	0	0	0	315,709

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Payout study II

[In $1,000]

Year	Power—Net operating revenue	Municipal and industrial			Irrigation		Development fund balance
		Net operating revenue	Interest at 3.222 percent	Unpaid balance	Net operating revenue	Unpaid balance	
1973	0	4,989	1,178	138,422	349	219,760	0
1974	----------	7,410	4,460	141,555	343	248,835	----------
1975	----------	7,784	4,561	195,727	3,353	267,299	----------
1976	----------	7,929	6,306	194,104	3,357	263,942	----------
1977	----------	9,644	6,254	190,714	3,133	260,809	----------
1978	----------	9,940	6,145	186,919	3,095	257,714	----------
1979	----------	10,241	6,024	182,702	3,065	254,649	----------
1980	----------	10,532	5,887	178,057	3,025	251,624	----------
1981	----------	10,852	5,737	172,942	2,985	248,639	----------
1982	----------	11,235	5,572	167,279	2,874	245,765	----------
1983	----------	11,546	5,390	161,123	2,834	242,931	----------
1984	----------	11,849	5,191	154,465	2,801	240,130	----------
1985	----------	12,153	4,977	147,289	2,749	237,381	----------
1986	----------	12,475	4,746	139,560	2,706	234,675	----------
1987	----------	12,802	4,497	131,255	2,670	232,005	----------
1988	----------	13,206	4,229	122,278	2,557	229,448	----------
1989	----------	13,532	3,940	112,686	2,512	226,936	----------
1990	----------	13,855	3,631	102,462	2,469	224,467	----------
1991	12,800	14,196	3,301	78,767	2,343	222,124	----------
1992	----------	14,461	2,538	54,044	2,271	219,853	----------
1993	----------	14,805	1,741	28,180	2,142	217,711	----------
1994	----------	15,149	908	1,139	2,010	215,701	----------
1995	----------	15,425	37	----------	1,933	213,768	27,049
1996	----------	15,775	----------	----------	1,798	211,970	55,624
1997	----------	16,054	----------	----------	1,725	210,245	84,478
1998	----------	16,407	----------	----------	1,589	208,656	113,685
1999	----------	16,629	----------	----------	1,510	207,146	143,114
2000	----------	17,054	----------	----------	1,356	205,790	172,968
2001	----------	17,001	----------	----------	1,350	204,440	202,769
2002	----------	17,022	----------	----------	1,287	203,153	232,591
2003	----------	16,972	----------	----------	1,281	201,872	262,363
2004	12,800	16,993	----------	----------	1,218	200,654	292,156
2005	16,400	17,011	----------	----------	1,148	199,506	325,567
2006	----------	16,963	----------	----------	1,138	198,368	358,930
2007	----------	16,984	----------	----------	1,085	197,283	392,314
2008	----------	16,940	----------	----------	1,073	196,210	425,654
2009	----------	16,961	----------	----------	1,010	195,200	459,015
2010	----------	16,916	----------	----------	997	194,203	492,331
2011	----------	16,937	----------	----------	925	193,278	525,668
2012	----------	16,898	----------	----------	920	192,358	558,961
2013	----------	16,854	----------	----------	895	191,463	592,215
2014	----------	16,875	----------	----------	843	190,620	625,490
2015	----------	16,837	----------	----------	825	189,796	658,727
2016	----------	16,858	----------	----------	751	189,045	691,985
2017	----------	16,819	----------	----------	743	188,302	725,204
2018	----------	16,843	----------	----------	671	187,631	758,447
2019	----------	16,808	----------	----------	659	186,972	791,655
2020	----------	16,749	----------	----------	640	186,332	824,804
2021	----------	16,773	----------	----------	566	185,766	857,977
2022	16,400	16,741	----------	----------	551	185,215	891,118
2023	----------	16,708	----------	----------	530	51,236	790,777
2024	----------	16,732	----------	----------	475	21,817	794,965
2025	16,400	16,703	0	0	449	0	806,700

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Comparison of the growth of the Lower Colorado River Basin Development Fund with and without Grand Canyon Dams

[In millions of dollars]

Year	Without Grand Canyon dams	With Grand Canyon dams	With dams, lower power price, import at 2010 [1]
1995	$27	$0	$0
1996	56	0	0
1997	84	0	0
1998	113	0	0
1999	143	0	0
2000	173	0	0
2001	203	0	0
2002	233	0	0
2003	262	0	0
2004	292	1	0
2005	326	49	35
2006	359	97	76
2007	392	145	117
2008	426	193	158
2009	459	241	199
2010	492	289	233
2011	526	337	267
2012	559	384	300
2013	592	431	333
2014	625	479	367
2015	659	526	400
2016	692	574	434
2017	725	625	471
2018	758	685	517
2019	792	744	562
2020	825	804	608
2021	858	863	653
2022	891	923	699
2023	791	848	610
2024	795	879	627
2025	807	917	651

[1] Power sold at 5 mills per kilowatt-hour.

DETAILS OF METHOD FOR PAY-OUT CALCULATION; COLORADO RIVER BASIN PROJECT WITHOUT GRAND CANYON DAMS

A pay-out study is a tabulation of figures which demonstrates how the capital cost of a project will be paid off if a given amount of revenue comes in each year. The first step is to determine how much revenue is available. The revenue figures that I used were based on the *net operating revenue* columns of the Consolidated Pay-out Table opposite page 235 in the August-September hearings on H.R. 4671 before this Subcommittee, a table prepared by the Bureau of Reclamation. Thus the calculations presented here start from the Reclamation figures for net operating revenue for irrigation and for municipal and industrial uses. The net operating revenues for power that I used are the average numbers that the Bureau of Reclamation gives in the above table as being available from Hoover dam after pay-out (1990) and Parker and Davis dams (2004). These numbers are $16,800,000/year from Hoover, and $3,600,000/year from Parker and Davis dams.

In my calculations, I take two factors into account in computing the net operating revenue for the Project without the Grand Canyon dams. The first factor is the extra cost of buying power from outside the Project to pump the water. The second factor is the revenue earned from the sale of water that would be evaporated if the dams were built.

In my Pay-out Study I, the extra cost of power was calculated at the rate of 5 mills/kilowatt-hour. The amount of power needed to pump water for the Central Arizona unit is 1.786 billion kwh/yr.[1] The Bureau of Reclamation allows $5.577 million/yr for pumping, but at 5 mills/kwh, $8.929 million/yr is required.[2] To arrive at the net operating revenue figures for my Pay-out Study I, the $3.352 million/yr was subtracted first from the irrigation revenues, then from the municipal and industrial revenues, as given by the Bureau of Reclamation study

[1] Supplemental Report on Central Arizona Project, Pacific Southwest Water Plan. January 1964, p. 31.
[2] Ibid.

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opposite p. 235 in the 1965 hearings. I assumed no additional revenues from water sales for my Pay-out Study I. These computations resulted in zero operating revenue in most years for irrigation, and a net operating revenue from municipal and industrial uses lower than the Bureau of Reclamation's. (See accompanying chart.)

For my Pay-out Study II, the two extra elements were taken into accounts as follows: First, the cost of pumping power was calculated at the rate of 3 mills/kwh, which results in a total power cost of $5.358 million/yr, or $.218 million/yr less than the Bureau of Reclamation allows. The other element is the sale of the water not lost from the reservoirs. The amount of this water is estimated at somewhat over 100,000 acre-feet/year. Allowing for transport losses, and selling the water for the Bureau of Reclamation's price of $50/af (1965 Hearings on H.R. 4671, p. 126), provides additional income of $4.250 million/yr. In Pay-out Study II, the $.218 million/yr and the $4.250 million/yr figures were added to the net operating revenue for municipal and industrial uses, leaving the irrigation net operating figure unchanged. (See accompanying chart.)

Once the net operating revenue figure is obtained, the computation proceeds as follows: Interest at 3.222% is computed on the Unpaid Balance. (Note: At the start of the Project, the Unpaid Balance is given by the Bureau of Reclamation to be $36,576,000 for municipal and industrial uses and $23,146,000 for irrigation uses.) The next step is to apply the municipal and industrial net operating revenue to the interest, and where there is any revenue left over, to subtract the remainder from the Unpaid Balance. This results in a new Unpaid Balance figure. The interest is now computed on this figure, the revenue is subtracted, a new Unpaid Balance computed, and so on down the table until the Unpaid Balance is reduced to zero.

In the year 1991, the revenues, $12,800 million, from Hoover dam are added in, and in the year 2005, $3,600 million from Parker and Davis dams. As the revenues from these dams and the municipal and industrial water come in, the capital cost is paid off, and the revenues flow into the Development Fund, where they are available to pay off the irrigation costs and for further investment.

The table on the next page shows the actual calculations by which I obtained the net operating revenues.

Computations of net operating revenues for payout studies I and II

[In thousands of dollars]

[Col. 1 is the year; col. 2 is the Bureau of Reclamation figure for irrigation net operating revenue; col. 3 is the Bureau of Reclamation figure for municipal and industrial revenue; col. 4 is the extra cost of buying power at 5 mills per kilowatt-hour for my payout study I; col. 5 is the new net operating revenue for irrigation for study I; col. 6 is the new net operating revenue for municipal and industrial for study I; col. 7 is the revenue added in study II because pumping power is bought for 3 mills per kilowatt-hour; col. 8 is the revenue added in study II from the sale of "lost" water; col. 9 is the new net operating revenue figure for irrigation for study II; col. 10 is the new net operating revenue figure for municipal and industrial for study II]

1	2	3	4	5	6	7	8	9	10
1973	349	521	3,352	0	0	218	4,250	349	4,989
1974	343	2,942		0	0			343	7,410
1975	3,353	3,316		1	3,316			3,353	7,784
1976	3,357	3,461		5	3,461			3,357	7,929
1977	3,133	5,176		0	4,957			3,133	9,644
1978	3,095	5,472			5,215			3,095	9,940
1979	3,065	5,773			5,486			3,065	10,241
1980	3,025	6,064			5,737			3,025	10,532
1981	2,985	6,384			6,017			2,985	10,852
1982	2,874	6,767			6,289			2,874	11,235
1983	2,834	7,078			6,560			2,834	11,546
1984	2,801	7,381			6,830			2,801	11,849
1985	2,749	7,685			7,082			2,749	12,153
1986	2,706	8,007			7,361			2,706	12,475
1987	2,670	8,334			7,652			2,670	12,802
1988	2,557	8,738			7,943			2,557	13,206
1989	2,512	9,064			8,224			2,512	13,532
1990	2,469	9,387			8,504			2,469	13,855
1991	2,343	9,728			8,719			2,343	14,196
1992	2,271	9,993			8,912			2,271	14,461
1993	2,142	10,337			9,127			2,142	14,805
1994	2,010	10,681			9,339			2,010	15,149
1995	1,993	10,957			9,538			1,993	15,425

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Computations of net operating revenues for payout studies I and II—Continued

1	2	3	4	5	6	7	8	9	10
1996	1,798	11,307			9,735			1,798	15,775
1997	1,725	11,586			9,959			1,725	16,064
1998	1,589	11,939			10,176			1,589	16,407
1999	1,510	12,224			10,382			1,510	16,639
2000	1,356	12,586			10,590			1,356	17,054
2001	1,350	12,533			10,531			1,350	17,001
2002	1,287	12,554			10,489			1,287	17,022
2003	1,281	12,504			10,433			1,281	16,972
2004	1,218	12,525			10,391			1,218	16,993
2005	1,148	12,543			10,339			1,148	17,011
2006	1,138	12,495			10,281			1,138	16,963
2007	1,085	12,516			10,249			1,085	16,984
2008	1,073	12,472			10,193			1,073	16,940
2009	1,010	12,493			10,151			1,010	16,961
2010	997	12,448			10,093			997	16,916
2011	925	12,469			10,042			925	16,937
2012	920	12,425			9,993			920	16,893
2013	895	12,386	3,352	0	9,929	218	4,250	895	16,854
2014	843	12,407			9,898			843	16,875
2015	824	12,369			9,841			824	16,837
2016	751	12,390			9,789			751	16,858
2017	743	12,351			9,742			743	16,819
2018	671	12,375			9,694			671	16,843
2019	659	12,340			9,647			659	16,808
2020	640	12,281			9,569			640	16,749
2021	566	12,305			9,519			566	16,773
2022	551	12,273			9,472			551	16,741
2023	530	12,240			9,418			530	16,708
2024	475	12,264			9,387			475	16,732
2025	449	12,535			9,332			449	16,708

Mr. ASPINALL. The gentleman from Florida?

Mr. HALEY. Mr. Chairman, I reserve my time.

Mr. ASPINALL. The gentleman from Pennsylvania?

Mr. SAYLOR. I will reserve my time.

Mr. ASPINALL. The gentleman from California.

Mr. JOHNSON. I have no questions.

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

Mr. HOSMER. On these charts that you have here you have knocked out many of the kilowatts of power, have you not, Mr. Ingram?

Mr. INGRAM. In the case where there are no dams, there is no power and no power revenue.

Mr. HOSMER. Still there is a demand for power out in that part of the country?

Mr. INGRAM. Yes, sir.

Mr. HOSMER. And there would have to be something to provide that power?

Mr. INGRAM. Yes, sir.

Mr. HOSMER. So your figures apply only as you have calculated them to the basin funds and not the cost involved in producing both water and power, is that correct?

Mr. INGRAM. In order to calculate that I would have to know how much.

Mr. HOSMER. Just answer my question. Somebody is going to have to put up the powerplant to supply this power.

Mr. INGRAM. Yes, I think West Associates will do it.

Mr. HOSMER. Mr. Nash, this grandiose scheme that my colleague has for the enlargement of the park area, do you realize that at the present time the Grand Canyon National Park alone is larger than the State of Rhode Island—do you realize that?

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Mr. NASH. Yes, sir, I do realize that.

Mr. HOSMER. Do you realize that the present park is big enough so that it is equal in size to the independent countries of Singapore, San Marino, Monaco, Andora, plus American Samoa, Virgin Islands, Malta, Hong Kong, Vatican City, the District of Columbia, Guam, Wake and Midway, all put together?

Mr. NASH. I realize that now, sir. [Laughter.]

Mr. HOSMER. I will reserve the rest of my time.

Mr. ASPINALL. The gentleman from Arizona?

Mr. UDALL. Thank you.

I want to welcome you gentlemen here and to tell you that as one member of the committee I appreciate your statements and I will read them carefully and the material that you have submitted today. And I will read the bulletin. I always do.

I regret that we have differences of opinion on this very important subject. But I do consider you and your organization honest, sincere people who fight for what you believe.

Mr. BROWER. We will stop sending you the Sierra Club Bulletin in a plain envelope.

Mr. UDALL. Mr. Brower, with regard to the first part of your statement which related to the Interior Department's alleged suppression of evidence, did you not receive a letter from the Secretary dated May 9, commenting on the telegram that you had sent and the various charges that you had made relating to the suppression of evidence?

Mr. BROWER. I have received one and I have finished a first draft of my reply, which I would like to circulate to the committee so that members will have both letters.

Mr. UDALL. Would you not think that the record would have been more complete if you had included in fairness to the Secretary his comments on the procedure within the Department where you have many agencies and many different points of view, sir?

Mr. BROWER. I have no copies, only the original. I would be delighted to have it included in the record at this point, and if the chairman would permit it to add my reply later. I felt that it would be better to let the Secretary see my reply before I turned it in to the committee.

Mr. UDALL. I can understand the requirements of courtesy.

Mr. Chairman, with reference to the reply to the telegram, I will ask unanimous consent to submit it to the Chair now and let the staff determine that it is pertinent, to check it for suitability and either put it in the record or the file.

Mr. ASPINALL. Without objection, it is so ordered.

(The letter follows:)

MAY 9, 1966.

MR. DAVID BROWER
Executive Director,
Sierra Club,
San Francisco, Calif.

DEAR MR. BROWER: This letter is in response to your wire from the Grand Canyon of March 30. I have delayed a reply pending a thorough-going review with members of my Secretariat of the Department's internal policy regarding conservation controversies, and its application to the current Colorado River controversy. It is my strong feeling that the Department should have a uniform policy covering all such disputes.

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It is the policy of this and other federal departments that once a department (or the administration) takes a final position on any proposed legislation, the orderly working of government requires that all officers and career employees in the performance of their official duties adhere to governmental policies that are finally evolved and developed by the policy-making officers of that government. This is not to say that officers and employees in such cases should not always readily respond to requests for facts and information within their competence and the missions of their agencies.

This telegram, stripped of all side issues, raises two basic questions: first, whether organizational discipline requiring influential departmental personnel to refrain from taking sides in a matter of public controversy constitutes an infringement on freedom of information and, second, whether it is proper to impose such restrictions in the first instance.

As applied to the Lower Colorado project situation, I am unable to see where any freedom of information issue is involved. The position of the National Park Service on the Bridge and Marble Canyon Dams was fully presented and carefully weighed when the matter was before the Department for consideration and is set forth in full in the report that went to the President and later to the Congress. That is a public document, available to all who request access to it, and there has been no attempt whatever to suppress it.

By the same token, no official or employee of this Department has at any time been instructed to withhold *information or* to refuse to answer questions on the subject of a *factual* nature.

For obvious reasons this is, and must always be, the permanent policy of this, or any other, Administration.

Now let us discuss you specific complaints and the controversy surrounding them. After the Supreme Court handed down its decision in *Arizona* v. *California* in June of 1963, the Interior Department developed its Southwest Water Plan for presentation to the Congress. All affected bureaus within the Department—including the Park Service, of course—had a full and unfettered opportunity to present their position to the Secretariat on all of the conservation issues raised by this plan.

After a thorough and painstaking analysis of all of the arguments and policy alternatives, I made a final decision for the department on January 22, 1964 and recommended that the Pacific Southwest Plan, including both Bridge and Marble Canyon dams, be authorized for construction. My letter to the President of February 14, 1964, as a part of the Department's Pacific Southwest Water Plan report. That report also includes as an appendix the full report of the National Park Service. The Southwest Water Plan report and its appendices were transmitted to Congress in April of 1964 and have been public documents open to scrutiny since that date.

In due course, Acting Director Stratton and Director Hartzog of the National Park Service sent out memoranda (copies attached) pointing out that the Department's decision had been made, and reminding the top policy officials of the bureau of the traditional policy to support the ultimate decision of the Department.

With the convening of the 89th Congress, the Department's decision was reviewed, and its recommendations were renewed. Thereafter, on May 10, 1965, in a report to the Congress, the Bureau of the Budget formulated and announced the Administration's final position on the Pacific Southwest Plan. For our purposes, the pertinent provisions of the Budget Bureau letter are the following:

"The Bureau of the Budget does not believe it necessary to authorize both Bridge Canyon and Marble Canyon dams at this time. Instead, we believe that the Bridge Canyon Dam should be deferred for later consideration. . . .

"[A] national commission should review the proposal to build a dam at the Bridge Canyon site including the effect of the construction of such a dam upon the scenic value of the river. Pending the completion of such a study and a congressional decision on this matter, it would be appropriate for the Congress to establish a moratorium upon the issuance of a license to any non-Federal entity for the construction of a dam at this site."

Consequently, on May 10, 1965, the Department's position and the Secretary's recommendation were superseded by the position adopted by the Bureau of the Budget on behalf of the Administration.

At the present time, since the Administration favors deferral of the Bridge Canyon dam authorization, it is appropriate for officials of any bureaus or agencies of this department to express their views on this subject. It is

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likewise appropriate for such officials to respond to requests for facts and information within their own competence and the mission of their agencies.

Naturally, my Department's policy, enunciated above, cuts both ways in regard to the conservation controversies. A striking example of the reverse situation was the case of the Canyonlands National Park, upriver on the Colorado. The Department first proposed such a park in 1961. With the concurrence of the Congress, it became the nation's newest National Park in 1964. In this instance, the park plan encompassed public land and a major dam site on the Colorado River for national park purposes. The Bureau of Land Management expressed vigorously within the Department its own divergent views concerning the area embraced by the proposed national park. Likewise, the Bureau of Reclamation initially had serious reservations concerning the "Junction" dam site which had been earlier identified and reserved below the confluence of the Green and Colorado Rivers within the park area originally recommended. The arguments of bureaus were heard, a decision was made, and thereafter officials of these bureaus supported the decision of the Department.

I hope this letter will clarify for your organization—and for all employees of this Department—the Department's position on matters of this kind. It is most vital that everyone understand the necessary ground rules under which the Federal Government must operate so that orderly debate and discussion of vital conservation issues can be carried out both within and without the government.

Sincerely,

STEWART L. UDALL, *Secretary of the Interior.*

APRIL 22, 1964.

Memorandum

To: All Regional Directors, Field Assistants to the Director, Chief, Field Design Offices.
Members, Director's Executive Committee.

From: Director.

Subject: The Pacific Southwest Water Plan and its relation to units of the National Park System.

Enclosed for your information and guidance are copies of recent correspondence concerning the subject proposal.

The memorandum to the Secretary, dated December 21, 1963, presents our recommendations concerning the plan and develops our reasons therefor.

The memorandum to the Secretary, dated January 27, 1964, clarifies the intent of the Congress, the Bureau and the Service toward water projects in Grand Canyon National Park and Monuments. The letter from Senator Hayden requests the position of the Service relative to the high dam at Bridge Canyon, and the letters signed by Assistant Secretary Carver on March 6, and Secretary Udall on March 27, reply to Senator Hayden and state the official Departmental position. Your attention is directed especially to these letters of reply and the fact that the Department's position is now the Service's position in the matter of Lower Colorado River water projects. We will all be guided accordingly.

A. CLARK STRATTON.

OCTOBER 20, 1965.

Memorandum

To: All Regional Directors and Chiefs, Field Design Offices.

From: Director.

Subject: Southwest Water Plan.

Recently, a complaint was filed with the Office of the Secretary to the effect that one of our employees was passing out literature published by the Sierra Club in opposition to the Bridge Canyon Dam, one of the structures in the Southwest Water Plan. Investigation confirmed this fact. This is a most disturbing development because it indicates that our employees may not understand a proper course of conduct concerning such policy decisions.

The Secretary, as a matter of policy, has approved the Southwest Water Plan, including the Bridge Canyon Dam. Moreover, he has recommended the same to the President.

This Service was given an opportuntiy to make its comments on this project, including the controversial dams. We did so, representing our views in the

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strongest terms possible. Our views were carefully considered. They did not prevail.

Each of you should take appropriate action to see that the employees in your Region are advised that a policy decision in this matter, having been made by the Secretary, it is binding upon them in their official capacities. They may not distribute literature in the areas of the National Park System, or otherwise engage in official conduct that contravenes the Secretary's policy.

GEORGE B. HARTZOG, Jr.

SIERRA CLUB,
San Francisco, May 17, 1966.

HON. STEWART L. UDALL,
Secretary of the Interior,
Washington, D.C.

DEAR MR. SECRETARY: Your reply of May 9 to my telegram of March 30 concerning the need for freedom of information in the Grand Canyon dam controversy is very much appreciated. The subject is a difficult one, but a vital one too, as we know from the care with which you replied. I do not feel, however, that the main issue has been covered, and hope that you will consider the further inquiry which follows.

A review of the chronology will show that a main issue was lost in the shuffle: several cognizant agencies within the government, most of them in Interior, have not been given their day in court in support of the Administration's position. In a sense, what the chronology indicates is that the Secretary, the Reclamation Commissioner, and the Director of the National Park Service have ignored the President's wishes. These conclusions are implied in some of these critical elements in the record:

1. *The Administration's position.* Although the Department advocated both Grand Canyon dams, as your letter of May 9 shows, the Department was overruled. As the Bureau of the Budget's letter of May 10, 1965, makes clear, the decision was to be deferred on Bridge Canyon dam pending a review of the scenic considerations at stake—a review by a commission of distinguished citizens drawn from outside the government. Further, it was stated that there should be a moratorium upon the issuance of a license to any non-Federal entity for dam construction at this site. This was the Administration's position, presumably therefore becoming the Department's position.

2. *The Park Service memo ignored the Administration's position.* Not in "due course," but seven weeks *subsequent* to the Administration's position having been spread upon the record and reiterated in the 1965 hearings, the Park Service memo of October 18, 1965 contravened that position and yours. It prohibited distribution of material that was responsive to Administration policy and which was also in support of what the law requires of the Secretary—protection of the National Park System until Congress decides otherwise.

3. *The Park Service's own position was not transmited to Congress in the usual way.* In the hearings, August 23–September 1, 1965, a colloquy between Chairman Aspinall and Commissioner Dominy shows the uncertain status of the report on the Southwest Water Plan. It had not been transmitted to Congress in the customary way, even though this had been requested. The colloquy states (page 150):

Mr. ASPINALL. Why do you not put it in a volume between two covers, front and back, so we can have it? . . .

Mr. DOMINY. I think that is right, Mr. Chairman. It is just that this has evolved with so many changes since we went along that we have not ever rewritten it and put it in the final package that you describe.

4. *The customary report to Congress still does not exist.* The letter from Assistant Secretary Kenneth Holum to you, together with accompanying documents from other agencies in one volume and Interior agency comments in an Appendix, constitutes the substitute which Chairman Aspinall apparently believed unprecedentedly inadequate for the largest Reclamation project yet proposed. The Appendix includes the Park Service presentation of the Bridge Canyon problem and no more than a passing reference to Marble Gorge. Although the Sierra Club has been an interested party in Colorado River matters for almost two decades, we did not receive a copy of the Appendix in the initial distribution; I myself did not see it until May 11, 1966.

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The Park Service evaluation of Bridge Canyon must have been helpful to the Bureau of the Budget. The treatment of Marble Gorge in the report, however, is inadequate. Since the Park Service field personnel are competent in these maters, there must have been heavy editing. Surely the Budget Bureau and the Congress were deprived of information essential to a sound decision.

5. *Information from other cognizant agencies is not available.* The Bureau of Outdoor Recreation appraisal of recreational benefits—or rather the lack of benefits—should have been presented, with perhaps the Director available for the exposition and for questions. He would not have had to present arguments any more inimical to the Administration's position than Commissioner Dominy did on May 12 and previously. The Director of the Geological Survey, or his representative, should surely have been available to commet upon the serious geological questions that have been raised; someone from the Bureau of Mines could well have commented upon the Nathan Report's information on the cost of mine-mouth coal power, information extremely important to an appraisal of benefit-cost ratios claimed by the Bureau of Reclamation. The impact on Indian tribes could have been explained by the Bureau of Indian Affairs; at least the Bureau experts could well have evaluated the presentation made by attorneys for the Hualapai Indians concerning the $16,000 per-person payment they expected for flowage rights at Bridge Canyon.

But for the present, in the belief that the National Park Service should be the leading agency in defense of Grand Canyon, I would focus only on what went wrong and seems obviously to require correction.

As my April 29 letter stated, "I am convinced that nothing you have done, and nothing else you are hoping to do for conservation, can offset the damage that will ensue if you let Grand Canyon go down the drain, and with it everything that has meaning in the National Park idea."

In short, the Interior agencies that should be heard in support of the Administration's position are silent. Only the Bureau of Reclamation is heard—and is negating the Administration's position as it speaks.

6. *Information: Discipline versus freedom.* The broad question of what the people's government ought to let the people know when national security is not involved, and what it cannot afford to disclose is still the big issue. That issue is not within the Sierra Club's purview except when scenic resources are jeopardized by secrecy. Surely every opponent to a move cannot be free to drag feet. Nor should self-servers be allowed always to loiter in the center of the stage. It will never be easy enough to separate opinion from fact because people always have opinions about which facts are comfortable or convenient for their purposes.

One thing that would always seem vital, in case of doubt, is to take every possible step to present full evidence in support of irreplaceable things like Grand Canyon before we take irreversible steps to impair them.

I don't envy you your responsibility, nor doubt your ability to cope with it.

Sincerely,

DAVID BROWER,
Executive Director.

P.S.—Congressman Morris Udall placed your letter of May 9 in the hearing Record on May 13. I wished you to see this letter before I submitted your letter and my response, which I am now sending in. Your opening line, as I told Oren Beatty, should read March 30, not April 30.—D.B.

Mr. UDALL. You can understand that within a large department you can only have one voice on matters of great policy. You would not expect the Secretary of Defense when he determines a matter of armament to have a congressional committee calling on the generals and everyone in the department who might have other views. You must have one voice speaking for the department on major matters.

Mr. BROWER. Certainly, I do understand this. I point out that our greatest concern was that when the administration had already taken a position to defer Bridge Canyon Dam, the Park Service felt constrained not to put in evidence that would support the administration's position while the Bureau of Reclamation was free to go on putting in evidence adverse to the administration's position.

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Mr. UDALL. I would certainly agree that any factual government information that is important ought not to be suppressed. And the Secretary makes an effort to do this, but he draws a difference between that and any effort within the department to counter the policy of the department when the department and the adminisraion esablishes a position. You cannot have the head of a department and certainly the head of a bureau saying that it is good in appearing before the Congress and other people in the department running around talking to people and saying that it is a bad project and that it should be defeated. You can appreciate this, I am sure.

Mr. BROWER. Yes, I do. I want to make it perfectly clear that I have been a very stanch admirer of Secretary Udall, and I regret that we have this difference at this time, but I certainly appreciate also that it is a very large department and it is beyond human capability to keep track of what is going on in so large a department. I hope that we come out of this good friends. Things are strained a little at the moment.

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mation I have from Mr. Dominy and from private utilities in our area is that if you go out and buy this pumping power you would be talking in terms of system costs at 5 or 6 mills.

Do you have any real reason to believe that the Government could go out and buy 3-mill power on firm basis; not standby power, but regular power?

Mr. INGRAM. We are talking about my best case. That is my best case.

Mr. UDALL. Your best case is not going to happen.

Mr. INGRAM. Let me first of all say this: I thank you very much, because I was worried a little bit about this point and you have enlarged upon it. And if you have enlarged your canal, this helps a great deal, because you can get the extra 100,000 acre-feet down there if you want to buy it.

The second point is that with a larger canal, larger ponds, the whole system being increased to handle this amount, you can take advantage of offpeaks and dumped power—you can look around for your best deal. That is what all electric utilities do.

Mr. Dominy is the expert in the field and Mr. Dominy says that he will have to pay for pump power at 5 mills. It troubles me a little bit, because the Imperial District buys pump power from the Arizona Service Co. at 3 mills per kilowatt. Mr. Skinner of the Metropolitan District has testified, not before this committee, that they are buying offpeak power from Glen Canyon Dam at 3 mills per kilowatt-hour.

The West Associates wrote a letter to the State Department of California Resources and said that they would be willing to sell power to pump water over the Tehachapi, which is a 3,000-foot lift, at 3 mills per kilowatt-hour. That was not a contract, but it was a letter of some kind. And the State department of water resources said that they could do it more cheaply by building their own nuclear reactor. These things are only bits and pieces.

I do not claim that Mr. Dominy can do it for 3 mills. I say that if he cannot I do not think that the Bureau of Reclamation are very good businessmen.

Mr. UDALL. All right. I wanted to get your comments in the record on that point.

In your best case, what are the total accumulations to the development fund?

Mr. INGRAM. The total accumulations are shown. The best case is $807 million.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Burton of Utah?

Mr. BURTON of Utah. I certainly respect your opposition, because I think that the Sierra Club probably knows as much about the project in my State which, unfortunately, was named Echo Park. If the people in Utah continue to exercise the same keen judgment and keep me here for a few more years, I will trot out Echo Park with a new name on it. We might call it "Chief Washiki" or even "Hualapai Dam." It might pass then.

Mr. SAYLOR. I want to say that the people of Utah do not hold anything against me. At one time they blamed me for not letting Echo Dam be built. Now I see that they are blaming somebody else.

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Mr. BURTON of Utah. That's because you have been most helpful to Utah the past 3 or 4 years. One of the problems that I have with the Sierra Club is that I think you gentlemen always overstate your case—I think that hurts the club—I do not think that it is good for your cause. This is what I think you have done on page 21; if you would just take your statement, Mr. Brower, and look to page 21, you come to the conclusion that former Senator Goldwater was against this whole project which, of course, he is not. I think that in fairness to him you should have said what his position is.

In view of the earlier rulings today on repetitious matters, Mr. Chairman, I would like permission to read two paragraphs from the statement of Senator Goldwater, that he gave this committee when he was here in August.

Mr. ROGERS of Texas. You have the unanimous consent to do it. You can read it.

Mr. BURTON of Utah (reading):

In this regard, I stress the importance of the construction of either of the Bridge Canyon dams. As will be proven, this structure enhances the feasibility of the development of the Colorado River Basin and contrary to much unfair and uninformed propaganda, does not violate the grandeur on the lower gorge of the park or the monument, but will open an area of unmatched scenic value to the visitor of limited financial means rather than reserving it for the privileged few who have sufficient funds to pay for expensive passage there. I know more surely of this probably than anyone attending the hearings, for I have twice in my life made the passage by boat through the entire length of the Grand Canyon on the Colorado. The most recent trip was in July of this year.

I want to lay particular stress to this point, Mr. Chairman and members of the committee. I recall the objections to the construction of Glen Canyon Dam, and had I looked on this in a selfish way and remembered the over six times that I traveled through that beautiful canyon, it would have been quite easy for me to have voted against it. But I think since the time that it was completed and the lake is now filling, the hundreds of thousands of people who are visiting there, seeing sights that they could never see except by an expensive journey down the river, justifies the construction of it.

That is Senator Goldwater's position.

I read the Sierra Club Bulletin, too, from time to time. Here is another example where you blatantly overstated your case. I am quoting from page 5 of the current May issue. The last paragraph of an article, Mr. Chairman, entitled "Other Arguments Against Dams in Grand Canyon." If our colleagues from Arizona and California have not read this, I think that they will be very interested in it [reads:]

The Bridge Canyon and Marble Gorge Canyon Dams are not necessary in any respect save possibly one—to remedy a deficiency of imagination and enterprise on the part of politicians representing Arizona and California in the Congress of the United States. After many years of bitter dispute, they made a deal at the Grand Canyon's expense. California's delegation sticks to it because it committed itself to do so; Arizona's delegation, because it does not trust the rest of the country to help it find a more acceptable way out of its water difficulties. This bankruptcy of statesmanship can cost us the canyon. If that happens, citizens who keep their peace must share the blame with politicians who kept their promises to each other—and in so doing, killed a priceless part of our heritage.

Now on page 5, Mr. Brower, right above that article, is a quotation from Secretary Udall which I do not have time to read. If you will just look at this quotation and read it, and look at the article under it, it would lead one to believe that the Secretary—that is, the present Secretary of the Interior—is against this whole project. Is that the case?

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Mr. BROWER. He is against Bridge Canyon Dam. He is for deferring it. That is the administration's position which he supports.

Mr. BURTON of Utah. You can have the remaining time I have left to comment on what I have said.

Mr. BROWER. I have read the article by Senator Goldwater. Many of the press were at the Reader's Digest Grand Canyon workshop, and if you will check with them I am sure that you will find that this is a fair report. Goldwater is for Bridge Canyon Dam. He is against the Marble Canyon Dam and hopes some way will be found to get the project through without it. He is particularly against the proposed diversion. This is perfectly clear. He made it quite clear. His remarks at that Grand Canyon workshop was that, if he had to choose between Marble and people, he had to choose in favor of people. If those were the alternatives, certainly I could understand his making that choice. I think that we have demonstrated that these are not the alternatives.

So far as the juxtaposition of the quote from Secretary Udall and other arguments is concerned, I would point out that the quotation from Secretary Udall is in juxtaposition with the paragraph on the page facing it, which omits letters as a device to show how much of the Grand Canyon is excluded from the national park and monument. I think that you will find, too, it is amusing, but——

Mr. ROGERS of Texas. The gentleman's time has expired.

Mr. BURTON of Utah. I would like to thank you for the copy of your Grand Canyon book, Mr. Brower.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. You have been in the committee room, I understand, for the greater part of the week; is that correct?

Mr. BROWER. My feet are flatter than they were.

Mr. FOLEY. And you have had an opportunity to hear the other witnesses testifying on this project?

Mr. BROWER. I have heard practically all of the testimony this time.

Mr. FOLEY. Are there any comments that you would like to make, and the other gentlemen with you, on the testimony that you have heard this week regarding this?

Mr. BROWER. I will make just one quick comment, and then pass the ball over. My own thought is that the choice has not been clear enough to the various advocates of this project. They sought to get water to Arizona, and thought that to have water they had to have Grand Canyon dams. This, I think, is the conclusion of both the Arizona and the California delegation, most of whom are on the bill. We are trying our best to demonstrate that this is not necessary at all.

I have made it clear in the statement—I made it clear all the way through my appearance here—that we are not concerned, even though the Sierra Club started in California, about California's water needs. We do not want people to go without water. We are concerned about other things, however. We are concerned that Grand Canyon, the most important, perhaps, of all of our national parks, should be unimpaired. We believe that it can be. We think that it is not necessary to put hydroelectric dams in the Grand Canyon in order to get water to Arizona. We are doing the best we can to show that it is not a choice between water for Arizona and Grand Canyon, but to have both—to have a more imaginative plan.

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That is all I have to say. Do you have anything to add, Mr. Ingram?

Mr. INGRAM. Well, there has been a great deal of discussion about studies and investigations for a solution to Arizona's water problems. Since the particular projects which are being authorized do not require these two dams, the dams would be better considered as a part of the overall investigation of future methods of solving the water problem.

Mr. FOLEY. Do you have anything to add, Mr. Nash?

Mr. NASH. I have not been able to attend most of the sessions. If I may, I would like to make a comment about a part of the Sierra Club Bulletin that was referred to by Congressman Burton of Utah. That is, the part that he read. I would just like to say that I was conscious of the fact that this would be read by some Congressmen when I wrote it. I am not embarrassed to have it read here. I stand fully behind it. I believe every word that I said. There is no physical or engineering necessity for these dams. There is no financial necessity for these dams. There is only a political pseudonecessity to get water to Arizona by this device. I remain convinced that there is no other kind of necessity involved here.

Mr. FOLEY. I will reserve the balance of my time.

Mr. ROGERS of Texas. The gentleman has 1 minute remaining.

Mr. Reinecke?

Mr. REINECKE. Mr. Ingram, in your chart for the best case, where you have 100,000 acre-feet, did you deduct from the revenues of that sale the cost of the pumping of the water?

Mr. INGRAM. That does not reflect that. I did not take the 100,000 acre-feet and multiply it. I reduced it.

Mr. REINECKE. Yesterday Mr. Dominy indicated that without Marble or Bridge Canyons that he felt it might be necessary to raise the cost of the water to help pay for the pumping costs which was something that the Reclamation Department—or Bureau—has not done before. Does this include the provision that such higher costs must be paid for the pumping?

Mr. INGRAM. In all cases I have used the Bureau's prices for water, $50 per acre-foot.

Mr. REINECKE. How about the cost of the pumping—you mentioned 5 mills in your best case and 3 mills in your worst case.

Mr. INGRAM. Right.

Mr. REINECKE. Is that 2-mill differential enough to justify, in your opinion, at least, what Mr. Dominy referred to the other day that they may have to charge more for water to offset the cost of pumping?

Mr. INGRAM. No. The chart that I prepared of the net operating revenues, taken in juxtaposition to the payout chart, shows this can actually be taken care of under the revenues obtained.

Mr. REINSCKE. I would like to ask of the staff whether we are entitled to use the money that we have to pay out from the other lower Colorado River projects, to apply it to irrigation in the case of the central Arizona project.

Mr. ROGERS of Texas. Very well.

Mr. ASPINALL. The money shall go to the General Treasury.

Mr. INGRAM. Can I comment on that? It is in section 403(e)(1) of the sections of the present legislation, of the bill before you.

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Mr. REINECKE. It is referred to. At the present time it is not done.

Mr. INGRAM. In the table, the Southwest water plan, which is not presented, the Bureau of Reclamation did anticipate doing just that.

Mr. REINECKE. I realize that the chart was prepared with either no dams or both dams. In view of the fact that the Department has now recommended against the Bridge Canyon Dam, have you made or are you prepared to make any statement regarding the payout schedule if just Marble Canyon Dam were included?

Mr. INGRAM. We do not know if Marble will produce any money yet—the question I guess you ask is whether it is likely to be a good investment.

Well, the contribution that Marble alone makes to the development fund—and this is a table on page 127 of the last hearings—is $39 million. That is after 53 years, on an investment of $368 million, which is a return of two-tenths of a percent per year. That does not sound like a very good investment. But even if you take Bridge and Marble Canyon Dams together, over 75 years they only accumulate $1.2 billion. That is on an expenditure of $1.2 billion, and that is the return on your investment. It is better. It is 1⅓ percent per year.

Again, it seems reasonable to question whether it is the best investment for $1,200 million.

The point then about Marble that I would make is that it is really not a very good investment. It will not produce very much money toward the development fund.

There is another point, too, which Mr. Carlin will cover. If the methods of benefit-cost analysis are properly applied, as he will show, the benefit-cost ratio of Marble is less than 1 to 1. So it is not even really a proper project.

There are, also, certain risks involved in Marble. There is the question of siltation and its life. The silt records of the Paria River are not very old—they are not more than 14 years old. And we are talking of a period of, well, 85 years from now.

Also we have again to assume that they can sell power at 6 mills per kilowatt-hour over this entire period of time to produce even that $39 million.

Marble is just a bad thing because, the way it is presently set up, if you put Marble by itself it would not even pay itself out. It would cost about $1 million a year. But because they take the revenues from Hoover and use that to pay off Marble, they can say that it pays out. But, really, it is just a case of subsidy by Hoover of Marble Dam.

Mr. REINECKE. I would like to ask one more question of counsel. Yesterday Mr. Udall brought out the point that without either of the two dams, and the revenues from Hoover, Parker, and Davis, would have to be applied to pay off the CAP, thereby depriving California of some of the development funds. I am not personally familiar with the distribution of the development funds. I would like to hear just how that would affect the development funds.

Mr. ROGERS of Texas. Let the Chair say this, that in view of the complexities that would be involved in this schedule, I think probably it would be better if the gentleman would discuss it with counsel in private and put in the record that information. I think that would be more helpful to everybody.

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I think it is too difficult in a situation of this kind to try to do it briefly.

Mr. REINECKE. I will be glad to do that. Thank you.

Mr. ROGERS of Texas. Without objection, when received it will be included in the record at this point.

(The information follows:)

SUMMARY EXPLANATION OF THIS APPLICATION OF BOULDER CANYON PROJECT REVENUES

Section 5 of the Boulder Canyon Project Act (45 Stat. 1057; December 21, 1928) directed the Secretary of the Interior to establish power rates which, along with other revenues accruing under the Act and the reclamation law, would in his judgment cover all operation and maintenance expenses and repay with interest the amount advanced for the project within 50 years.

Section 5 also provides:

"After the repayments to the United States of all money advanced with interest, charges shall be on such basis and the revenues derived therefrom shall be kept in a separate fund to be expended within the Colorado River Basin as may hereafter be prescribed by Congress."

In the absence of such a provision as this, the disposition of net revenues after payout would presumably be governed by the "Hayden-O'Mahoney amendment" to the Interior Department App. Act, 1939 (52 Stat. 291, 318). In this case they would be covered into miscellaneous receipts of the Treasury.

Subsequently, the Congress enacted the Boulder Canyon Project Adjustment Act (54 Stat. 774; July 19, 1940). Section 2 of this Act requires all receipts from the project to be paid in to the Colorado River Dam Fund to be available for—

(a) annual appropriations for operation, maintenance and replacement costs to assure continuous operations;

(b) repayment to the Treasury, with interest, of the advances to the Colorado River Dam Fund for the construction of the project;

(c) payment of $600,000 annually until 1987 to the States of Arizona and Nevada;

(d) transfer of $500,000 annually into a special fund in the Treasury designated the "Colorado River Development Fund."

If, by some catastrophe or unforeseeable cause, the revenues should be insufficient after making provision for operation, maintenance and replacements, the payments to the States of Arizona and Nevada and the transfer to the Colorado River Development Fund are to be proportionately reduced by the Secretary.

The provision dealing with the transfer of funds to the Colorado River Development Fund prescribes the uses of these moneys. For the years of operating ending in 1938, 1939, 1940 appropriations from this funds were authorized only for the continuation and extension of studies of a comprehensive plan for the utilization of the waters of the Colorado River. For the ensuing years up to and including the operating year ending in 1955, appropriations were authorized for investigation and construction of projects in and among the four States of the upper division. And, for the years of operation ending between 1956 and 1987, inclusive, appropriations were authorized for the investigation and construction of projects in the States of both the upper and lower divisions. (A 1948 amendment (62 Stat. 284) provides that the Colorado River Development Fund need not be the exclusive source of funds for these purposes).

Once the project is paid out in accordance with the Boulder Canyon Project Adjustment Act (Sections 1 and 2)—i.e., in 1987 or thereabout—the revenues derived from the project would under present law, presumably be governed by the Boulder Canyon Project Act provision quoted above and be deposited "in a separate fund to be expended within the Colorado River Basin" as the Congress prescribes.

Assuming enactment of H.R. 4671 amended to conform to Committee Print No. 19 (Recommended Revision of H.R. 4671), the $500,000 now available annually from the Colorado River Development Fund for investigations and development would be transferred, under the terms of Section 502, to the Upper Colorado River Basin Fund as reimbursement for expenditures heretofore and hereafter made to meet deficiencies in generation at Hoover Dam during the filling period of the storage units of the Colorado River Storage Project. Any

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deficiency remaining after 1987 would be made up from the Lower Colorado River Basin Fund which would be established by Section 403(a) of the Committee Print No. 19. To this fund would be credited all revenues arising from the facilities authorized under the legislation and, in addition, all Federal revenues, in excess of those necessary for operation, maintenance and replacements at the Boulder Canyon and Parker-Davis projects after payout of these projects has been accomplished. This will, in effect, displace the provision of the Boulder Canyon Project Act referred to above requiring such revenues to be placed in a separate fund to be expended within the Colorado River Basin as thereafter prescribed by Congress.

The revenues in the Lower Colorado River Basin Fund are to be available:

(1) to defray the operation, maintenance, and replacements costs of all facilities of the project;

(2) to make whatever payments might be necessary to reimburse the Upper Colorado River Basin Fund, in accordance with section 502; and, after these two items are covered;

(3) to make payments annually to the general fund of the Treasury to return the reimbursable costs of the projects authorized by the bill within the prescribed 50-year payout period;

(4) to pay interest on the investment in interest-bearing features, and

(5) to the extent available, to return the costs incurred for the importation of water to the Colorado River for use below Lee Ferry (not including, however, water which replaces that which is required to meet the requirements of the Mexican Water Treaty) and for the protection of States and areas of origin of such imported water.

Mr. INGRAM. I could comment on this question.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Johnson, did you reserve your time?

Mr. JOHNSON. No.

Mr. ROGERS of Texas. The Chair recognizes Mr. Haley.

Mr. HALEY. I will yield to the gentleman from Colorado.

Mr. ASPINALL. I want to ask Mr. Ingram a question.

Did I understand you to say that the silt will fill up Marble Canyon?

Mr. INGRAM. No; I said that the records that show how much silt is coming down the river are not very old—they do not go back very far.

Mr. ASPINALL. From what river?

Mr. INGRAM. From the Paria. They are 14 years old. They have not taken detailed records longer than that. I am not saying that Marble will fill up quickly. I am just saying that this is a risk.

Mr. ASPINALL. I hope that you have more foundation for your statement than that.

Mr. ROGERS of Texas. Mr. Haley.

Mr. HALEY. I yield my time.

Mr. ROGERS of Texas. Mr. Tunney, do you care to be recognized for 2½ minutes. Did I recognize you?

Mr. TUNNEY. Yes.

Mr. ROGERS of Texas. Mr. Saylor, did you reserve your time?

Mr. SAYLOR. Yes, sir.

Mr. ROGERS of Texas. The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. I just want to say that I would like to commend my colleague from Kansas, Mr. Skubitz, for the statement he made. I take it from the statement that with a bill of the magnitude and of the size that we have before us now, with the changes that will be

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made, this committee should have the advantage of all of the testimony from everybody who is interested, pro and con. I will reserve the balance of my time.

Mr. ROGERS of Texas. Mr. Johnson, did you reserve your time?

Mr. JOHNSON. No; I have no further time.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. You are all employed by Sierra Clubs?

Mr. BROWER. Yes.

Mr. HOSMER. The mathematician seems not to be aware of where the water comes from that is going to Marble Canyon Dam. It is already desilted by Lake Powell.

Mr. INGRAM. Let me say, first of all, that the Paria siltation dam will not be at the mouth of the Paria Canyon. As you know, it is some distance up the canyon. The land between Glen Canyon and Marble Canyon—half of that land drains into the Paria itself. Consequently, there is a good deal of land which is——

Mr. HOSMER. I though that you were talking about Pikes Peak and at some time one might have this develop into a new one.

Mr. BROWER. May I——

Mr. UDALL. Will you yield?

Mr. HOSMER. Yes.

Mr. UDALL. The bill has a provision for the Paria silt control reservoir above where it dumps into the Colorado River.

Mr. BROWER. May I respond, Mr. Hosmer?

Mr. HOSMER. In a moment. I do want to get to this before my 2½ minutes expire.

The sheet that you gentlemen have on the economics, of course, goes up to the year 2025 only and disregards the cost to the Nation in one way or another of providing the power that will not come from these unbuilt dams that will have to be supplied to take care of the needs of the area. And, also, it disregards the fact that this plan is carefully tailored for the future development on the river. You seem to assume that some of these irrigation projects that are here will come into being.

The interests of the United States of America can only be served by the importation of water into this area and this must be financed somehow.

I reserve the balance of my time.

Mr. HALEY. (presiding). Thank you.

Mr. BROWER. Could I respond just on that silt question?

Mr. HOSMER. All right.

Mr. BROWER. On page 14 of my statement, I have reference to that. I inquired into——

Mr. HOSMER. Are you going to repeat your statement—is this repetition?

Mr. BROWER. No; this is new to the committee because the Bureau has not given this information.

Mr. HOSMER. The statement——

Mr. BROWER. There is an estimate from the best figures we have available at the moment of what the probable silt life of Bridge Canyon and Marble Canyon is.

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Mr. HOSMER. You are not going to make any guess on any of that, are you?

Mr. BROWER. Beg pardon?

Mr. HOSMER. Did your companion not say that there was not enough information at the present time to make any reasonable estimate on that, in any way?

Mr. BROWER. He said that there is a 14-year record of the flow in the Paria Basin—that does not mean that we do not have other records that the Bureau has put together before. My estimate comes from that and it is a very rough one, that the Marble and Bridge Reservoirs could be filled with silt in 70 years without the Paria and other silt-retention reservoirs, and 50 years longer with them.

Mr. HOSMER. Have you any estimates at all, then?

Mr. BROWER. Beg pardon?

Mr. HOSMER. Have you any estimates of what the life of these dams are, with silt control?

Mr. BROWER. I said that would add 50 years if you built those.

Mr. HOSMER. About 150 years?

Mr. BROWER. 120 years in total if you are willing to extrapolate from the meager records of what the siltation rate is.

Mr. HOSMER. Do you know how much life Hoover and Glen have beyond 100 years?

Mr. BROWER. Hoover and Glen?

Mr. HOSMER. They have a silting problem. I think that they were all designed on a 100-year basis.

Mr. HALEY. The time of the gentleman has expired.

The Chair recognizes the gentleman from Colorado.

Mr. ASPINALL. Mr. Brower, in order to bring our records up to date, I would like to know how many members there are of the Sierra Club, or were on May 1, 1966?

Mr. BROWER. On May 1, 1966, 38,000, plus or minus a few—39,000 at the end of the month.

Mr. ASPINALL. How much money have you allocated in your club to the Lower Colorado River project as proposed in H.R. 4671 since January 1965? If you do not have that with you, we will receive it from you for the record.

Mr. BROWER. I will be glad to supply that.

Mr. HALEY. Without objection, it is so ordered and will be made a part of the record at this point.

(When received the information will be placed in the committee files.)

Mr. HOSMER. Will you yield?

Mr. ASPINALL. Yes.

Mr. HOSMER. I think there are several other subsidiary organizations. I do not know who all are involved. Maybe Mr. Brower could bring in all of his confederated groups and furnish that information to the committee, and it might give us a better picture.

Mr. UDALL. Will you yield at that point?

Mr. ASPINALL. Yes.

Mr. UDALL. The record of the August 1965 hearings has a tabulation of the membership of all these organizations.

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Mr. ASPINALL. Just to bring it up to date, what the Sierra Club consists of. I recognize that there are subsidiary organizations. Thank you very much.

Mr. HALEY. Thank you very much, gentlemen, for your testimony.

Mr. FOLEY. I reserved 1 minute of my time.

Mr. HALEY. You will then be recognized for that.

Mr. FOLEY. Do you want to further comment on the allocation of the revenues?

Mr. INGRAM. Just to make the point that I did not make this allocation, I used the Bureau of Reclamation figures. I only did what they did. They are the ones that took the Hoover-Parker-Davis money away from California and applied it to Marble and Bridge Canyons.

I took the money that they applied to the dams to make them pay out, since Marble does not pay out by itself, and I applied it to the central Arizona project.

Mr. SAYLOR. Will you yield?

Mr. FOLEY. I yield.

Mr. SAYLOR. Our counsel gave me the revenues available from the Hoover project power system and they tallied to the penny with the statement that has just been made. In the year 2025, with the worst figures that you can figure, you have $316 million. And after you have paid for all of the irrigation.

Mr. HALEY. The gentleman's time has expired.

Thank you very much, gentlemen.

Mr. BROWER. We thank you.

Mr. HALEY. The next witness is Mr. Alan P. Carlin, economist.

Mr. HOSMER. Mr. Chairman, I renew my objection to his testimony on the same grounds heretofore stated to the previous testimony; namely, because it is repetitious and not within the scope of the testimony of the witnesses who have testified before this committee when the hearings began in accordance with the statement of the Chair.

Mr. HALEY. May the Chair state, with reference to the gentleman who is before you, that I think that, perhaps, the first three pages of the statement are in order. And running over this very hurriedly, I doubt if some of the rest of it is, but in order for the gentleman to proceed, he may make the first three pages of his statement for the record.

We will ask the staff of the committee to go over it to see what is proper, and that will be included in the record when so determined.

The gentleman may proceed to make his statement as indicated.

STATEMENT OF ALAN CARLIN, ECONOMIST

Mr. CARLIN. Mr. Chairman and members of the committee, I would like to state, and to make it absolutely clear, that it will not be possible to make clear to the readers of the record how I arrived at the figures and the conclusions stated in the first three pages without the entire remaining part of my statement.

I should like to point out, if I may, that this statement represents approximately 3 months work by both myself and my colleague. It is entirely new.

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Mr. HALEY. May I say to the witness that if the Chair finds that it is new material, why, it will be included—rather, if the staff so finds— that it is new material, it will be included in the record.

The gentleman has the first three pages here which he can read if he wants to do so, and you can comment on the balance.

Mr. CARLIN. Would it then be possible to read the entire statement?

Mr. HALEY. It is the Chair's view that the first three pages of your statement are pertinent.

Mr. CARLIN. The first three pages make, among other things, the point that Bridge Canyon is not economically justified. The complete documentation for that appears on the second or third page from the end of the statement, which, in turn, refers to numbers which appear in our basic paper, which appears in the middle of the paper.

Mr. ASPINALL. If my colleague will permit me—Mr. Carlin, you know the rules of the committee, do you not? The rules of the committee state that you should have your statement in the committee's hands within 24 hours of the meeting. You have complied with that?

Mr. CARLIN. Yes, sir.

Mr. ASPINALL. You have 5 minutes now in order to make your statement.

We wish to have you make your statement. If you have more than you can cover in 5 minutes, we usually permit more time for that.

You have permission now granted to read your statement which is pertinent and new material, and all that is pertinent and new material will go into the record. And if it is not pertinent and new material, we will leave out that part.

You can testify here before us at the present time orally and present the whole thing.

Mr. CARLIN. Thank you, sir.

I would like to attempt to summarize all of this and do it as briefly as I can with the help of some charts that I have prepared, and to make it absolutely clear that the complete documentation for every statement and every number is contained in my whole statement as submitted to the committee.

Mr. HALEY. The gentleman may proceed.

Mr. CARLIN. I have made a few editorial changes in the copy of the statement as presented to the committee. I will leave a copy of my final record statement with the staff. In addition, I should like to make two somewhat more substantive changes as follows:

First, the fifth sentence on page 2 should read as follows: "Or to put it another way, the effect of building the project would be to decrease total national income below what it would have been without the project."

The second paragraph on page 5 of the new material at the end of the statement should be replaced by two paragraphs.

The second of these two new paragraphs is plainly technical in that it explains the assumptions made; therefore, I will attempt to save time by reading only the first of these two paragraphs. But I request that both be included in the record.

This new first paragraph should read as follows:

Before leaving the Marble Gorge project, it is worth examining one more comparison with the nuclear alternative we have discussed. My colleague, Dr. Hoehn, has developed some figures on the cash-register value of Marble Gorge versus our 600 megawatt nuclear alternative that demonstrate that the nuclear plant would be far superior to Marble as a revenue producer. Over a 50-year

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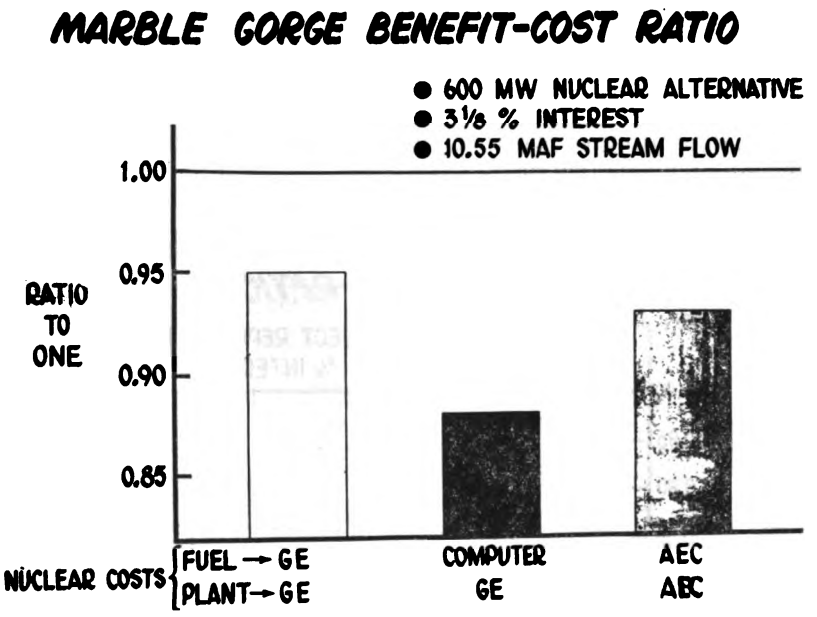
period a nuclear alternative would show a profit of $454 million versus a loss of $11 million for Marble. Over 70 years, the cumulative profits are $693 million versus $190 million. And over 100 years, $1,052 million verus $491 million.

I would now like to proceed to my summary statement.

My statement outlines my qualifications in economics and those of my colleague in this work, Dr. William Hoehn.

I have made detailed studies of the Marble Canyon cost-benefit figures and have found the Bureau's analysis wanting. They have not shown the lowest-cost alternative and have, apparently, used incorrect procedures.

CHART I



Part of this can be explained: Nuclear power costs have been decreasing very rapidly. As shown here on chart I, where a 600-megawatt nuclear alternative in the Marble Canyon project is used to determine power benefits from the project, the benefit-cost ratio is at most 0.95 to 1 at the Bureau's interest rates of 31.8 percent. This assumes that the alternative is used to generate peaking power with exactly the same load factor as the project.

At higher interest rates, the benefit-cost ratio is even lower.

The first and highest bar on this chart is based on a recent General Electric Co. price list. The recent General Electric and other bids for nuclear plants have, in fact, averaged about 10 percent less than the costs I have used.

We expect fuel costs to be less in the early 1970's when the Marble project would be completed and the prices guaranteed by General Electric. We have, therefore, computed our own fuel costs which would imply an even lower benefit-cost ratio, as shown here in the second bar on the chart.

I might add that in the last week we have made some new calculations using a 550-megawatt nuclear alternative to Marble. This would

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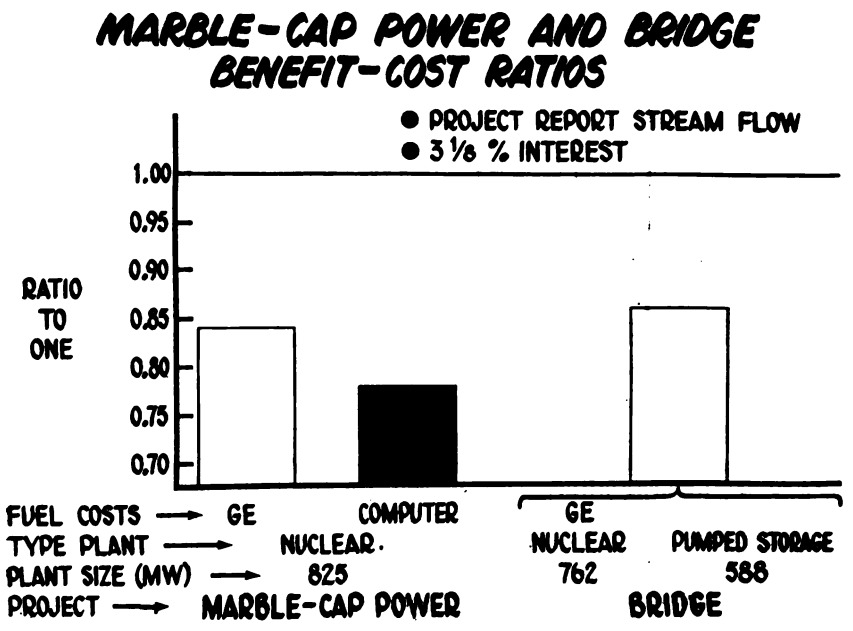
be entirely adequate to furnish the same power to the load centers minus transmission losses. Using the smaller plant, we find a benefit-cost ratio of 0.91 to 1 as compared to the 0.95 to 1 shown in the first bar of the chart.

If, instead of General Electric's prices, you prefer to use the Atomic Energy Commission's nuclear cost figures specifically developed as an alternative to this project, we have computed a benefit-cost ratio of 0.93 to 1, as shown in the third bar. I might add that these Atomic Energy Commission costs are taken from the study that Mr. Udall presented to the committee yesterday.

The particular boundaries for the Marble Gorge project chosen by the Bureau seem particularly suited to justifying their project, rather than our alternative. If the baseload power requirements of the central Arizona project are added to the planned peaking capacity of the Marble project, the combined Marble-CAP has a benefit-cost ratio of 0.78 to 0.84 to 1, as shown here in the first two bars on chart No. II, depending on whether you use General Electric fuel costs or our computer code fuel costs.

CHART II



Finally, we have done some benefit-cost calculations for the proposed Bridge Canyon project. This time the lowest cost alternative we could find was a combination nuclear and pumped storage plant. Using GE nuclear costs, we find a benefit-cost ratio of only 0.86 to 1, as shown in the third bar on the chart; once again, this is less than the 1-to-1 ratio that has always been the minimum criterion for economically sound projects.

We have, also, made some computations on the effect of lower streamflows on the Marble benefit-cost ratio. These are shown here on chart III. It will be seen that the ratio rapidly declines still further *from its already* economically unsound level.

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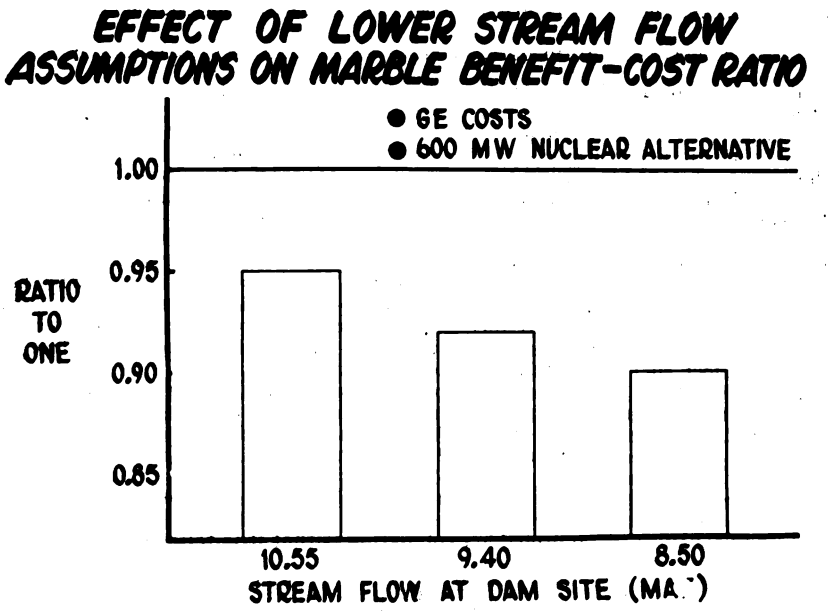
CHART III



In summary, we find that nuclear and combination nuclear and pumped storage plants provide lower cost alternatives to the Bridge and Marble projects, and that the projects are therefore not economically justified. We have made a deliberate attempt in our calculations to lean over backward to favor the projects. Wherever possible we have used the Bureau's own figures. I will be happy to go into what some of these concessions have been if the committee is interested.

Mr. HALEY. Does that complete your statement?

Mr. CARLIN. Yes, it does, sir.

(The complete statement of Mr. Carlin follows:)

ECONOMIC FEASIBILITY OF THE PROPOSED MARBLE AND BRIDGE CANYON PROJECTS

(By Alan P. Carlin, Economist)

Mr. Chairman and members of the Committee. I am a resident of Santa Monica, California, and come before you as a private citizen not representing any organization. Since your hearings last August one of my colleagues, Dr. William E. Hoehn, and I have made detailed studies of the economic justification for the proposed Marble and Bridge Canyon Projects and wish to present our findings to the Committee. We have not received financial compensation in any form for our work. My qualifications in the field of economics include a doctorate from the Massachusetts Institute of Technology and experience in project analysis, particularly in the water, power, and transportation fields. Mr. Hoehn holds a doctorate in economics from Northwestern University and is engaged in research on the nuclear power industry. Both Dr. Hoehn and I currently hold the position of Economist with The RAND Corporation, Santa Monica, California.

These hearings are particularly concerned with the effect that the proposed additional dams in the Upper Colorado Basin would have on the stream flow in the Lower Basin. To illustrate the effects of such changes in stream flow, we have computed the effects of smaller stream flows on the economic feasibility of the proposed Lower Basin dams at Marble Gorge and Bridge Canyon. These computations have reinforced the findings of an earlier analysis completed in

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February 1966, that the Marble Gorge Project is not economically justified. Since these new calculations are derived by revising our earlier analysis to take account of smaller stream flows, it is best to begin by discussing our basic study.

BENEFIT-COST RATIO OF LESS THAN ONE-TO-ONE IS DEMONSTRATED

This study, by Dr. Hoehn and myself, shows that a nuclear alternative located at a load center would be a lower cost alternative for generating peaking power than the Marble Gorge Project. Even when the other benefits claimed by the Bureau are added to the cost of the nuclear alternative (which is taken to be the value of the benefits from power generated by the Project), the total benefits from the Project to the nation as a whole are less than its total costs. In economic parlance, this is to say that the benefit-cost ratio is less than one-to-one. In other words, no matter what one may think about the effects of the Project on the distribution of income in the country, the total benefits, no matter who receives them, are less than the total costs, no matter who pays them. Or, to put it still another way, the effect of building the Project would be to *decrease* total national income below what it would have been without the Project. It is hardly necessary to point out that the general practice has been to reject such projects as economically unsound.

The costs of the nuclear alternative are based on the conservative quotations given by the General Electric Company in their nuclear price list. Both the nuclear alternative and the Project have been costed using the extraordinarily low rate of interest preferred by the Bureau. At higher and more realistic rates of interest, the Project would look even worse by comparison. The Bureau, which does not wish to consider a nuclear alternative to the Project, despite its lower cost, uses extraordinarily high costs for the thermal alternative it is willing to consider. The probable explanation is that it is following the (theoretically) incorrect practice of costing the alternative at a higher rate of interest than the Project. Another major difference between our study and the Bureau's is that we assume that our nuclear alternative is located at one rather than two load centers. The use of two alternative plants unnecessarily increases the cost of supplying an equivalent amount of electricity.

Nuclear cost figures are also developed using somewhat more optimistic nuclear fuel costs, using an Atomic Energy Commission study of alternatives to the Bridge and Marble Projects, and using a larger alternative plant that would also provide the base-loaded power needed for Central Arizona Project pumping. In each case the benefit-cost ratio is shown to be even lower than for our principal nuclear alternative. With this introduction and summary, I shall next turn to our basic paper itself.

[The basic paper of February 1966]

IS THE MARBLE CANYON PROJECT ECONOMICALLY JUSTIFIED?

(Alan P. Carlin and William E. Hoehn,[1] the Rand Corp., Santa Monica, Calif.)

After many hundreds of pages of testimony[2] and several economic studies,[3] there still appears to be considerable uncertainty as to the economic merits

[1] Any views expressed in this paper are those of the authors. They should not be interpreted as reflecting the views of The RAND Corporation or the official opinion or policy of any of its governmental or private research sponsors. Papers are reproduced by The RAND Corporation as a courtesy to members of its staff.

[2] Most recently in U.S. Congress, House, Committee on Interior and Insular Affairs, *Lower Colorado River Basin Project*, Hearing before Subcommittee, 89th Congress, 1st Session, August 23 to September 1, 1965.

[3] The most important ones available to us are U.S. Department of the Interior, Bureau of Reclamation, *Pacific Southwest Water Plan, Supplemental Information Report on Marble Canyon Project, Arizona*, January 1964; U.S. Atomic Energy Commission, Division of Reactor Development and Technology, Office of Civilian Power, "A Specific Comparison of the Economics of Nuclear Electric Power and Hydro Electric Power—Bridge and Marble Canyon Projects," February 1, 1965; and Alan P. Carlin, "An Economic Reevaluation of the Proposed Marble Canyon Project," Hearing, *op. cit.*, pp. 957–961. Mr. Floyd E. Dominy, Commissioner of the Bureau of Reclamation, has testified (in Hearing, p. 146) that another study, prepared for the Bureau by the Ground Systems Group of the Hughes Aircraft Company, found "that Marble and Bridge Canyon Dams are economically and financially feasible power developments." In fact, however, the report, entitled "Comparative Assessment of Benefits—A Benefits Analysis of Bridge Canyon Dam and Marble Canyon Dam," was not intended to be a cost-benefit analysis of the projects. Although the report does deal with a number of peripheral issues, it will not be treated further in this paper.

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of the controversial proposed Marble Canyon Project on the Colorado River just above Grand Canyon National Park in Arizona. This controversy is of importance not only to the conservationists, who are the principal opponents of the Project, but also to the nuclear power industry since nuclear power provides one of the principal alternatives. Demonstration that such an alternative is preferable to the Project would raise many questions as to the economic justification of other proposed hydroelectric projects, a major competing source of power. The purpose of this paper is to review the earlier studies of the question and to present some new and more refined cost-benefit calculations on the Project.

THE ISSUES

The present status of the argument is that both sides agree that Marble Canyon is not competitive if used for supplying baseloaded power. The Bureau of Reclamation contends that the Project is justified if the power generated is used for peaking purposes, and it is this contention that is to be examined here. This question should be carefully distinguished from whether the Bureau could sell the power generated at a profit if the Project were built. Because Bureau projects carry much lower capital charges than privately financed power projects, it is possible that the Bureau could sell the power at a profit even if the project were not economically justified.

The accepted practice for computing the benefits of a power project is to use the cost of producing the same power by the lowest cost alternative means.[4] Although nuclear power has never been used for peaking purposes, there is no known technical reason why it cannot, and considerable reason to think that it will provide the lowest cost alternative to the Marble Canyon Project. As the Bureau recognizes in its Report,[5] there is little point building the alternative power generation facilities in the Grand Canyon, and considerable economic justification for building them at the load centers. This would avoid the unnecessary expense of transporting the power from the Grand Canyon to the load centers, when it can be generated just as well at the load centers. In order to minimize the costs of the alternative, it is best to build one plant. This could be located in either the Phoenix-Tucson or Los Angeles areas, or wherever else there is sufficient demand for peaking power in the immediate vicinity.

In order to compute the cost of the alternative nuclear plant, the only economically justifiable procedure is to use the same rate of interest as used for the Project.[6] Although there can be and has been considerable debate as to what interest rate should be used in computing the cost of such projects,[7] there can be no doubt that the use of different rates for the Project and the alternative can result in a serious distortion of the results. Although economic theory cannot tell us exactly what the rate is, it does specify that there exists a single equilibrium rate of interest at which the demand and supply for loanable funds of equal risk are in equilibrium. Capital theory does recognize the existence of a risk premium, but if anything the Marble Canyon project, with its much longer assumed pay-out period, contains a greater element of risk than the nuclear alternative.

PREVIOUS STUDIES

With these fundamentals of cost-benefit analysis in mind, it is possible to assess some of the existing economic studies made on the Marble Canyon Project. The Bureau's study, although not very clear on the point, appears to use a higher interest rate for the alternative than for the Project.[8] The alternative examined is "gas-fired steamplants in the Phoenix and Los Angeles areas." At higher interest rates such plants may well be the least expensive alternative, but at the Bureau's three per cent rate nuclear plants appear more attractive.

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[4] Perhaps the best reference is Otto Eckstein, *Water-Resource Development*, Cambridge, Harvard University Press, 1958, pp. 239–245. A more recent reference is A. R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey," *The Economic Journal*, Vol. 75, No. 300, December 1965, pp. 709–710.

[5] Marble Canyon Project Report, *op. cit.*, p. 22.

[6] Eckstein, *op. cit.*, p. 242.

[7] For a summary of and references to much of this debate see B. Sobin, "Some Interest Rate Aspects of Weapon Systems Investment Policy," Research Paper P–171, Institute for Defense Analyses, Weapon Systems Evaluation Division, February 1965.

[8] Marble Canyon Project Report, *op. cit.*, p. 22. The Bureau does not specify what rate it used, but assumes "publicly-owned non-Federal" facilities. It is difficult to account for the Bureau's cost estimates in any other way.

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The AEC study,[9] on the other hand, compares the Project with a nuclear alternative at equal interest rates, but somewhat curiously insists on comparing the Project with a nuclear alternative at the same site. As the Bureau has pointed out, in apparent reference to the AEC study, "* * * the cost of power per kilowatt-hour from a nuclear substitute for the Bridge Canyon facilities would be 70 percent higher than power from Bridge Canyon, and for Marble Canyon the nuclear substitute would produce power at a cost 58 percent higher than from Marble Canyon. These studies were on a comparative basis at-site, neglecting the costs of transmission and water. They were adjusted to account for the difference in plant economic life so that the results are comparable".[10]

What the Bureau neglects to point out is that the study also states that "* * * the cost data apply to generation at the dam site or nuclear plant site and *no* costs are included for transmission. Once again, this is a simplifying assumption which could place the nuclear plant at a relative disadvantage. If transmission and cooling water costs had been included in the comparison, a nuclear alternative could be more economic (in M/KWH) if its transmission and cooling water costs for the particular site location were equal to or less than 33% and 16% of the Marble and Bridge transmission costs, respectively".[11]

Since the construction of the alternative nuclear plant at or near a load center would certainly result in transmission and cooling water costs less than 33 percent of Marble transmission costs, this is a very relevant consideration. It is even more damaging to the Bureau's case when it is considered that their statement implies that they have no disagreement with the AEC's estimates of nuclear costs.

The third study, by one of the authors, concludes that the benefit-cost ratio for the Marble Canyon Project is slightly less than one-to-one at the Bureau's 3 percent rate of interest and progressively less at higher rates. Unlike the other two studies, it assumes a common interest rate and the location of a nuclear alternative at the load center. It uses somewhat more tentative, older (and higher) nuclear costs than those used in this study.

The earlier study has been criticized by the Bureau of Reclamation on two principal grounds:[12]

(1) That the "usual practice" in "Project Benefit Analysis" is to "measure the benefit in terms of the cost of achieving the same result by the most likely alternative means that would exist in the absence of the project"

(2) That "Mr. Carlin has overlooked the cost of transmitting power to the central Arizona pumping plants which is a project function of the Marble Canyon hydro facility." It is worth reviewing these arguments in some detail since the Bureau would presumably make the same objections to the analysis to be presented in the next section.

(1) If the alternative cost principle is to be used for measuring the benefits from power projects, the alternative chosen should be the most economical alternative source rather than "the most likely alternative that would exist in the absence of the project." The problem with the latter phrasing is that it leaves the door wide open to an interpretation such as the Bureau appears to have made in this case that robs the principle of any meaning as an economic criterion for selecting projects and turns it into a question of semantics. The choice of the "most likely alternative" becomes a matter of personal preference. The Bureau appears to favor what it alleges to be the preference of 'the responsible electrical utilities in the area."[13] But it must be remembered that these utilities face very different costs of capital, insurance, and taxes than the Bureau; to accept their judgment (assuming no bias on their part) is to accept a different set of resource

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[9] AEC, *op. cit.*

[10] Letter from N. B. Bennett, Jr., Acting Commissioner, to the Hon. Wayne N. Aspinall, Hearing, *op. cit.*, p. 774.

[11] AEC, *op. cit.*, p. 3.

[12] "Analysis of Mr. Alan P. Carlin's Statement 'An Economic Reevaluation of the Proposed Marble Canyon Project'" (unpublished), pp. 1 and 3. One noteworthy feature of the "Analysis" is that it raises no objections to the costs of the nuclear alternative presented in the earlier study other than item (2).

[13] The Bureau argues (p. 2) that because of continuing investment by utilities in the area in conventional thermal generating plants, "the most likely alternative [to Marble Canyon] would be conventional steam electric generating plants financed, constructed, and operated by non-Federal interest." Such an argument ignores the fact that the Southern California Edison Co. and the San Diego Gas and Electric Co. are now building a 450 mw plant at San Onofre and that the Los Angeles Department of Water and Power is currently awaiting an Atomic Energy Commission permit to build 490 mw nuclear plant in Malibu.

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prices in selecting, and, in this case, even in costing the alternative.[14] Because capital charges are higher for nuclear power plants than for conventional thermal plants, while the opposite is true of fuel costs, one would expect to observe a preference for conventional plants at high interest rates (i.e., current private financing) than at low rates (the Bureau's 3 percent).

(2) The Bureau's position that it is necessary to transmit power from the alternative nuclear plant to the Central Arizona Project pumping plants appears to be in contradiction to the published statements of Commissioner Floyd E. Dominy and Secretary of the Interior Stewart Udall before the House Committee on Interior and Insular Affairs in August 1965 that the Bureau intends to sell Marble Canyon power commercially as peaking power rather than to use it to supply the baseload requirements of the Central Arizona Project.[15] If the Bureau wishes to transform Marble into a baseload facility suitable for supplying the Central Arizona Project, the nuclear alternative will look even better in comparison with Marble Canyon. In brief, the Bureau is trying here to both have its cake and eat it—to claim the benefits from selling Marble power as peaking power while insisting that the alternative plant do what Marble would no longer do (provide baseload power to the Central Arizona Project).

The Bureau recognizes that the "Economic Reevaluation" study is far from dogmatic about locating the nuclear alternative in the Los Angeles area. But, the Bureau says, "if located in central Arizona nearer project water pumping loads, [cooling] water costs could be substantial and electric power transmission costs less."[16] We question that cooling water costs would be larger than the value of the water evaporated by Marble Canyon. Since the latter is not given

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[14] One of the worst features of the Bureau's interpretation of the alternative cost principle is that they apparently feel that it justifies the economically unjustified practice of costing the alternative at a different rate of interest than the Project.

[15] The relevant passage from Hearing, *op. cit.*, pp. 162–163, is as follows:

"Mr. REINECKE. I believe I understood the other day that the predominant use of Marble would be for the pumping power required for the central Arizona project.

"Mr. DOMINY. A good part of the energy out of Marble will be devoted to pumping energy.

"Mr. REINECKE. And also that the pumping cycle would be based on, I believe someone said 11 months a year, 1 month for downtime and repairs, and so forth.

"Mr. DOMINY. Yes, sir.

"Mr. REINECKE. So rather than a peaking load, it is pretty much a steady baseload, is it not?

"Mr. DOMINY. Except that we believe that the proper way to get the maximum revenue from Marble for the basin fund will be to buy baseload steampower or offpeak thermal power and sell Marble as a peaking commodity to the extent that we can work this in and exchange arrangements with the utilities. So we will be looking for the maximum possible use of Marble at peak power values and do our pumping to the extent possible from offpeak thermal power.

"Mr. REINECKE. I was operating on the basis that the Marble would operate just for this pumping and as such, according to the literature supplied again, the pumping requirement is 1,785,835,000 kilowatt-hours, or on an 11-month basis, 225,000 kilowatts. Twenty-four hours a day, based on a 600,000-kilowatt generating plant provides you an operating characteristic of about 37.5 per cent. Does that sound reasonable? Is that in the area that you are anticipating the operation?

"Mr. DOMINY. You have come pretty close. We are now planning Marble for an average load factor of about 35 per cent.

"Mr. REINECKE. Then on that same basis I have calculated the requirement, the water requirement, again looking at a steady baseload and assuming an overall efficiency of 80 per cent, and I find that in order to produce that much power out of Marble, it is going to take 8.1-plus million acre-feet per year. How much does this leave for peaking?

"Mr. DOMINY. Well, as I say, instead of operating at Marble so as to be producing power only as needed at the pumps, we expect to correlate with the power industry to use offpeak power at the pumps to the maximum extent possible and release Marble production for peaking purposes which will be sold at a higher rate.

"Mr. REINECKE. I am not familiar with the power generating industry, now. But it seems that we are building a 600,000-kilowatt generating plant and we are only generating an average of 225,000 kilowatts. Granted that there is the peaking characteristics involved, but isn't it more reasonable to pull the size of this plant down and save the coordinating costs?

"Secretary UDALL. Congressman, may I try to put this in a focus for you that I think will tell you what we really envision.

"The negotiations that we are presently carrying on with the West group, include—and I hope before we get through will include—all the public and private utilities in the entire region. If negotiations work out, it may very well turn out in the end that Glen Canyon might have to be redesigned for peaking and Marble used for peaking because we can produce more revenues that way. If we have a highly integrated system of the type we envision, and this is what the engineers are beginning to study, the cheapest and most efficient way to get pumping power would be out of the entire system in terms of using thermal power for pumping, and in terms of using our hydro facilities as a peaking vehicle for the entire region. This is really the road we think we are headed down, but we won't know all the answers until the studies are completed."

[16] "Analysis * * *," *op. cit.*, p. 3.

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any numerical value in the tables presented in the "Economic Reevaluation" study, we believe that the effect of omitting both costs in the previous study is if anything to bias the conclusions in favor of Marble Canyon.[17]

NEW CALCULATIONS

In order to overcome the limitations of the "Economic Reevaluation" study, we have made some more detailed calculations based on the current General Electric price list.[18] These costs represent in general the maximum estimated price at which GE will now contract to build nuclear power stations on a turn-key basis and to supply nuclear fuel when the plant is finished. They have usually, in fact, offered to build plants for somewhat less when requested to submit bids on specific projects.[19] The interest rate chosen for the analysis is 3⅛ per cent, since the bureau has stated that this is the rate at which benefit-cost analyses should now be performed.[20] Although we, along with most other economists who have examined the problem, regard this rate as much too low,[21] its use gives the greatest possible benefit of doubt to the Project. At higher rates of interest, the Marble Canyon Project would look progressively worse since capital costs are a much larger percentage of Marble Canyon costs.

The results of these calculations are shown in Table 4, column (4). Because the GE fuel costs are higher than those generally expected to prevail in the late 1970s and early 1980s, we have also made some calculations using our own computations of fuel costs. These are presented in column (3) of Table 4. For purposes of comparison, columns (1) and (2) show the comparable figures according to the Bureau of Reclamation and as adapted from the Atomic Energy Commission report mentioned earlier. It should be stressed that only the figure for power benefits (line 1a) comes directly (with only a minor adaption) from the AEC report. The remaining figures in column (2) are Bureau figures with minor adaptations. They are given for comparative purposes rather than to imply any agreement by the AEC with the figures in parentheses or the use made of their numbers.

The major uncertainty with regard to the figures in columns (3) and (4) concerns the underlying figure in line 2b of Table 3. Because nuclear plants have not been and are unlikely to be built as peaking plants in the near future, little information is available on the minimum levels at which they might be operated if they were designed with this in mind. Technical opinion does favor keeping the nuclear reactor and steam system hot between peaks; keeping them hot enough to maintain the generators in a conditions of spinning reserve also somewhat improves the comparability of the nuclear alternative examined here with the proposed Marble Canyon Project. Table 3 assumes that this can be accomplished with 10 percent of the fuel needed for full load operation.

This whole problem of trying to force a nuclear power plant into a peaking mode where it is relatively less efficient while still using it to determine the power "benefits" from Marble Canyon can be solved, however, by expanding the rather arbitrary boundaries of the Marble Canyon Project to include all power to be generated or used by the Lower Colorado River Basin Project except that generated directly as a part of the Central Arizona Project. Nothing illustrates the lack of a meaningful relation between the Central Arizona Project and the Marble Canyon Project quite so much as the fact that the Bureau plans to operate Marble Canyon as a peaking facility (so as to maximize revenue) while the Central Arizona Project needs baseloaded power (where nuclear power is better suited). What the Bureau intends to do is to sell Marble Canyon power as peaking power and buy baseloaded power from commercial sources. This will mean that someone else will have to build baseload facilities of approximately 225 mw to supply the Central Arizona Project. It is entirely feasible, however,

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[17] The basis for this judgment is given in unfavorable assumption 3 and favorable assumption 4 below.

[18] General Electric Co., *Atomic Power Equipment Handbook*, Sections 8801 to 8805.

[19] A case in point is the recently-announced Dresden III reactor of 800 mw. for which the contract price was $79 million (*Wall Street Journal*), January 21, 1966, p. 10); the GE price list gives an estimate of $90.6 million.

[20] See Hearing, *op. cit.*, p. 127.

[21] By way of comparison, one careful study recommends that public water projects such as Marble Canyon should use a discount rate of not less than 10 per cent. See Jack Hirshleifer, James C. DeHaven, and Jerome W. Milliman, *Water Supply: Economics, Technology and Policy*, Chicago, 1960, p. 354.

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to build a larger nuclear plant that would provide *both* 225 mw of baseload and 600 mw of peaking power. Columns (5) and (6) of Table 4 compare this alternative with the Bureau's proposal of building Marble and buying 225 mw of baseload. The comparison is even less favorable for the Bureau's proposed solution and, we believe, more meaningful than columns (3) and (4) are for Marble Canyon by itself. It is worth adding that the Dresden plant near Chicago is already being regularly operated without difficulty over a 55 per cent load change in a semi-peaking mode similar to that assumed to columns (5) and (6).

In summary, the figures developed here suggest that the Marble Canyon Project is not economically justified since a nuclear alternative could generate the same electrical power at a lower cost, especially if the same plant were used to generate the power needs of the Central Arizona Project in addition. In reaching these conclusions it has been necessary to make a number of simplifying assumptions. These assumptions tend to bias the conclusion in both directions, although not seriously, we believe. It is nevertheless worthwhile enumerating the more important of these assumptions.

ASSUMPTIONS UNFAVORABLE TO MARBLE CANYON

1. Equal value of nuclear and hydro power

The calculations made here implicitly assume that one unit of nuclear power is equal in value to one unit of hydroelectric power at the same time of day. This ignores the fact that a hydro plant may be able to respond much more quickly to an emergency need for more power.[22] This quicker response time is not of much value during normal operations, especially in an area such as Southern California and Arizona that already has a larger than average percentage of hydro sources to absorb most of the minor fluctuations. Nuclear response time decrease at higher initial levels so that the 825 mw alternative is better in this respect than the 600 mw.

2. No allowance for additional reserve capacity for nuclear alternatives

The nuclear alternatives examined here include no allowance for the additional reserve capacity that would be required to provide firm power in a system including either of them rather than Marble Canyon. This problem arises because Marble Canyon would consist of four units of 150 mw each rather than a single unit.

3. Exclusion of possible cooling water costs for nuclear alternatives

If a nuclear alternative is located away from the ocean, as would be the case for the 825 mw plant, it would probably be necessary to use substantial quantities of fresh water consumptively for cooling purposes.[23] We estimate that the 600 and 825 mw plants would require about 9,300 and 17,100 acre-feet per year, respectively.[24] These figures are to be compared with the estimated 30,000 acre-feet that would be evaporated annually by Marble Canyon Dam[25] plus 7,800 acre-feet annual evaporation by the additional capacity that produces the power the Bureau plans to purchase for the Central Arizona Project.[26] If the 600 mw nuclear alternatives were located on the Ocean, there would be no significant extra cost for cooling water. If the alternatives were located on the Colorado River, the cooling water losses would be substantially smaller than the Marble Canyon losses. If the alternatives are located in Arizona away from the River, something should be added to the cooling tower losses to account for the cost of transporting the water from the Colorado River. We believe that the higher Marble Canyon losses more than account for these extra transit costs.

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[22] If the plant is not already being used to capacity.

[23] This assumes that it would not be advisable to use either the Colorado River or Central Arizona and Salt River Projects as sources for "flow through" condenser water. Calculations suggest that it would be possible to do so, but that it might lead to an unacceptable rise in water temperatures (especially in the case of the Colorado River) or minute but nevertheless unacceptable radiation hazards (particularly in the case of Central Arizona and Salt River water).

[24] These estimates assume that one pound of cooling water is evaporated for each pound of steam, as suggested by conventional thermal experience. Steam flow is estimated to be about 7.1 and 9.8 million pounds per hour for the 600 and 825 mw plants, respectively.

[25] See favorable assumption 4 below.

[26] The difference between 17,100 acre-feet for the plant that includes such power and the 9,300 acre-feet for the plant that does not.

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ASSUMPTIONS FAVORABLE TO MARBLE CANYON

1. Use of General Electric price list

Use of the GE price list favors Marble Canyon because the list prices are above *current* market prices and because nuclear costs are expected to fall during the next 100 years. Experience suggests that the GE price list overstates current market prices obtained through competitive bidding by at least 5 to 10 per cent. The GE fuel prices used here refer to plants coming into production between 1969 and 1971. Marble Canyon (and therefore its nuclear alternatives) would not be finished before 1973 at the earliest. Nuclear fuel costs can be expected to fall with time. The computer fuel costs take into account the price changes expected through the middle of the 1980s, but assume constant costs thereafter. Nuclear plant costs can also be expected to fall over time. The calculations made here, however, implicitly assume that the costs of hypothetical replacement plants necessary to fill out the assumed 100 year life of the Project are the same as for the initial nuclear plant. In particular, no allowance is made for future replacement by a breeder reactor, for which estimated costs are about half of near term nuclear costs.

2. Constant prices

No price escalation has been assumed in either the Bureau's Marble Canyon costs or in the costing of the nuclear alternative. Since the Bureau's calculations are about two years older than the current GE price list, inflation may have increased Marble Canyon costs more.

3. Use of General Electric data optimized for baseloaded plant

Under this heading, we must consider three separate items: cost of money, plant capacity factor, and mode of operation.

A. Cost of money

If the cost of money is high, it is desirable to design a core with higher specific power (Kw/Kg of fuel) to minimize the fuel inventory. This results in a higher fabrication cost per unit of fuel since the heat transfer surface area must be the same in the smaller core, or other compensating adjustments such as increasing coolant flow rates must be made.

Since increasing specific power increases fuel costs, an optimum design exists between the increasing fabrication cost and the decreasing inventory costs.[27]

Since the GE costs have been optimized on the basis of 5 per cent and 9 per cent rates of interest for fabrication and inventory costs, respectively, merely converting them to the 3⅛ per cent rate of interest understates the reduction in cost to the extent that the lower interest rate favors a lower fabrication cost (lower specific power) and increased inventor costs.

B. Plant capacity factor

The plant capacity factor will become an increasingly important consideration. The early nuclear plants are the lowest incremental cost plants on the utility grid. For this reason they are ordinarily base loaded. In the future however, as more nuclear plants are added to the utility system grids, the designs will need to take into account the fact that a lower overall plant capacity factor will naturally occur. At lower capacity factors the cost attributed to fuel inventory increases and becomes a larger fraction of total fuel cost. At the very low capacity factors of peaking plants the fuel inventory can become over one half of the total fuel cost. In cases such as these the fuel inventory would be held to a minimum by decreasing core size as much as possible. Though unit fabrication costs and reprocessing costs might suffer somewhat, the change in design might be warranted. The effect of plant capacity factor should also be considered in the purchase of present plants.

The core initially optimized for a high capacity factor would not be expected to be optimum over the life of the plant when in later years it operates with lower capacity factors. For this reason a plant which can incorporate

[27] W. J. Doolard and L. E. Strawbridge, "Fuel Management in Large Pressurized Water Reactors," *Nuclear Performance of Power Reactor Cores*, U.S. Atomic Energy Commission, Division of Technical Information, TID–7672 (1963), p. 329.

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smaller future cores, which would be more nearly optimum at lower capacity factors, would be given extra consideration in the evaluation of a plant proposal. In addition to decreasing core size, fissionable material inventory can be reduced in thermal reactors by increasing the moderator to fuel ratio in under moderated cores. This reduces the conversion ratio but is economically justified in plants of lower capacity factors.[28]

Again, since the GE plant is optimized for near-baseloaded operation (80 per ent) while our plants are baesd on 40 and 54 percent, respectively, merely inreasing carrying charges to reflect the longer cycle overstates the cost of operaion at a low capacity factor to the extent the adjustments suggested in the statelent above optimize plant operations for low capacity figures.

C. Mode of operation

It has been common practice to rate the core burnup on the basis of full power capacity with equilibrium fission product poisons. Experience at the Yankee Atomic Electric Co. plant, however, has demonstrated that there are situations where it is economically feasible to extend the core burnup beyond the point at which full rated power can be maintained under equilibrium conditions. Each individual utility must decide whether this action is desirable based upon the incremental decrease in fuel costs for extended burnups at reduced power levels versus the incremental increase in other system operating costs which must supply the replacement power. These factors will vary not only from utility to utility but also as a function of time of year, since replacement power costs vary seasonably.

A corollary of this approach is the consideration of operating the nuclear plant as a peaking plant after it can no longer operate at full load continuously. Due to the xenon decay period, a nuclear plant operating on a 24 hour cycle can operate at full load during peak daily load periods and by tapering off to a lower load each night can maintain the daily capacity to meet full power requirements long after it could no longer do so on a steady state basis. This feature will be very useful in the future when nuclear plants must also be used in a peaking type of operation.[29]

Here we find three separate overstatements of cost. First, the General Elecric fuel cycle cost data are based on the warranted burnup levels; actual burnp will surely be in excess of warranted burnup, by perhaps 25 per cent. Second, he GE figures are based on operation to the point at which rated power can just e maintained with equilibrium xenon and other fission poisions; both Dresden nd Yankee operate beyond these levels, derating plant output (at Dresden, lerating level is 100 thermal megawatts or over 14 per cent; at Yankee, the igure is nearer 35 per cent). The extent to which such derating can be carried ut depends on the cost of replacement power for the difference between rated nd actual power.

Third, since the GE figures are based on a nearly-baseloaded plant while the uclear alternatives discussed here are peaking and fractional-base plus peaking espectively the "corollary" discussed in the quote above is particularly applicable. To the extent that such a mode of operation can meet "full power requirements ong after it could no longer do so on a steady basis," the fuel costs for the nuclear lternatives are overstated.

. Exclusion of Marble Canyon evaporation and seepage losses

There is no dispute as to whether Marble Canyon Dam will increase the evapoation of water from the Colorado River. No allowance for the value of this vater appears to have been made in the Bureau's project report or in this analyis. Evaporation from the proposed reservoir may be as much as 30,000 acreeet per year.[30]

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[28] *Ibid.*, p. 329–330.

[29] *Ibid.*, p. 331.

[30] The Marble Canyon project report indicates that the area of the reservoir surface ould be about 4,000 acres at the normal water elevation (see Drawing 788–D–21). vaporation data collected over a 32 year period at Lee's Ferry, Arizona, suggests that he mean annual evaporation from the reservoir might be about 7.5 feet. See U.S. Department of Commerce, Weather Bureau, Hydrologic Branch, *Mean Monthly and Annual vaporation from Free Water Surface for the United States, Alaska, Hawaii, and West ndies*, Technical Paper No. 13, Washington, July 1950, p. 2. Lee's Ferry is located on he Colorado River about 40 miles north of the damsite and adjacent to the proposed eservoir.

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Although there is considerably more dispute about the matter, there may also be some seepage.[31] A plausible assumption is that the additional seepage resulting from the reservoir exceeds present evaporation from the River. Even more difficult is the question of how to evaluate the economic value of the evaporation losses. If and when Lake Powell is filled,[32] the value of the water will be negligible[33] until such time as the available water is not sufficient to meet all present and authorized uses. This might occur if water flows fall sufficiently short of expectations, the Central Arizona Project is built, or the Upper Basin states use their entire allotment. In that case, the 30,000 acre-feet will come out of the water that would otherwise be used by California, and in particular, the Los Angeles Metropolitan Water District.

The value of the water to the MWD is equal to the additional costs of obtaining it elsewhere. Although there is a large element of sunk costs involved, it is significant that the incremental cost of Feather River water to the MWD has been estimated at upwards of $63 per acre-foot at a 3.5 per cent rate of discount and more at higher rates.[34] Marginal pumping costs for the Colorado River Aqueduct are about $11 per acre-foot. Therefore, in some future years, it is likely that the additional evaporation losses resulting from the proposed Project may be as much as $1.56 million.[35]

5. Exclusion of Marble Canyon's effect on the canyon's natural beauty

No value has been attributed by either the Bureau or us to the impairment of the natural scenic beauty of what is commonly acknowledged to be an unusually scenic Canyon.[36] Although it is difficult to attach an exact monetary value to this cost, it is not negligible, especially considering that the site can never be restored to its present natural state and is one of the few stretches of a major scenic river canyon still in a natural state. The Bureau says that it did not allow for such costs in its study "as there are also arguments to the effect that the beauty of the Canyon will not be affected, or may even be enhanced."[37] This appears to be a minority opinion, however, and that of an interested party.

6. Exclusion of cost of an afterbay structure and continued use of river by boating expeditions

Neither the Bureau nor we have taken into account the cost of preventing the largec urrent surges and variations of flow below the proposed dam.[38] Mr. Floyd E. Dominy has testified that a so-called afterbay structure may be necessary to prevent such variations if the dam iso perated as a peaking plant.[39] Failure to do so would further impair the natural scenic beauty of the Canyon and make boating through the Grand Canyon even more difficult.

Even assuming that such a structure is built, there is some dispute as to whether boating expeditions would still be possible. If they are not, the cost in terms of the producers' and consumers' surplus foregone might be about $120,000 per year.[40]

Any judgment as to the net effect of the assumptions just listed must be a matter of opinion. It is the opinion of the authors that on balance they are favorable to Marble Canyon.

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[31] This possibility has been raised by P. T. Reilly in "Some Recent Observations on Glen Canyon," *Sierra Club Bulletin*, Vol. 50, No. 3, March 1965, pp. 3–4 and by William C. Bradley, as quoted in Hearing, *op. cit.*, p. 784.

[32] If the use of the River's water by the Metropolitan Water District is restricted in order to fill Glen Canyon, the value of the evaporated water is its value to the MWD, as outlined below.

[33] Limited to its value in diluting the salts carried by the River.

[34] Hirshleifer, *op. cit.*, p. 354.

[35] The product of 30,000 acre-feet and $52 per acre-foot.

[36] See Francois Leydet, *Time and the River Flowing: Grand Canyon*, Sierra Club, San Francisco, 1964.

[37] "Analysis * * *," *op. cit.*, p. 4.

[38] Hearing, *op. cit.*, p. 146.

[39] Hearing, *op. cit.*, p. 146.

[40] The Sierra Club has testified (Hearing, *op. cit.*, p. 814) that about 600 people made the trip in 1964. The average price paid was perhaps $350. If the producers' and consumers' surplus is taken as $200 per person, the net cost would be $120,000 per year. This calculation ignores the fact that the boat trips are rapidly increasing in popularity.

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TABLE 1.—*Capital costs of alternative nuclear powerplants located at load center*

[Millions of dollars]

	600 mega-watts	825 mega-watts
1. Nuclear boiler	26.2	33.4
2. Remainder of plant	44.4	56.9
3. Total costs covered under contract with prime contractor	70.6	90.3
4. Additional costs met directly by power producer	10.6	13.5
5. Total	81.2	103.8

NOTES ON LINE

1. (Interpolated) cost of single-cyle, non-reheat, boiling-water, enriched-uranium nuclear boilers designed for 525 mw and 750 mw plants. Based on General Electric Co., *Atomic Power Equipment Handbook*, Section 8802, p. 10 (Sept. 13, 1965). Experience suggests that a 525 mw boiler can provide an adequate steam flow for a 600 mw plant, and that a 750 mw rated boiler can supply steam for an 825 mw plant. The base prices given in the *Handbook* were increased by $10/kw to cover containment costs; these figures represent the estimated cost of the nuclear portion of the plant. Typical stretch ratings experienced or projected are: Dresden, 17 percent; Yankee, 38 percent; Oyster Creek, 20 percent; and Dresden II, 11 percent.

2. These figures represent the General Electric *Handbook* prices (Section 8804, p. 7, Sept. 13, 1965) for complete plants of 600 mw (and 825 mw) less the prices for nuclear boilers of 600 mw (and 825 mw) as given in Section 8802 and the $10/kw containment cost. This provides the estimated cost of the non-nuclear portion of a plant sufficiently large to handle the "stretch" capacity of the nuclear boilers of 525 mw (and 750 mw).

4. This item covers costs excluded in paragraphs 1 and 5 of the *Handbook*, Section 8804, p. 5. Principal components are site and right-of-way, operating spares, interest during construction, property and excise taxes, and escalation. *Nucleonics*, Nov. 1964, p. 20, estimates these at 15 percent of the listed price. Dresden station contract cost was $45 million and Commonwealth Edison Co. incurred $6,545,000 of "* * * site, overhead, and minor plant addition costs * * *," or about 14.5 per cent of contract cost (as given in an Oct. 20, 1965 release by the Publicity Dept., Commonwealth Edison Co.).

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TABLE 2.—*Nuclear fuel costs of alternative nuclear powerplants located at load center*

[Mills per kilowatt-hour]

Plant size	600 megawatt					825 megawatt				
Core	I	II		III ff.		I	II		III ff.	
Source	GE	GE	Computer	GE	Computer	GE	GE	Computer	GE	Computer
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Uranium depletion	0.78	0.66	0.74	0.59	0.66	0.77	0.65	0.74	0.58	0.66
2. Plutonium credit	(.32)	(.22)	(.21)	(.21)	(.21)	(.32)	(.21)	(.21)	(.21)	(.21)
3. Reprocessing	.33	.25	.18	.21	.15	.33	.25	.18	.21	.15
4. Fabrication	.78	.55	.28	.49	.23	.76	.53	.28	.47	.23
5. Financing cost	.22	.21	.16	.20	.15	.18	.17	.12	.16	.11
6. Total	1.79	1.45	1.15	1.28	.98	1.72	1.39	1.11	1.21	.94
7. Years in use (approx.)	4	8	6.8	18	19.2	3	6	4.4	21	22.6
8. 30-year average		1.39	1.13				1.30	1.04		

NOTES ON COLUMNS

(1), (2), (4), (6), and (9): Lines 1 to 4: Interpolated costs for 525 and 750 mw single cycle, non-reheat plants, based on General Electric Co., *Atomic Power Equipment Handbook*, Section 8805, pp. 12–13 (May 24, 1965). Columns (4) and (9) show the costs for the third and subsequent cores. Line 5: Represents fuel cycle financing cost at 3.13 per cent interest. Derived by taking 62.5 per cent for columns (1), (2), and (4) and 50.0 per cent for columns (6), (7), and (9) of GE figures, *ibid.*, on the assumption that the GE figures represent 5.0 per cent interest charges for one year prior to irradiation, 9.0 per cent for four years (in the reactor) and one year in cooling and recovery. The 62.5 percent assumes one year in pre-irradiation, eight years in the reactor, and one year in reprocessing, all at 3.13 percent. The 50.0 per cent assumes one year in pre-irradiation, six years in the reactor and one year in reprocessing, all at 3.13 per cent. The eight and six years are obtained by comparison of the operating factors of 40 per cent and 54 per cent, respectively, with the GE assumption of 80 per cent load factor and (average) four year operating life per core. Line 7: the third and subsequent cores are assumed to remain in the reactor for eight years each in the case of the 600 mw plant and six years in the 825 mw case.

(3), (5), (8), and (10): Results of computer calculations using a fuel code developed by Dr. N. B. McLeod of NUS Corporation and a code published by the Atomic Energy Commission in its *Guide to Nuclear Power Cost Evaluation*, Vol. 4, *Fuel Cycle Costs*, TID-7025, as modified to meet the needs of the present study. The following table illustrates some of the cost assumptions (typical of the values used by GE and others) that were used as inputs in the analysis:

	Core	
	II(1975–79)	III(1980–84)
Fabrication ($/Kg.U)	55.00	44.00
UF_6 prior to enrichment ($/Kg.U)	173.85	156.46
UF_6 at discharge enrichment ($/Kg.U)	26.75	25.68
Conversion charge ($/Kg.U)	5.60	5.60
Pu Credit ($/g)	7.25	7.25
Separation plant charge ($/day)	22,043	17,949
Average fuel exposure (MWD/MTU)	27,000	27,000
Interest on working capital (per cent)	3.13	3.13

Due to cost limitations we were able to obtain cost figures for only the two periods, 1975–79 and 1980–84. Accordingly, we have assumed the costs of the 1980–84 period to hold for future periods, although the downward trend indicated will probably continue.

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TABLE 3.—*Average annual costs of alternative nuclear powerplants located at load center*

[Millions of dollars]

Plant size	600 megawatts		825 megawatts	
Source of fuel costs	Computer (1)	GE (2)	Computer (3)	GE (4)
1. Capital costs	4.54	4.54	5.80	5.80
2. Fuel costs:				
(a) Power production	2.40	2.95	4.07	5.08
(b) Spinning reserve	.32	.39	----	----
3. Operating and maintenance costs:				
(a) Fixed	.84	.84	1.16	1.16
(b) Variable	.21	.21	.39	.39
4. Special nuclear insurance	.31	.31	.33	.33
5. Total	8.62	9.24	11.75	12.76

NOTES ON LINE

1. Capital costs shown in Table 1, line 5 at 5.59 per cent per year. The 5.59 per cent corresponds to a net return of 3.13 per cent, depreciation (sinking fund) of 2.06 per cent (corresponding to 30 years) and an allowance for interim replacement of 0.40 per cent.

2a. Columns (1) and (2): Assumes average annual generation of 2.123 billion kw at the average fuel costs shown in line 8 of Table 2. The 2.123 billion kwh is the energy that would be generated by Marble Canyon, minus transmission losses to the load centers. Columns (3) and (4): Assumes 3.909 billion kwh. The 3.909 is the sum of 2.123 and 1.786. The latter represents projected annual energy purchased by the Central Arizona Project as given in U.S. Dept. of the Interior, Bureau of Reclamation, *Pacific Southwest Water Plan, Supplemental Information Report on Central Arizona Project, Arizona*, January 1964, p. 31.

2b. Assumes that the 600 mw plant would consume 10 per cent of full load fuel requirements for 4718 hours per year. The 4718 represents one year minus three weeks when the plant would be out of service for refueling and maintenance and 3538 hours per year that it would be at full load.

3a. Assumes average fixed operating costs (excluding the interim replacement included in line 1) of $1.40 per kw-year for a 600 mw plant. This figure is taken from an unpublished study, U.S. Atomic Energy Commission, Division of Reactor Development and Technology, Office of Civilian Power, "A Specific Comparison of Nuclear Electric Power and Hydro Electric Power—Bridge and Marble Canyon Projects," February 1965, p. 7.

3b. Assumes average variable operating costs of 0.1 mill per kwh, *ibid.*

4. Since the Bureau has omitted all mention of insurance costs for Marble Canyon (which is apparently a hidden subsidy by the Federal Government), only the cost of special nuclear insurance is included here. This insurance covers an unusual risk not present in the case of hydroelectric projects. Our treatment of insurance is conservative in that it ignores the special risks also present in the case of a hydroelectric project, especially in the event that the dam should break. The estimates are based on the premium paid by Commonwealth Edison Company for their Dresden plant, as shown in U.S. Congress, Joint Committee on Atomic Energy, Subcommittee on Legislation, *Selected Materials on Atomic Energy Indemnity Legislation*, 89th Congress, 1st Session, June 1965, pp. 17 and 66. Private nuclear liability insurance rates for Dresden are used for the first $60 million of coverage. The remaining $14 million of private insurance is taken at the rate of 2.5 per cent of the base rate per $1 million coverage. Price-Anderson Act insurance (to $486 million) is computed at the rate of $30/mwt. These estimates are very conservative in that up to 75 per cent of the private premiums are maintained in a special fund which is earmarked for refund on the basis of the first ten years of experience.

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TABLE 4.—*Benefits and costs of proposed and expanded Marble Canyon Project*

[Millions of dollars]

	Marble Canyon project				Revised Lower Colorado River Basin project power	
	Bureau of Reclamation	Atomic Energy Commission (as adapted)	Carlin-Hoehn			
			Computer fuel	GE fuel	Computer fuel	GE fuel
	(1)	(2)	(3)	(4)	(5)	(6)
1. Benefits:						
(a) Power	17.17	8.61	8.43	9.05	11.56	12.57
(b) Fish and wildlife	.36	(.36)	.36	.36	.36	.36
(c) Recreation	.32	(.32)	.32	.32	.32	.32
(d) Area redevelopment	.15	(.15)	.15	.15	.15	.15
(e) Total	18.00	(9.44)	9.26	9.88	12.39	13.40
2. Costs:						
(a) Capital charges	8.16	(8.16)	8.45	8.45	8.45	8.45
(b) Operating costs	1.94	(1.94)	1.94	1.94	1.94	1.94
(c) Power purchases	.39				5.58	5.58
(d) Total	10.49	(10.10)	10.39	10.39	15.97	15.97
3. Benefit-cost ratio	1.7 to 1	(0.93 to 1)	0.89 to 1	0.95 to 1	0.78 to 1	0.84 to 1

NOTES ON COLUMN

(1): Assumes an interest rate of 3 per cent. U.S. Department of the Interior, Bureau of Reclamation, *Pacific Southwest Water Plan, Supplemental Information Report on Marble Canyon Project, Arizona*, January 1964, pp. 20, 24 and 25.

(2): Assumes an interest rate of 3 percent. Line 1a: AEC figure of $8.80 million minus $0.19 million representing the annual loss of revenue resulting from the reduction in energy generation from Glen Canyon Powerplant (*ibid.*, p. 22) if the Marble Canyon Project is built. The $8.80 million figure is that given in U.S. Atomic Energy Commission, Division of Reactor Development and Technology, Office of Civilian Power, "A Specific Comparison of the Economics of Nuclear Electric Power and Hydro Electric Power—Bridge and Marble Canyon Projects," February 1965, p. 7. Lines 1b to 1d: Assumed to be the same as column (1) since the AEC study does not state. Line 2a: From column (1). The $0.39 million omitted in line 2c represents the annual cost of purchasing power to firm the on-peak generation of Marble Canyon power. It has also been excluded from the benefits (line 1a).

(3) and (4): Assumes 3.13 per cent interest and the 600 mw plant developed in Tables 1 to 3. Line 1a: Table 3, line 5 minus $0.19 million. Line 2a: Assumes an initial capital investment of $257.75 million (see Marble Canyon Project Report, *op. cit.*, p. 25) at a gross return of 3.28 per cent, including 0.16 per cent depreciation (100 year life).

(5) and (6): Assumes 3.13 per cent interest. Line 1a: Table 3, line 5, minus $0.19 million. Line 2c: Amount the Bureau proposes to spend to purchase additional power for the Central Arizona Project, as given in U.S. Department of the Interior, Bureau of Reclamation, *Pacific Southwest Water Plan, Supplemental Information Report on Central Arizona Project, Arizona*, January 1964, p. 31.

ADJUSTMENTS TO ACCOMMODATE RECALCULATED STREAM FLOWS

Using the basic paper as a basis, we have recently made some calculations to show the effects of lower stream flow assumptions on the benefit-cost ratio for the Marble Gorge Project. Both the Bureau's study and our Paper assume an average stream flow of 10.55 million acre-feet (maf) past the dam site. The Bureau states that this is the expected 50 year average for the period 1975 to 2024. Since their benefit-cost study is predicted on a 100 year economic life for the dam, their figure should actually have been for a 100 year average. If the average flow in the years 2025 to 2074 is taken as the 8.25 maf guaranteed to the Lower Basin,[1] the 100 year average would be 9.40 maf. Use of this figure in the analysis presented in our Paper decreases the power generation required of the nuclear alternative. It reduces the fuel costs (shown in Table 3, line 2) in our most expensive nuclear alternative (a 600 mw plant using GE fuel costs) from $3.34 to $3.06 million, and the benefit-cost ratio for the Project (shown in Table 4, line 3) from 0.95 to 1 to 0.92 to 1.

It may be, however, that as a result of additional dams in the Upper Basin

[1] This assumes that the possibility of importing water into the Lower Basin (say at Lake Mead) from elsewhere, as suggested in the pending legislation, is not realized. If it is, additional water will be withdrawn in the Upper Basin, resulting in smaller average flows past the Marble Gorge site.

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or new studies of Upper Basin depletion the average during the first 50 years would be appreciably less than 10.55 maf. We have chosen 8.80 maf to illustrate the effect of such a change since we understand that this closely approximates the new Bureau figure. Again using 8.25 maf for the second half century, the average is roughly 8.50 maf. This results in fuel costs for our principal nuclear alternative of $2.83 million and a benefit-cost ratio of 0.90 to 1. These figures suggest that the benefit-cost ratio gradually declines still further below one-to-one with decreasing stream flow.

Since the completion of our basic study in February, our conclusions have been even further strengthened and broadened by suggestions from readers and a number of additional calculations on our part. We stand ready to explain these additional calculations in detail to anyone interested in exploring them further. I will only briefly outline them here.

NUCLEAR ALTERNATIVE WOULD CONTRIBUTE MORE TO DEVELOPMENT FUND THAN MARBLE

Before leaving the Marble Gorge Project, it is worth examining one more comparison with the nuclear alternative we have discussed. My colleague, Dr. Hoehn, has developed some figures on the "cash-register" value of Marble Gorge versus our 600 mw nuclear alternative that demonstrate that the nuclear plant would be far superior to Marble as a revenue producer. Over a 50 year period, the nuclear alternative would show a cumulative profit of $454 million versus a loss of $11 million for Marble. Over 70 years, the cumulative profits are $693 million versus $190 million. And over 100 years, $1,052 million versus $491 million.

The figures above are developed from our basic paper of February 1966, with amendments to reflect a 50-year depreciation period for *financial* analysis of Marble Gorge. On this basis, the annual capital charge for Marble Gorge for the first fifty years is increased from $8.16 million to $10.26 million, reflecting the shorter write-off period; annual costs are correspondingly increased from $10.49 million to $12.59 million for years 1 to 50, and $2.33 million thereafter. Marble Gorge revenues are based on the Bureau's assumed figure of $10 per kilowatt-year capacity charge, and 3 mills per kilowatt-hour for energy. The profitability of the nuclear plant as a "cash register" is enhanced by operating it to 80 percent load factor, which Marble Gorge is unable to do because of the limitations of streamflow. The nuclear plant in this calculation is depreciated over 30 years (as is our cost-benfit analysis), but is assumed to have a service life of 100 years.[2] The interest charge used throughout is 3⅛ percent. The 100-year contribution to the development fund of $1,052 million is based on average revenue of 3 mills/kwh for energy beyond the 2.1 billion kwh generated by Marble. For an average of 2.5 mills/kwh over the same period of analysis for this additional energy, the nuclear alternative contributes $948 million (193 percent of Marble Gorge); and for 2 mills/kwh, the nuclear plant earns $844 million (172 percent of Marble Gorge).

BRIDGE BENEFIT-COST RATIO ALSO LESS THAN ONE-TO-ONE

Finally, I wish to turn to the other dam proposed for the Grand Canyon in the pending legislation. This dam would be located downstream from Grand Canyon National Park and Monument, but would back water into both.

With the assistance of Mr. Laurence Moss,[3] we have also made some benefit-cost calculations for this Project. We find that the ratio is 0.86 to 1 when the Project is compared with a combined nuclear plant of 762 mw operated at a 90 per cent load factor and a pumped storage plant of 588 mw operated at a cycle

[2] There is no known reason why a nuclear plant should become unserviceable after 30 years. Nuclear fuel costs may decrease in the meantime so much that it becomes profitable to build a new plant, but this will only be done if the average costs of the new plant are less than the marginal cost of continuing to operate the old plant. In other words, the continued use of the costs of the original plant beyond 30 years represents an upper bound on the costs of replacement plants. There would be some additional replacement costs involved with continued use of the same plant, but they would be minor compared to the differences in cumulative profits indicated above.

[3] Mr. Moss is a nuclear engineer with the position of Assistant Project Manager at Atomics International in Los Angeles. His assistance was not rendered as part of his duties with AI.

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efficiency of 67 per cent.[4] The combination is assumed to be located at a load center. The size of the plants has been chosen so as to yield 1350 mw with a load factor of 41.7 per cent, as in the case of Project power after transmission losses.[5] Using capital costs for a 750 mw nuclear plant, developed in a way similar to those in our basic paper, and GE fuel costs, developed as in Table 2 of the paper, we find that total annual costs for the alternative, comparable to those given in line 5 of Table 3, are $16.95 million.[6] When the other benefits claimed by the Bureau for Marble are included, the benefit-cost ratio at an interest rate of 3.13 per cent is 0.86 to 1. These figures asume that the average flow past the dam site will be some unspecified amount used in the Bureau's project report (apparently 11.4 maf). At lower stream flows, the benefit-cost ration would once again decline slightly.

Mr. Moss has brought to our attention the unusually low bids recently received by the Tennessee Valley Authority for a proposed nuclear power plant. Although a complete evaluation of these bids is not yet available, preliminary analysis suggest that they represent a major reduction in the capital costs of nuclear plants from the costs used in our study.

My conclusions from all this is that neither the Bridge nor Marble Canyon Projects are economically justified. Reductions in average stream flow have the effect of further reducing the benefit-cost ratios. In addition, it is my understanding that Mr. Jeffery Ingram of the Sierra Club has submitted detailed calculations to the Committee that indicate that neither the Marble nor Bridge projects are necessary to make the Central Arizona Project financially feasible. Assuming that Mr. Ingram is correct, the dams are not only not economically justified, but also not financially necessary.

Mr. HALEY. It is now just a few minutes before 12 o'clock. The committee will recess now and reconvene at 2 o'clock.

(Whereupon, at 12 o'clock meridian, the committee was in recess, to reconvene at 2 p.m., the same day.)

AFTERNOON SESSION

Mr. ROGERS of Texas. The Subcommittee on Irrigation and Reclamation will come to order for further consideration of pending business.

Our first witness is Mr. Alan Carlin.

Mr. Aspinall is recognized to commence the questioning.

STATEMENT OF ALAN CARLIN, ECONOMIST—Resumed

Mr. ASPINALL. Mr. Carlin, you have quite an extensive statement. It will take quite a bit of analyzation. But somebody is right and somebody is wrong. If you are right, it would appear that you folks

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[4] J. M. Wallace, in "Pumped Storage—A New Opportunity for Hydro Generators," *Westinghouse Engineer*, Vol. 26, No. 1, January 1966, p. 8, states that the cycle efficiency of pumped storage plants varies between 65 and 75 percent.

[5] It should also be pointed out that the use of pumped storage makes the alternative comparable to the Project in its ability to respond rapidly to load changes.

[6] The average annual cost of the nuclear portion, in millions of dollars, is as follows:

Capital costs (5.59 percent of $97.4 million)	5.44
Fuel costs (6.00 billion kwh at 1.24 mills/kwh)	7.44
Operating and maintenance:	
Fixed ($1.40/kw)	1.05
Variable (0.1 mill/kwh)	.60
Special nuclear insurance	.32
Total nuclear plant	14.85

At $80 per kw (see C. W. Hubbard, "These Factors Must Be Weighted in Developing Pumped Storage Plants," *Power Engineering*, Vol. 70, No. 2, February 1966, p. 45), 588 mw of pumped storage comes to $47.0 million. At a gross capital charge of 3.28 percent (100 year life at 3.13 interest), this is $1.54 million. If operating, maintenance, and replacement costs are assumed to be the same as for the 600 mw Marble Canyon Project ($0.56 million for the dam, powerplant, and headquarters), the total annual pumped storage costs are $2.10 million, for a grand total of $16.95. Adding other benefits claimed for the Bridge Project ($2.33 million), this comes to $19.28 million, compared with Bridge costs of $22.33 million (at a net return of 3.13 percent, minus the $0.91 million in power purchases shown by the Bureau). This represents a benefit-cost ratio of 0.86 to 1.

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should become the advisers to the Congress on many different matters and leave the Bureau of Reclamation out, because as I read your statement and as I understood theirs, you are almost in complete disagreement.

Now, let me ask you this. What remuneration did you receive for this work which took you 3 months?

Mr. CARLIN. I received no compensation for the work. Some of the costs of duplicating some of the copies of my statement that you have in front of you were borne by the Sierra Club.

Mr. ASPINALL. What you are saying is that you won't receive any remuneration for your work.

Mr. CARLIN. I have no expectation of it.

Mr. HOSMER. Will the gentleman yield?

Mr. ASPINALL. Yes.

Mr. HOSMER. You did this on RAND time, didn't you?

Mr. CARLIN. I did not.

Mr. HOSMER. You and Dr. Hoehn worked in the building on this report?

Mr. CARLIN. Sometimes after hours.

Mr. HOSMER. How did it get labeled RAND Study, then?

Mr. CARLIN. It has not been labeled a RAND Study at any time by either Dr. Hoehn or me.

Mr. HOSMER. Who labeled it a RAND Study, then?

Mr. CARLIN. I don't know.

Mr. HOSMER. RAND Corp., Santa Monica, Calif., is put on the label. Is that put here to deceive us into believing that it is an official study of the RAND Corp?

Mr. CARLIN. I don't know what you are referring to.

Mr. HOSMER. You don't know what I am referring to?

After page 3, it says, "Is the Marble Canyon economically justified? Alan Carlin and William E. Hoehn, RAND Corp., February 1966."

Mr. CARLIN. On the added 49 copies sent to the committee but not on the first copy. I was unfortunately forced to use copies that had previously been printed at the expense of the Sierra Club with the permission of the RAND Corp. I am not——

Mr. HOSMER. This is your study and Dr. Hoehn's study.

Mr. CARLIN. Would you let me finish, please?

Mr. HOSMER. Why did you have to get the RAND permission for reproduction?

Mr. CARLIN. Because it was printed as what is called a RAND Corp.——

Mr. HOSMER. It had a number on it, too, didn't it?

Mr. CARLIN. RAND Corp. paper with a capital "P." RAND puts out various series, RM's, P's, and this has been published and printed at the expense of the RAND Corp. as a P. This is one of those copies here; yes.

Mr. HOSMER. They paid you nothing for the study and made you work at night to carry it out; is that right?

Mr. CARLIN. Who made me?

Mr. HOSMER. RAND.

Mr. CARLIN. RAND has not made work on this study; no, sir.

Mr. HOSMER. How come somebody had to get the permission of the RAND Corp. to reprint it?

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Mr. CARLIN. Because it has appeared as a RAND paper.

Mr. HOSMER. Are they in the habit of printing stuff that their employees write up on their own time?

Mr. CARLIN. Yes, sir. This is P-3302. That means that since RAND was founded they have published 3,302 of these.

Mr. HOSMER. Printed that many of them at their expense?

Mr. CARLIN. At their expense. That is a certain number of copies of 3,302 different papers.

Mr. HOSMER. I see. Now, they are a big Government contractor, aren't they?

Mr. CARLIN. Yes.

Mr. HOSMER. Where do they get their money to print up these things and distribute them around like this?

Mr. CARLIN. I am not familiar with exactly which funds are used. It may, for example, come out of the percentage that they receive on their contracts.

Mr. HOSMER. They come from some place and it looks pretty suspicious to me.

Mr. CARLIN. I would point out to you that, in accordance with RAND contracts, this paper has been submitted for review by the Department of Defense and has been cleared by the Department.

Mr. HOSMER. That is great. It has been cleared by the Department of Defense. And they took up a lot more Government time on this paper.

Do you mean to infer that Secretary McNamara is against these dams?

Mr. CARLIN. I have not in any way tried to imply that.

Mr. ASPINALL. I want to ask one more question on my own time.

Do you know whether or not any of the officers or the board of RAND Corp. belong to the Sierra Club?

Mr. CARLIN. Not to my knowledge.

Mr. ASPINALL. That is all.

Mr. ROGERS of Texas. Mr. Saylor.

Mr. SAYLOR. Mr. Carlin, as a member of this committee, I want to congratulate you and commend you and apologize for the abuse that you have taken.

You have appeared here on your own time as a citizen of this country in a forum that has been provided, and I think it ill behooves us to attack you in the manner in which it has been done.

Might I ask you, Mr. Carlin——

Mr. HOSMER. Will the gentleman yield?

Mr. SAYLOR. No; I will not.

Mr. Carlin, may I ask, you list yourself as an economist. You have stated here in this paper your background. You have a degree from MIT; is that correct?

Mr. CARLIN. Yes, it is, sir.

Mr. SAYLOR. When did you get this degree?

Mr. CARLIN. I received it in June 1964.

Mr. SAYLOR. And since that time in what capacity did you receive that doctorate's degree? For what kind of work?

Mr. CARLIN. In the field of economics.

Mr. SAYLOR. The field of economics. And since that time, what has been your experience?

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Mr. CARLIN. I have been employed on a full-time basis since that time by the RAND Corp. in the position of an economist.

Mr. SAYLOR. And has your field as an economist been confined particularly to the water and power fields?

Mr. CARLIN. My field is economic development and as a part of it, a major part, I have analyzed a number of water, power, and transportation projects in various countries of the world, especially India.

Mr. SAYLOR. Now, you have said that associated with you in this study was Dr. Hoehn. Is Dr. Hoehn with you here?

Mr. CARLIN. No. He was not able to be here due to other commitments, and because he did not feel that he could afford, financially, the expense of coming here.

Mr. SAYLOR. Have you submitted for comment this paper you have to the Bureau of Reclamation?

Mr. CARLIN. A copy of an earlier paper, which is printed in the August hearings was submitted to the Bureau. I have not sent copies of this new revised paper to the Bureau. However, it has been available free of charge to all Government agencies from the RAND Corp. for at least 2 months.

Mr. SAYLOR. Can you tell us when the RAND Corp. published this paper?

Mr. CARLIN. The date on here is February. My recollection is that it was finally cleared in March, so that it became available to people outside of RAND, I think, during the month of March.

Mr. SAYLOR. I just want to say to you that the chairman of the full committee said that either you should take over the Bureau of Reclamation, or the Bureau should get out. I have been maintaining that for a long time. I am glad to have the concurrence of the chairman.

I would rather see you down there than I would see some of the people in Government.

That is all, Mr. Chairman.

Mr. ASPINALL. Would my colleague yield? I am not quite ready to go that far, yet.

Mr. SAYLOR. The chairman of the subcommittee asked me has the RAND Corp. any connection with the Rand-McNally Corp.?

Mr. CARLIN. No, it has no connection.

Mr. SAYLOR. Thank you, Mr. Carlin.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Mr. Carlin, I wanted to say that I respect the sincerity with which you appear here, though I certainly disagree with your ultimate conclusions. I think we need more people in this country who believe in things and are willing to act and come forward and take a position, and in that spirit, I congratulate you on your appearance here.

Mr. CARLIN. Thank you, sir.

Mr. UDALL. Mr. Chairman, during the lunch hour I have gone through this rather extensive statement of Dr. Carlin's. I think there are some inaccuracies and some of the bases for his conclusion are clearly in error. I am not renowned as a nuclear physicist or engineer or hydrologist, but with some of my technical people we are preparing a commentary and analysis of this.

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I would like to ask unanimous consent that this study be received by the committee. I will have it ready by 5 o'clock today and if the Chair will determine some appropriate disposition, either the record of the file——

Mr. SAYLOR. Reserving the right to object, and I will not object, I think the gentleman is performing a very valuable service, and I would only ask that he permit Dr. Carlin and Dr. Hoehn to take a look at the comments you have to make with regard to his paper.

Mr. UDALL. I will be happy to furnish him a copy and I think he is entitled to that.

Mr. HOSMER. Reserving the right to object, and I won't, since the Bureau of Reclamation made a comment on his last runaround, the previous year, I think it also should have an opportunity to state in the record what it believes the facts to be.

Mr. ROGERS of Texas. Does the gentleman make that as a unanimous consent request?

Mr. HOSMER. Yes.

Mr. ROGERS of Texas. Without objection, the unanimous consent of the gentleman from Arizona will be granted, together with the reviews suggested by the gentleman from Pennsylvania, together with the reviews suggested by the gentleman from California.

Mr. CARLIN. Sir——

Mr. ROGERS of Texas. Dr. Carlin.

Mr. CARLIN. Is it then my understanding that I will be given a chance to comment in turn on what the Bureau has to say?

Mr. ROGERS of Texas. On what the Bureau has to say?

Mr. CARLIN. Yes.

Mr. ROGERS of Texas. Well, as far as the Chair is concerned, you will have an opportunity if you want to come back or have someone here insert your remarks in the record.

Mr. UDALL. Dr. Carlin, I will be happy to receive it.

Mr. ROGERS of Texas. All of this will be public, Dr. Carlin, and you will have a chance to furnish information on it within the time allotted by the record—the time in which the record is kept open for insertions.

Mr. CARLIN. Thank you, sir.

Mr. UDALL. I just had one more thing. This might go on forever. I could comment on your comment on my comment, but I won't go that far.

(The material referred to follows:)

ANALYSIS OF ALAN P. CARLIN'S TESTIMONY—"ECONOMIC FEASIBILITY OF THE PROPOSED MARBLE AND BRIDGE CANYON PROJECTS, MAY 1966"

(Morris K. Udall)

This testimony is essentially based upon a revision of an earlier paper authored by Mr. Carlin entitled "An Economic Reevaluation of the Proposed Marble Canyon Project" appearing on pages 957–959 of the hearing before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives on H.R. 4671 and similar bills, Lower Colorado River Basin Project. That paper was commented on by Commissioner Dominy's letter of January 10, 1966, at the request of Senator Robert F. Kennedy.

The substance of that paper, as well as this current testimony by Mr. Carlin was that the Bureau of Reclamation in its January 1964 report, Pacific Southwest Water Plan, overestimated the cost of producing power from alternative sources located at load centers because privately financed gas-fired thermal plants in lieu of Federally financed nuclear plants were used, and thus overstated the benefits.

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The Bureau's engineering and economic analyses made for the Southwest Water Plan were made a few months prior to that time and as pointed out to Mr. Carlin, in its January letter, much of the area generation then was in the form of gas-fired (oil-supplemented) steam plants. An example was given wherein the Southern California Edison Company in 1962 had nearly one-half billion dollars invested in over 4,000,000 kilowatts (80% of its total system) of this type generation. More recently, it was also pointed out that some 8,000,000 kilowatts of coal-fired thermal plants are planned for the Southwest as announced by the Western Energy Supply and Transmission Associates. Therefore, it was felt that the use of fossil fuel thermal alternatives was completely justifiable. Cost conscious utility executives would not be building and planning coal-fired plants in the Southwest if nuclear plants produced power cheaper.

Nuclear power as well as fossil fuel thermal plants is given full consideration as a possible alternative to hydro projects. However, for low plant factor operation as is the situation for the proposed Bridge and Marble Canyon projects, manufacturers and trade journals regularly refer to various types of low-cost thermal plants available for *low-load-factor operation*. I know of no manufacturer who will recommend nuclear plants for low-load-factor operation. Thus, we have seen nothing to indicate the economic superiority of a nuclear peaking plant over a conventional thermal peaking plant. The authors appear to be unsure of this point themselves as noted from this quotation from page 9:

"* * * Because nuclear plants have not been and are unlikely to be built as peaking plants, little information is available on minimum levels at which they might be operated if they are designed with this in mind. Technical opinion favors keeping the nuclear reactor and steam system warm between peaks; keeping them warm enough to maintain the generators in a condition of spinning reserve also somewhat improve the comparability of the nuclear alternative examined here with the proposed Marble Canyon Project * * *."

So the authors' proposal is therefore entirely theoretical. The authors have also missed the import of the full testimony given in recent hearings concerning the use of power from the Bridge and/or Marble Canyon Projects. The Bureau expects to purchase off-peak pumping power from the utilities to the maximum extent possible, firming up these off peak purchases and meeting some of the pumping load from the hydro plants. The balance of the hydro production (low load factor) will be sold commercially. To perform these functions requires transmission lines from Marble to load centers and from the Central Arizona pumps to the transmission system. These were allowed for in the Bureau's cost estimates for Marble and Bridge Projects. Any comparable alternative must provide an equivalent function. Mr. Carlin's failure to include any transmission costs discredits the balance of his statement. The peaking power to be sold from Bridge and/or Marble plants must be transmitted directly to load centers in the states of Arizona, California, Nevada, New Mexico and Utah. Regardless of where alternative plant or plants are located there will be transmission costs to the other load centers. There are several major areas where the authors have failed to give due consideration to essential matters—thus leading them to erroneous conclusions. Briefly these are:

1. Calculating an alternative for the hydro projects using Federal financing is not proper when measuring *power benefits*.

2. There is no provision made for reserves for these single-unit plants (presumably Federal since Federal financing was used) located on another utility system. The authors take note of this on page 11 but make no cost allowance for it. What would be an equitable allowance is open to question, but if capacity is worth $10/kwyr and if 18% is a reasonable amount for reserves, the value of reserves on an annual basis could well be $1,080,000 for a 600-mw plant and $1,485,000 for an 825-mw plant. These plants could be developed with enough multiple units to greatly reduce the reserve requirements but smaller nuclear units are infeasible from a cost standpoint.[1]

3. It does not appear that any allowance for the terminal switchyard(s) has been made at the nuclear plants. If so, they are not shown in Table 3. Even at load centers, the plants are usually located sufficiently far from metropolitan centers that at least a subtransmission system terminates at the plant. These costs would range to $10 or more per kilowatt.

4. There has been no allowance made for transmission costs associated with the nuclear alternate. The Marble Canyon hydro complex is but one part of the multi-

[1] With the nuclear plants consisting of single generator units, the multiple-unit Marble Canyon hydro will have greater reliability and greater flexibility in operations than will the nuclear alternative.

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purpose Colorado River Basin Project. Additional transmission lines required for marketing purposes, including that necessary for serving the pumping function of the project, can cost as much as $2.00/kw-yr based on past experience of interconnecting major systems in that area. This would add about $1.2 million per year to the cost of the proposed 600 MW or 825 MW nuclear plant.

5. The 825–MW alternative is not valid as it does not equate to the 600–MW hydro facility. As previously explained, the 600–MW facility serves both pumping and commercial loads. It is interesting to note that even here where 225 megawatts additional capacity has ostensibly been added for project pumping purposes that no means has been provided to transfer this power to the pumping plants. This cannot be done without cost.

6. In evaluating thermal alternatives to hydroelectric projects, the Federal Power Commission permits a 5 to 10 percent hydrothermal adjustment (Tech. Memo No. 1) as an increase in the cost of capacity of the thermal alternative. This is to take account of certain advantages hydro is considered to have over thermal capacity. These advantages include lower operating costs, greater service availability, and greater operating flexibility due in part to simpler and more rugged equipment operating at lower speeds and temperatures. This adjustment does not seem to have been made in the authors' calculations.

7. Cooling water costs have been omitted. Costs of cooling water for nuclear plants located inland, as will be noted from the previously referred-to hearings would be $50 per acre-foot for municipal and industrial purposes in the project area. This cost is essentially a conveyance cost. A fossil-fueled thermal plant installation at maximum efficiency consumes about 20 acre-feet per megawatt of installed plant capacity while a nuclear plant's use is about 60% higher. The total water conveyance cost for a 600–MW nuclear plant operating at maximum efficiency would add around $960,000 per year.

From table 3 of Mr. Carlin's statement, annual costs for 600–MW nuclear reactors total (1) $8,620,000 and (2) $9,240,000 for two differently assumed fuel cost analyses using Federal financing and no taxes. Adding the costs of the above items but allowing nothing for cooling water costs we get the following totals which we believe are more realistic:

Annual cost for 600-megawatt nuclear plant from table 3	(1) $8,620,000	(2) $9,240,000
Annual cost of transmission [1]	1,200,000	1,200,000
Annual value of reserves (600,000 kilowatts×$10×18 percent)	1,080,000	1,080,000
10 percent hydro adjustment (0.10×$4,540,000)	454,000	454,000
Annual cost of switchyard at plant ($10/kilowatts (600,000 kilowatts) (0.0559)	335,000	335,000
Subtotal	11,689,000	12,309,000

[1] Costs for transmitting power to pumping plants and other load centers.

Since the net generation delivered to load is 2,123,000,000 kilowatthours, the cost of production and transmission, neglecting water costs, is 5.5 and 5.8 mills per kilowatthour for above columns (1) and (2), respectively. Compare this with the 4.5 mills/kwh as the economic cost of power produced by Marble Canyon delivered *at load center* as given by the Atomic Energy Commission.[2]

As benefits are measured by the cost of the nuclear alternative in the author's testimony, the $9.26 and $9.88 million benefits under the "Carlin-Hoehn" proposal. Columns (3) and (4), Table 4 would increase to $11.25 and $11.87 million respectively when adding the omitted hydro adjustment, transmission,[3] and switchyard

[2] AEC Report, Feb. 1965—Note bottom Page 9.

[3] Benefits (millions of dollars):

	(3)	(4)
Power (part)	8.430	9.050
Hydro adjustment	.454	.454
Switchyard at plant	.335	.335
Transmission	1.200	1.200
Fish, wildlife, etc.	.830	.830
Total	11.251	11.871

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costs, but neglecting the costs of reserves and cooling water. In any case, the benefit-to-cost ratio is at least 1 to 1 for Column (3) and 1.1 to 1 for Column (4) under the adverse comparison without reserves and of course substantially in excess of 1 to 1 with proper allowance for reserves.

The original costs of the Atomic Energy Commission study, Column (2) of Table 4, were not developed on the basis for use in a benefit-to-cost comparison, but have been so used by Mr. Carlin. Consequently, certain cost components have also been omitted from the analysis with the situation in Column (2), Table 4, being very similar to Columns (3) and (4) as discussed above. When all of these relative costs are included, the benefit-to-cost ratio is also substantially in excess of 1 to 1.

Additionally, it is stated on page 3 that "Capital theory does recognize the existence of a risk premium, but if anything the Marble Canyon Project, with its much longer assumed payout period contains a greater element of risk than the nuclear alternative."

It should be noted that the special nuclear insurance costs used are based in part upon Federal participation in the insurance program. American insurance companies have been unwilling to offer the full required coverage, and the cost of any substantial losses would be largely at Federal expense. There is no objection to using insurance costs on this basis, but it is important to point out that the Federal Government also assumes a monetary risk for the nuclear alternative which could be far more substantial than for the hydro project.

On Page 16, it is stated that evaporation losses may be as great as 30,000 AF per year. Of the 4,000 acres of reservior area in Marble Canyon Reservoir, over half is river area which now loses water by evaporation. The increased evaporation loss caused by Marble Canyon Reservoir is estimated to be 10,000 acre-feet per year, not 30,000 acre-feet.

As for the Bridge Canyon discussion, it is possible to consider a nuclear-pumped storage combination alternative which will provide excellent electrical resource characteristics provided a nuclear plant site location has adequate water and a favorable pumped storage site can be found. Both require water and both must be near load centers, otherwise a substantial transmission cost may be involved. Such costs, including cooling water costs, are significant, and can easily cause potential pumped storage projects to become uneconomical. The use of $80/kilowatt pump storage cost, as used by Mr. Carlin, is too low as there is no allowance for transmission. Suitable pumped storage sites do not generally occur at load centers, but some distance away, and therefore the statement "The combination * * *" (nuclear & pumped storage) "is assumed to be located at a load center", is a hypothetical assumption not usually found in realtity. In summary, these annual costs may have been omitted from the alternatives to Bridge:

(1) Hydro adjustment factor.
(2) Switchyard costs at the nuclear and pumped storage plants.
(3) Tranmission or sub-transmission costs to connect the nuclear and pumped storage facilities.
(4) Cost of pumping energy for the pumped storage facility.
(5) Cooling water costs.

Again, if these omitted costs are included, then the Bridge Canyon project will show a favorable benefit-cost ratio, superior to the alternatives.

ANALYSIS OF ALAN P. CARLIN'S TESTIMONY—"ECONOMIC FEASIBILITY OF THE PROPOSED MARBLE AND BRIDGE CANYON PROJECTS" MAY 1966, BUREAU OF RECLAMATION

We have reviewed Dr. Carlin's testimony and also Congressman Udall's analysis of it. Briefly summarized below are in the main points Congressman Udall makes regarding Dr. Carlin's testimony.

(1) Dr. Carlin's contention that nuclear powered thermal plants are the lowest cost source of electric power in the Pacific Southwest is not borne out by reason of the fact that private utilities in the Pacific Southwest have recently made large investments in gas-fired (oil supplemented) steamplants and have announced plans to make large investments in coal-fired thermal plants in the future.

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(2) By omitting transmission costs from the analysis of nuclear alternatives for the Marble Canyon and Bridge Canyon Projects, Dr. Carlin and Dr. Hoehn have not evaluated comparable alternatives in their paper and thus have not included all costs of the nuclear alternatives.

(3) Further, the costs of the nuclear alternatives evaluated by Drs. Carlin and Hoehn are low because (a) no provision was made for reserves for the single unit plants; (b) it appears that no costs were included for terminal switchyards; (c) it appears that no consideration was given to the 5 to 10 percent hydrothermal adjustment permitted by the Federal Power Commission as an increase in the cost of capacity of thermal alternatives, and (d) no costs for cooling water were included in their analysis.

(4) By assuming Federal financing in their calculation of the costs of the nuclear alternatives, the authors have imporperly measured power benefits.

(5) Even if power benefits are measured assuming Federal financing of alternatives, Congressman Udall concludes that the Marble Canyon and Bridge Canyon Projects would be economically justified showing a favorable benefit-cost ratio if the omitted costs cited above were included in Dr. Carlin's and Dr. Hoehn's analysis of nuclear alternatives. In the case of the Marble Canyon Project he demonstrates this to be so by supplying the missing cost data, with the exception of the cooling water costs.

We concur fully in these principal points of Congressman Udall's analysis. We wish, however, to amplify several of the points noted by Congressman Udall as well as note several other points believed to be pertinent.

There is little doubt, from a theoretical viewpoint, that a nuclear plant could be selected of a certain size and operational pattern to contribute as much or more to the Development Fund as would the Marble Canyon hydroplant. This would require, however, Federal construction and operation of a nuclear plant.

Dr. Carlin and Dr. Hoehn indicated in their statement that the accepted practice for computing power benefits of a Federal hydroelectric project is to use the cost of producing the same power by the lowest cost alternative means and that the only economically justifiable procedure to compute the cost of the lowest cost alternative is to use the same interest rate as used for the Federal hydroelectric project.

However, Senate Document No. 97, 87th Congress, 2d Session, containing a statement entitled "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources" states the following concerning the measurement of electric power benefits:

"The value of power to the users is measured by the amount that they should be willing to pay for such power. *The usual practice is to measure the benefit in terms of the cost of achieving the same result by the most likely alternative means that would exist in the absence of the project.* In the absence of economically feasible alternative means, the value of the power to users may be measured by any savings in production costs, increase in value of product that would result from its use, or its net value to consumers. [Emphasis supplied.]

Since a federally financed nuclear plant is not a likely alterantive, that would be built if the proposed hydroelectric plant is not built, Dr. Carlin's and Dr. Hoehn's definition of benefits is not in accordance with the concepts expressed in Senate Document 97, 87th Congress. In our evaluation we have applied the concepts expressed in Senate Document 97, 87th Congress.

There are several inconsistencies in the treatment of costs that need to be analyzed. Most of these have been covered in Mr. Udall's statement and those covered by Mr. Udall will not be discussed further with the exception of the one significant omission, electrical transmission facilities. Transmission facilities are needed to market commercial peaking power at several points in the Pacific Southwest, and in addition, are required to provide power to operate the project pumping plants. Any alternative, regardless of the type or location, must do these things which Dr. Carlin's analysis does not do. The Bureau of Reclamation expects to purchase offpeak pumping power from the utilities to the maximum extent possible, but, nevertheless, meeting the onpeak pumping load from Marble Canyon hydroproduction. The balance of the Marble production (low load factor) could be sold commercially. It seems that Dr. Carlin has missed the full import of testimony given in August 1965 which brings out this dual function, i.e., supplying pumping as well as commercial loads. Some of this testimony is quoted below.

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1. Page 111. "The Marble Canyon feature is the principal power development proposed for initial authorization as a part of the Lower Colorado River Basin Project. It will serve two principal purposes—provide project pumping energy and contribute to the development fund revenues derived from the sale of commercial power * * *. The commercial power generated at Marble will meet a part of the requirement for peaking power in the area * * *."

2. Page 154. "A good deal of the Marble Canyon Dam cost is allocated against irrigation because it would be used as a primary source of water supply providing pumping for irrigation."

3. Page 162. (Mr. Dominy's testimony, also quoted by Dr. Carlin, but apparently misinterpreted): "* * * Except that we believe that the proper way to get the maximum revenue from Marble for the Basin Fund will be to buy baseload steam power or offpeak thermal power and sell Marble as a peaking commodity to the extent that we can work this in and exchange arrangements with the utilities. So we will be looking for the maximum possible use of Marble at peak power values and do our pumping to the extent possible from offpeak thermal power * * * instead of operating Marble so as to be producing power only as needed at the pumps, we expect to correlate with the power industry to use offpeak power at the pumps to the maximum extent possible and release Marble production for peaking purposes which will be sold at a higher rate * * *."

It is clear from the above that transmission facilities are required to market peaking power in the Pacific Southwest and to provide project pumping power.

It is noted that Mr. Udall uses $2.00/kw-yr for the annual cost of transmission. The $2.00/kw-yr is about right for the operation, maintenance, and replacement cost component but about another $4.00/kw-yr should be added to cover the interest and amortization component making a total annual cost of $6.00/kw-yr for transmission.

Mr. Udall's "Analysis": An Unrepentant Rejoinder

(Alan P. Carlin and William E. Hoehn)

I. THE BASIC DISAGREEMENT

Representative Morris K. Udall's "Analysis of Alan P. Carlin's Testimony—'Economic Feasibility of the Proposed Marble and Bridge Canyon Projects, May 1966'" narrows the area of disagreement concerning the economic feasibility of the two proposed Grand Canyon dams. Disagreement is now limited mainly to the unquantified elements of our previous analysis. Although the Udall "Analysis" expresses some skepticism concerning the use of nuclear plants for low load factor operation, there appears to be little disagreement concerning the basic costs of our nuclear alternative, except for the important question of the proper interest rate for discounting the capital investments.

In our basic study[1] we specifically recognized that there were a number of lesser items relating to cost that were quite difficult to quantify. We identified and discussed these in considerable detail. None was a major element of cost. Some were favorable to the nuclear power alternative, and some were favorable to the hydro Project. Taking both sets of items into account, we concluded that *on balance* these items had the effect of favoring the nuclear alternative.[2] That is, these items as a whole added less to the cost of the nuclear alternative than they did to the cost of the hydro Project. As a simplifying assumption, it was therefore fair to the hydro Project to exclude these items from the cost estimates, because, if they had all been quantified and included, the hydro Project would have looked even worse than it did otherwise. We were, in fact, leaning over backward to be fair to the hydro Project.

What the Udall "Analysis" does is to select some of the items that are unfavorable to the nuclear alternatives; it concentrates on these and ignores the favorable items. By excluding the favorable items the "Analysis" falls into a logical error and, in effect, stacks the cards against the nuclear alternative.

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[1] Alan P. Carlin and William E. Hoehn, "Is the Marble Canyon Project Economically Justified?" The RAND Corporation, P–3302, February 1966. This constitutes the major portion of "Economic Feasibility of the Proposed Marble and Bridge Canyon Projects: Statement before the Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs" (May 1966) by Alan P. Carlin (hereafter referred to as Statement).

[2] P–3302, p. 18.

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Moreover, in quantifying the costs of the items that it does select, the Udall "Analysis" appears to have a strong bias toward overestimation. While these items are admittedly difficult to quantify in dollar terms, we can offer good arguments for lower estimates.

In what follows we will look first at the important question of capital charges—a point of basic economics which the Udall "Analysis" fails to understand, although it is essential to any fair comparison of alternatives. Next we will look in detail at two particularly flagrant instances of less than perfect objectivity on the part of the "Analysis" and one of the main additional items of cost proposed by the "Analysis." Then, in the second Section we will consider the other issues raised in the "Analysis." The third Section looks at the other side of the ledger and attempts to quantify the items favorable to the nuclear alternative that the "Analysis" chose to ignore. In the last Section we compute some new benefit-cost ratios at the increased level of quantification suggested by the Udall "Analysis."

CAPITAL CHARGES FOR ALTERNATIVES

"Calculating an alternative for the hydro projects using Federal financing," the "Analysis" says, "is not proper when measuring *power benefits*." [3] In other words, since the Bureau used "Federal financing" (i.e., 3 percent interest),[4] the "Analysis" is saying that our alternatives should be costed at a higher rate. While we would only too willingly agree that the subsidized "Federal" rates preferred by the Bureau are not appropriate for costing *either* the Project or the alternatives, it is not "proper" to use anything but the *same* rate for both.

We would be only too happy to use higher rates, *as long as the Bureau did the same.* The economic rationale for this principle, as explained earlier in P–3302,[5] is that the use of higher capital charges for the alternatives would create a handicap for them that would not result in a true comparison of the value of the economic resources used in each. But the Udall "Analysis" says that this accepted principle of economics "is not proper." Even without this elementary knowledge of economics, reference to the work cited on page 3 of our P–3302,[6] would have shown that Professor Otto Eckstein of Harvard, perhaps the leading authority on the analysis of water resources investments and until a few months ago a member of the President's Council of Economic Advisers, has said the following:

"Since the alternative-cost principle is designed to determine the most efficient way of expanding power capacity, that is, at least cost of the nation's resources, it is important that the value of the resources that would be needed for each of the alternatives be measured with the same set of prices. The use of different prices would mean that the resources which are used up in the alternatives would not be valued with the same yardstick, and that the final cost estimates used to determine their relative merits would not be comparable from the nation's point of view.

"Among the prices that must be applied uniformly to all alternatives is the rate of interest, the price for the use of capital. Although private steam plants are financed at a higher interest rate than public hydroelectric projects, the difference in the interest rates is partly due to the fact that government bonds do not reflect the riskiness of power projects. Uniformity of treatment must also extend to the taxes, which are included among costs. If the costs of the public project are estimated with a different set of taxes than the alternative steam plant, the cost of the alternative is overestimated, for the extra taxes do not represent real costs in terms of resources."

HYDRO-THERMAL CAPACITY VALUE ADJUSTMENT

Besides deficiencies in basic economics, the Udall "Analysis" also suffers from a distressing tendency to overstate its case. The hydro-thermal capacity value adjustment which is proposed [7] to make the Project's hydro-generated power

[3] Numbered item 1.
[4] We question, by the way, that these charges represent even Federal capital costs since the Treasury is now paying considerably more than 3 (or 3⅛) percent for new long-term obligations.
[5] *Op. cit.*, pp. 2 and 3.
[6] Otto Eckstein, *Water-Resource Development*, Harvard University Press, Cambridge, 1958, p. 242.
[7] Numbered item 6.

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more comparable to that generated by our nuclear alternatives is indeed omitted from our formal calculations, but is listed as an unfavorable assumption in P–3302[8] (a fact that the "Analysis" conveniently forgets to mention). We should like to point out, however, what the source quoted in the Udall "Analysis" actually says about the magnitude of such an adjustment:[9]

"The hydro-steam capacity value adjustment may range up to the equivalent of ten percent of the at-market cost of steam electric power, but is normally equivalent to about five percent."

This statement should be compared with the "Analysis's" assertion that "the Federal Power Commission permits a 5 to 10 percent hydro-thermal adjustment (Tech. Memo No. 1)" and the actual use of 10 percent in computing the adjustment which is later added to our costs. We shall use the "normal" 5 percent figure in subsequent calculations.

USE OF UNDERSTATED AEC COST FIGURES

Another flagrant example of the "Analysis's" overstatement of its case occurs at the crucial point where it attempts to show that the unit cost of power from our nuclear alternatives, plus what are deemed appropriate additions, exceeds the costs of Project power. To make this comparison, the "Analysis" selects a figure from a preliminary analysis of the comparative costs of nuclear and hydro power prepared by the Atomic Energy Commission for the Bureau of the Budget[10] rather than the Bureau's Project report[11] or our own carefully worked out comparative figures. But what the "Analysis" neglects to point out is that the AEC figure for hydro generation costs, 4.5 mills/kwh, is *not* comparable to the nuclear plant figures for two important reasons:

1. The figure is based on generation at the damsite of 2.308 billion kwh per year rather than the 2.123 billion kwh delivered to load centers.
2. A rate of 3 percent was used by the AEC in computing annual capital charges rather than the 3⅛ percent now required for benefit-cost analyses[12] and used by us in developing the basic nuclear costs that the "Analysis" used in the comparison.

In particular, the "Analysis" compares a hydro plant valued at a lower interest rate and with greater assumed output to a nuclear plant at a higher rate of interest and lesser generation; this is obviously contrary to benefit-cost assumptions and renders meaningless any such comparison. Inasmuch as the "Analysis" mentions the proper annual power generation in calculating the kwh cost of the nuclear plant and inasmuch as a simple division of the Bureau of Reclamation's published annual cost figure (also at 3 percent interest) of $10.487 million by the 2.123 billion kwh yields 4.94 mills/kwh, directly and clearly contradictory to the AEC figure, we can only conclude that the "Analysis" is sadly lacking in objectivity. But it would be even more appropriate (given, of course, the "Analysis's" desire to neglect various simplifying assumptions favorable to the Project), to use Project costs of $10.78 million (reflecting 3⅛ percent interest), which yields 5.07 mills/kwh.

TRANSMISSION COSTS

Finally, since the "Analysis" claims that "Mr. Carlin's failure to include any transmission costs discredits the balance of his statement," perhaps it would be important to examine whether this really is the case. The first and most fundamental fact which must be borne in mind in any discussion of the subject is the contradictory nature of various statements emanating from various dam proponents on the subject and the almost total absence of any publicly available information as to precisely where the Bureau's transmission lines would be located, their capacity and voltage, and detailed cost estimates for each segment.

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[8] Item 1, page 11.

[9] Federal Power Commission, Bureau of Power, *Instructions for Estimating Electric Power Costs and Values*, Technical Memorandum No. 1, March 1960, p. 8.

[10] AEC, Division on Reactor Development and Technology, Office of Civilian Power, "A Specific Comparison of the Economics of Nuclear Electric Power and Hydro Electric Power—Bridge and Marble Canyon Projects," February 1, 1965.

[11] U.S. Department of the Interior, Bureau of Reclamation, *Pacific Southwest Water Plan, Supplemental Information Report on Marble Canyon Project, Arizona*, January 1964, p. 20.

[12] U.S. Congress, House Committee on Interior and Insular Affairs, *Lower Colorado River Basin Project*, Hearing before Subcommittee, 89th Congress, 1st Session, August 23 to September 1, 1965, p. 127; hereafter referred to as Hearings.

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Without this information, it is quite possible for the proponents to argue anything they wish as suits their particular objectives of the moment. Compare, for example, the following statement by Secretary of the Interior Stewart Udall with what his own brother, Representative Morris Udall, says in his "Analysis":

"Secretary UDALL. Congressman, may I try to put this in a focus for you that I think will tell you what we really envision.

"The negotiations that we are presently carrying on with the West group, include—and I hope before we get through will include—all the public and private utilities in the entire region. If negotiations work out, it may very well turn out in the end that Glen Canyon might have to be redesigned for peaking and Marble used for peaking because we can produce more revenue that way. If we have a highly integrated system of the type we envision, and this is what the engineers are beginning to study, the cheapest and most efficient way to get pumping power would be out of the entire system in terms of using thermal power for pumping, and in terms of using our hydro facilities as a peaking vehicle for the entire region. This is really the road we think we are headed down, but we won't know all the answers until the studies are completed." [13]

On the other hand, Representative Udall now says:

"The Bureau expects to purchase off-peak pumping power from the utilities to the maximum extent possible, firming up these off-peak purchases and meeting some of the pumping load from the hydro plants. The balance of the hydro production (low load factor) will be sold commercially."

If you believe the Secretary, no transmission lines would seem to be required from the dams to the pumps; if you believe Representative Udall, on the other hand, they are necessary. But the "Analysis" goes one step further in that it appears to claim that our alternatives must not only provide power to the CAP pumps, but also that they serve *exactly* the same loads that would be served by the Project. This claim, of course, serves the interests of dam proponents in that their Projects suffer from the disadvantage that most of the power must be marketed at major load centers located hundreds of miles from his fixed sites. Apparently the Bureau plans to market a minor portion of this power along the way, as seems only sensible. But while it may be to the proponents' advantage to claim that our alternatives should serve exactly the same consumers, there is no basis in cost-benefit theory for this assertion.

As A. R. Prest and R. Turvey have recently pointed out: [14]

"The [electric] supply system constitutes a unity which is operated so as to minimize the operating costs of meeting consumption * * *.

"If we now try to apply the principle of measuring benefits by the cost savings of not building an alternative station it follows from the system interdependence just described that the only meaningful way of measuring this cost is to ascertain the difference in the present value of total operating costs in the two cases and deduct the capital cost of the alternatives. * * * In general, * * * a very complicated exercise involving the simulation of the operation of the whole system is required."

The question at hand is how "the simulation of the operation of the whole system" can most practically and accurately be approximatel. The "Analysis" proposes to approximate it by serving exactly the same customers. This, however, does not "minimize the operating costs of meeting consumption." Now in the real world of the Pacific Southwest power grid, it is known that very large quantities of power are going to be brought into the major load centers over lines that will pass fairly near both proposed Projects. And given recent discussions between the Bureau of Reclamation and WEST Associates, there is every reason to believe that the Bureau plans to integrate its transmission facilities for these two Projects with the new WEST and other existing facilities, which will exist whether or not the Projects are built. In brief, there is every advantage in terms of minimizing the total cost of meeting Pacific Southwest power demands and no reason not to let the existing facilities and the new facilities planned by WEST and others meet the loads in their immediate areas (and along the routes of transmission lines to the load centers), and to locate the alternatives to the Projects at the major load centers (as the Bureau itself proposed in the case of Marble). *This includes power for Central Arizona Project pumping.*

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[13] Hearings, *op. cit.*, pp. 162–163. This was quoted in P–3302, but the "Analysis" makes no attempt to explain the apparent contradiction.

[14] "Cost-Benefit Analysis: A Survey," *The Economic Journal*, Vol. 75, No. 300, December 1965, p. 710. This article was previously footnoted on page 2 of P–3302.

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We believe that P–3302 already fairly well covers the case where our alternatives are not required to supply power to the pumps. We also pointed out that our alternatives could be located in Arizona, with lower cooling water costs than the value of the water evaporated by the Marble Canyon Project. Since the Udall "Analysis" makes such a point about transmission costs, however, we have endeavored to cost out two detailed examples (see Tables 1 and 2 near the end of this rejoinder) that would specifically provide facilities for power to the CAP pumps and thereby meet the latest ground rules laid down in the "Analysis." What Representative Udall may not have realized in suggesting these new rules is that they lower the benefit-cost ratio for our Marble plus CAP pumping power alternative even further below its already clearly unacceptable level. Specifically, instead of an 825 mw Marble plus CAP power alternative, the same functions can be performed by a much more efficient 600 mw alternative with a higher load factor located on the shores of Lake Havasu as close as possible to the proposed Havasu pumping plant of the Central Arizona Project. This plant is assumed to produce the 2.308 billion kwh produced by Marble plus as much as possible of the off-peak pumping power required by the CAP. The alternative includes a transmission line to convey the saleable power to the Phoenix area. It is assumed that under the Project the Bureau would purchase off-peak pumping power at its figure of 3 mills/kwh.[15]

Our second detailed case is a 550 mw[16] nuclear plant located in or near Los Angeles. It is assumed that on-peak generation from the plant is traded for on-peak power to operate the pumps from, say, the Mohave plant being built by Southern California Edison Company, or from other sources in that area. Both cases are intended to be illustrative of the diversity of options available for a nuclear alternative.

II. Mr. Udall's Other Specific Complaints

The previous Section discussed both our major quarrel with the Udall "Analysis" and four specific issues which we feel are particularly significant, not only in terms of their bearing on the major quarrel, but also because of what they reveal about the manner and quality of the "Analysis" itself. In this Section we will discuss the remaining specific issues raised by the "Analysis" approximately in the order that they are raised there. The numbering system will follow that of the "Analysis."

MISTAKEN ATTEMPTS TO DISCREDIT NUCLEAR ALTERNATIVES

The first two pages are given over first to an explanation as to why the Bureau did not feel it necessary to examine a nuclear alternative. The argument runs somewhat as follows:

(1) Much of the generating capacity of the Pacific Southwest was in the form of gas-fired (oil-supplemented) steam plants at the time that the Bureau's engineering and economic analyses were made in 1963.

(2) Western Energy Supply and Transmission Associates (WEST) are planning 8,000 mw of new coal-fired plants for the Southwest.

(3) "Therefore, it was felt that the use of fossil fuel-thermal alternatives was completely justifiable. Cost conscious utility executives would not be building and planning coal-fired plants in the Southwest if nuclear plants produced power cheaper."

From there Mr. Udall goes on to attack the feasibility of using nuclear plants for low load faster operation, explaining that—

(4) "I know of no manufacturer who will recommend nuclear plants for low-load factor operation . . . [and that] the author's proposal is . . . entirely theoretical."

In rebutting these statements, we note: (1) That whatever may have been the case in 1963 may not still be the case in 1965 or 1966, particularly in as rapidly changing a field as nuclear power. In 1962 there were only three nuclear plants at full-power operation in the country, all "First Round Demonstration Reactors." In the last thirteen months, contracts have been announced or let for fourteen

[15] Hearings, *op cit.*, p. 164. This is the average rate at which the Bureau expects to sell energy (as distinguished from capacity) from Marble.

[16] Transmission losses would reduce the power received at the load centers from Marble to this level. Our use of a 600 mw alternative in P–3302 was one more free gift that the "Analysis" does not acknowledge.

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new "Second Generation" reactors totalling 9,219 mwe [17], or four times the nuclear capacity installed to that point.

(2) As to the WEST plans, we have heard allegations from several independent sources in the electric power industry that a major report prepared for WEST [18] by Stone and Webster Engineering Corporation favored nuclear power rather than coal (even though the report presumably used higher, real interest rates), but that the report has not been made public by WEST Associates. Perhaps Representative Udall would be in a better position than we [19] to obtain a copy of this report for the enlightenment of the Committee and the Bureau.

(3) We are not arguing whether the Bureau chose the least cost alternative at the time they prepared their January 1964 report; we are arguing whether they are the least cost alternatives at the present time. We do observe, however, that Mr. Dominy's statement prepared for the 1965 hearings included a section entitled "Changes Since January, 1964 Which Affect Economic and Financial Analyses,"[20] in which not a word is mentioned about any change in the least cost alternatives to the two dams. Since our GE cost data date from this period, it is our view that at least at that point the Bureau was not justified in continuing to use Fossil fuel alternatives. We are also somewhat aghast to find that the Bureau would depend on the judgment of anyone else, even "cost-conscious utility executives," on a matter so important as this. This is particularly the case when it is considered that the Bureau should be evaluating its alternatives at the same low interest rate it insists on using for evaluating its own projects, and that this rate differs markedly from the rates used by utility executives.

(4) As to the use of nuclear power under low load factor conditions, operating experience to date is with First Round plants not explicitly designed for flexible operation. Both Shippingport and Dresden have long been operated in load-following rather than baseloaded modes, although nuclear units *in general* are most profitably operated at high load factors. Provided the nuclear and steam system is kept warm to minimize thermal stresses, there exists no technological barrier to operation of a nuclear plant in a peaking mode. We think it very significant that the AEC study, which Mr. Udall himself introduced into the record, apparently did not even think the subject worth discussing, even though it did not include fuel to maintain system operating temperature, as we did.

The same report also states the following:[21]

"The assumed nuclear plant alternative is evaluated on the basis of its providing the same peak and annual generation as the hydro plant. This is a conservative assumption and results in overstating the energy cost potential of the nuclear plant. The output of the hydro plant is determined by water flow characteristics and in designing the plant for meeting peaking loads, the annual capacity factor is relatively low. A nuclear plant can provide the same peaking load and can also operate at a high capacity factor. The capacity factors at which the nuclear plant are evaluated are round 40 per cent."

That is, it is the hydro project that is inherently "fuel" (i.e., water flow) limited; to maximize profitability it will be operated as a peaking unit only. Our calculations were intended to show that the full costs of operation of a comparable nuclear plant at low load factor are less than those of the Marble project. From a revenue standpoint, if secondary power can be sold at above marginal cost, there is every reason to run the nuclear plant to higher load factors. This could include providing off-peak energy for pumping power for Central Arizona Project pumps, either directly via transmission lines or by a displacement or reorganization of the network of energy producers and customers to minimize system transmission losses.

We furthermore provided an alternative that specifically included the pumping power required by the CAP. This alternative, we pointed out, involves little more than the daily load changes experienced by the Dresden (nuclear) plant.

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[17] "Nucleonics News of the Month," *Nucleonics*, Vol. XXIV, No. 3, March 1956, p. 17. Since that report was printed, two more reactors have been announced.

[18] Or possibly some of its member utilities. Mr. T. A. Phillips of Arizona Public Service Company refers to a Stone and Webster study for several WEST members that led to the formation of WEST in a paper entitled "Energy for the Growing West" presented at the American Power Conference, Chicago, Illinois, April 27–29, 1965.

[19] We have met a wall of ignorance wherever we have inquired about the report, which provides some circumstantial evidence as to the truth of the reports we have heard.

[20] Hearings, *op. cit.*, pp. 126–127.

[21] AEC, *op. cit.*, p. 2.

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RESERVES (2)

The "Analysis" notes, as we did on page 11 of P–3302, that we did not make any quantitative allowance for reserves. The "Analysis" has apparently overlooked, however, the fact that we did not include the cost of reserves for the hydroplants either! The Bureau sets these costs at $391,000 for Marble[22] and $913,000 for Bridge.[23] If the "Analysis" wishes to quantify this cost, it is also necessary to add something to our Marble and Bridge Project costs for the same purpose.

We are happy to see that Mr. Udall, unlike Mr. Hosmer, is a little less certain about what would be an equitable allowance for reserves for our alternatives (the reason we thought it better not to try to quantify this particular cost in the first place). We would remind Mr. Udall, however, that the proper allowance for reserves depends not only on the size of the units under consideration, but also on the status of reserves on the system into which the plant is integrated. We note that General Electric assumes 5 percent spinning reserves in its systems studies of fossil versus nuclear costs.[24] We believe that the advent of the Northwest-Southwest intertie and the increasing integration of the Pacific Southwest power grid will greatly reduce reserve requirements during the 100 year period of analysis used here and that the construction of many large generating stations elsewhere in the years to come will greatly decrease the difficulty that any particular system would have in providing reserves for our 600 mw alternative. Taking all these factors into account, we believe that a generous allowance for reserves would be 10 percent. At Mr. Udall's $10/kw-yr (quite a high price considering the Bureau's 3⅛ percent interest rate), this would come to $0.55 million for our 550 mw alternative and $0.60 million for our 600 mw alternative.

We would also point out that one disadvantage of the Projects compared to our alternatives is that unexpected variations in River flow such as have been experienced over the years at Hoover impose an added burden on any consumer or electric utility that must depend on the Projects for firm power. This can usefully be thought of as an additional reserve requirement for the Project. We can only hope and inquire whether this factor has been adequately taken into account by the Bureau when it determined reserve requirements and the expected selling price for power from the Projects.

SWITCHYARD COSTS (3)

The "Analysis" argues about switchyard costs although we have noted that our plant costs are based on GE "upper limit" estimates and that current plant costs are on the order of 10 percent lower than list; we have also included the *private utility* planning factor of 15 percent of plant costs for costs borne by the supplier although a large fraction of this represents interest during construction which for our purposes should be at 3⅛ percent; we felt that we had been overly generous in estimating normal components of plant cost and that miscellaneous items of this sort would be covered. Instead, the "Analysis" has established a capitalized cost of $6 million for the switchyard, although the 500 mw (rated capacity) Nine Mile Point nuclear plant under construction by the Niagara-Mohawk Power Company has switchyard costs of only $2 million.[25] We believe that this is more representative of the costs involved. Since the Udall "Analysis" is so concerned about minor items, however, we wish to improve the accuracy of our estimates by reducing our planning factor from 15 percent to 10 percent, and quantifying various elements assumed to be covered under the original 15 percent.

We also note that the "Analysis" is concerned about possible subtransmission systems from our alternatives to the load centers they serve. We find no reason to believe that our alternatives need be much further from the load centers than the large transformers which will be necessary to step down the voltage of the Bureau's (as yet unspecified) high tension lines.

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[22] Marble project report, *op. cit.*, p. 20.
[23] U.S. Department of the Interior, Bureau of Reclamation, *Pacific Southwest Water Plan, Supplemental Information Report on Bridge Canyon Project, Arizona*, January 1964, p. 20.
[24] General Electric Company, Atomic Power Equipment Department, *Nuclear Power and System Generating Costs: A Conservative Study for Utility Management and System Planners*, GED–5189, San Jose, October 1965, p. 6.
[25] *Electrical World*, June 14, 1965, p. 97.

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THE 825 MW ALTERNATIVE (5)

We have never attempted to "equate" our 825 mw alternative to the Marble Gorge Project. What we said [26] was that our 825 mw alternative could be equated with Marble *plus* the pumping power needs of the CAP (excluding that internally generated by the CAP). As for the explanation that the "600 MW facility serves both pumping and commercial loads," we have yet to learn how Mr. Udall proposed to explain away Secretary Udall's statements before the Committee referred to in the preceding section. In brief, we fail to see why our 825 mw alternative does not fully equate to Marble plus externally supplied CAP pumping needs, at least under the old ground rules.

COOLING WATER COSTS (7)

The "Analysis" again neglects to mention that we listed the exclusion of possible cooling water costs for our nuclear alternatives as an unfavorable assumption,[27] and included about a three-quarter page discussion of the whole issue. We believe our estimates of possible cooling water requirements for our alternatives as given there to be if anything a little high. We observe that the "Analysis's" 60 percent differential between fossil and nuclear cooling water requirements is unsupported and believe 50 percent is more accurate.[28] We note that the "Analysis" talks in terms of "a fossil-fueled thermal installation at maximum efficiency" and note that the figure derived is that for a base-loaded plant, while our nuclear plants would operate at load factors between 40 and 60 percent. We also note that the "Analysis" states that "nuclear plants located inland" must pay conveyance costs of $50 per acre-foot. We fail to see why this must necessarily be the case if the plants are located on major rivers, such as the Southern California Edison Company's Mohave site or our Lake Havasu site.

SPECIAL NUCLEAR INSURANCE

The "Analysis" totally misinterprets the quotation from P–3302 concerning the fact that the "Marble Canyon Project, with its much longer assumed payout period, contains a greater element of risk than the nuclear alternative." The risk referred to is not that of a disaster (which is normally covered by insurance rather than a higher rate of interest), but rather the economic risk that economic conditions will change in such a way that the Project will not be able to pay back the capital invested in it with suitable interest.

The "Analysis" shows great concern [29] for possible Federal Government losses due to its assumed nuclear risk above $74 million. We note that we have already charged $30 per thermal megawatt per year for insurance premiums to the Federal Government to cover the risk based on the provisions of the Price-Anderson Act. If Mr. Udall believes this sum to be inadequate, we suggest that the appropriate action would be to introduce legislation to amend the Act. We see no reason to alter our stated view [30] that our treatment of the insurance question is quite conservative.

BRIDGE CANYON PROJECT

We have the following point-by-point rebuttal to Mr. Udall's brief comments on the Bridge Canyon analysis:

Hydro Adjustment Factor (1): "Although the principle of pumped storage owes its existence to the demand for more economical peaking power, it attains even greater value in providing almost instantaneous spinning reserve. This facility of rapid loading, with the set able to pick up load within a matter of sec-

[26] P–3302, p. 10.
[27] P–3302, pp. 11–12, item 3.
[28] See, e.g., W. Kenneth Davis, "Nuclear Energy and the Natural Environment," Paper for presentation at Federation of Western Outdoor Clubs Conference, Seattle, Washington, 23 April 1966, Bechtel Corporation, p. 12. Cooling water costs are developed in notes to Table 2 below.
[29] "Analysis * * *," pp. 7–8.
[30] As explained on page 23 of P–3302.

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onds, is unmatched by any other form of peaking power—making pumped storage an ideal standby in the event of a sudden unit outage." [31] Therefore, no hydrothermal adjustment factor is justified against a pumped storage plant.

Switchyard Costs (*2*) : Our comments here are the same as those previously made under Marble Canyon.

Transmission Costs (*3*) : The transmission lines between the nuclear and pumped storage facilities are not likely to be long in the Southern California area (where our alternatives would almost certainly have to be located if 1350 mw of peaking capacity are to be readily absorbed) because of the close proximity of mountains and ocean. We believe this cost to be minor compared to the substantial gap between benefits and costs shown even for our P–3302-type level of quantification using GE plant and fuel costs.

Cost of Pumping Energy (*4*) : The Udall "Analysis" is wide of the mark here. This cost has already been incorporated in the calculations. The 762 mw at a cycle efficiency of 2/3 is equivalent to 508 mw, so that 762 mw from the nuclear plant at a load factor of 49 percent (off-peak) will provide 588 mw on-peak from the pumped-storage unit at the required 42 percent load factor, together with the 762 mw on-peak from the nuclear plant. All energy costs have been assigned to either the nuclear or pumped storage sections of the project.

Cooling Water Costs (*5*) : As indicated above, the Southern California area with its close proximity to the ocean is probably the only area capable of absorbing the output from this plant; therefore the imputed cost of water evaporated at Bridge, which would be substantial, should be added to the hydro costs, not cooling water costs to the nuclear.

As to the problems of findings a suitable site for a proposed nuclear-and-pumped-storage plant, our position is that Southern California is particularly well endowed with ocean water for cooling, nearby mountains for developing head, and large load centers all in close proximity to each other. This suggests a reasonable probability that a suitable site could be found within the cost figures shown if the Bureau wanted to investigate the possibilities of a least cost alternative to Bridge.

III. The Favorable Assumptions

Now that we have discussed all of the proposed nuclear cost increases and other issues raised by the Udall "Analysis," we wish to turn to the simplifying assumptions favorable to the Marble Project, which Mr. Udall has totally ignored Our aim is to quantify them as best we can given the Bureau's proposals so as to be able to compare them with the additional quantifications that the "Analysis" has proposed on the other side. We shall follow the same order and numbering system used in P–3302 in discussing them.

1. USE OF GENERAL ELECTRIC PRICE LIST

Enough is said in P–3302 on this subject. We believe we would be justified in reducing our plant capital costs by 5 to 10 percent and using our computer code fuel costs. As mentioned at the end of the prepared Statement, it appears likely that when fully analyzed, recent bids for a 1000 mw nuclear plant for TVA will show a sharp downward drop in nuclear power costs below that reflected in the GE price list used in our analysis. A TVA report showing a detailed financial analysis of the bids is expected in June.

2. CONSTANT PRICES

Construction costs, particularly for on-site construction labor, have risen rapidly since the Bureau's cost estimates were made in October 1963. The question of exactly how much they have risen for these two particular dams would require a new (and we would hope independent) cost estimate. On way of approximating the change, however, is to use available indexes of construction costs (which represent the bulk of Project costs). Perhaps the most appropriate for the purpose is the *Engineering News Record* construction price index quoted in the Commerce Department's *Survey of Current Business*. This inceased from 120.5 in October 1963 to 132.4 on April 1, 1966, or about 10 percent. On the other

[31] R. K. Evans, "Pumped Storage Hydro," *Power*, May 1966, p. 192.

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hand, nuclear plant costs have continued to decline during the period,[32] so that use of our earlier (1965) figures is a conservative estimate of the price changes involved. Annual capital costs for the Project should be increased from the $8.45 million shown in our Paper to $9.33 million,[33] or an increase of $0.88 million.

3 USE OF GENERAL ELECTRICAL DATA OPTIMIZED FOR BASELOADED PLANT

Until detailed technical studies are carried out on this question, it is almost impossible to attempt to quantify the cost of this favorable assumption. But it may well be substantial.

4. EXCLUSION OF MARBLE CANYON EVAPORATION AND SEEPAGE LOSSES

As indicated in P–3302, the major uncertainty here is the value of the water evaporated by the Project. Mr. Udall does not challenge our suggested valuation of the water, but instead questions our estimates of the additional net water losses resulting from the Project.

We specifically state in the Paper that "a plausible assumption is that the additional seepage resulting from the reservoir exceeds present evaporation from the River."[34] We footnote two sources who believe that such seepage will be significant. Since Mr. Udall does not attempt to refute this argument or even footnote any authorities who may hold contrary views, we see no reason to abandon our original position. Mr. Udall further believes that total evaporation will be only 20,000 acre-feet per year (twice 10,000), as opposed to our documented 30,000 acre-feet. Once again, in the absence of any documentation for his belief, we see little reason to accept his unsupported opinion. At our $52 per acre-foot,[35] 30,000 acre-feet per year comes to $1.56 million.

We should also like to point out that economic theory would suggest that it would be appropriate to make an annual charge equivalent to the annual capital charges on the value of the water held in bank "storage." Since this water is unlikely to be recovered (since the reservoirs will eventually be filled with silt rather than emptied), this charge should be made in perpetuity. We will define seepage losses to include this charge.

5. EXCLUSION OF MARBLE CANYON'S EFFECT ON THE CANYON'S NATURAL BEAUTY

This is undoubtedly one of the major favorable assumptions we made in favor of the Project. Judging by the public response to the appeal of the conservationists to defeat the proposal and the many man hours that have been voluntarily poured into defeating the dams, many people must believe this to be very important. But how much? We would still prefer not to try to qualify this.

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[32] While shop wages, which constitute a larger proportion of nuclear plant costs, have also been rising, so has productivity. In addition, the nuclear power industry is reducing plant prices very rapidly due to the impact of rapid technological advance and increasing economies of scale resulting from rapidly rising orders.

[33] Capital costs shown in Table 3 of the Marble Gorge project report, *op. cit.*, should be revised as follows:

[In millions of dollars]

	Project report	P–3302	Revised
1. Construction costs	237.57	237.57	261.33
2. Interest during construction	20.17	20.17	23.12
3. Total Federal costs	257.74	257.74	284.45
4. Average annual capital costs	8.16	8.45	9.33

NOTE.—The revised line 1 figure is 10 percent higher than the Bureau figures. The revised line 2 figure has first been increased 4.17 percent to reflect the 3⅛-percent interest rate (as compared to the 3 percent used in the project report), and then 10 percent more to reflect the price change. The line 4 revised figure reflects the same 3.28-percent gross return used in P–3302.

[34] *Op. cit.*, p. 16.

[35] P–3302, p. 17. With the increased Upper Basin depletion now envisaged, the MWD seems destined to lose at least part of its present allotment before very long if the Central Arizona Project is built.

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6. EXCLUSION OF COST OF AN AFTERBAY STRUCTURE AND CONTINUED USE OF RIVER BY BOATING EXPEDITIONS

The Bureau still has not made public (to the best of our knowledge), what the cost of an afterbay structure would be. Apparently it hopes that it can get by without even building such a structure, despite the serious effects that a peaking facility would have on park values without it. An adequate structure would undoubtedly cost millions of dollars.

We believe that $120,000[36] is a conservative figure for the producers' and consumers' surplus that would be foregone in an average year as a result of a reduction if not abandonment of boating expeditions through the Grand Canyon.

7. ACCEPTANCE OF THE BUREAU'S ALLEGED RECREATION AND FISH AND WILDLIFE BENEFITS

We neglected to mention in P–3302 that we had accepted the Bureau's alleged benefits for recreation and fish and wildlife without the critical examination they deserve. We see no evidence that the Bureau has taken account of the fact that a considerable portion of their assumed recreational and fishing use is likely to draw visitors away from other nearby reservoirs, particularly Lake Mead and Lake Powell, and therefore cannot be taken as a net increase in benefits to the nation. Since the new reservoirs would be about equally far from major population centers and the existing reservoirs cannot be said to be overcrowded, we argue that the Bureau's estimates can be conservatively reduced by at least one-half.

8. USE OF STREAM FLOWS ASSUMED IN PROJECT REPORTS

For reasons already outlined in the prepared Statement, the stream flow projections used in the project reports and P–3302 are almost certainly too optimistic for the 100-year assumed life of the Projects. As suggested in the Statement, the effect of lower stream flow projections is to further lower the benefit-cost ratios for the Projects.

9. USE OF SUBSIDIZED 3-1/8 PERCENT INTEREST RATE

Use of higher, real interest rates would have a dramatic effect in lowering the benefit-cost ratio because of the fact that the Projects are more capital intensive. At any reasonable interest rate, there can be no possible doubt as to the economic infeasibility of the Projects. We would also point out that even the Bureau's interest rate is likely to rise at the end of the Fiscal Year, June 30.

IV. New Benefit-Cost Calculations With Increased Quantification

With the detailed discussion in the last three Sections of some of the assumptions made in P–3302, both favorable and unfavorable, behind us, we can turn now to some new benefit-cost calculations at the increased level of quantification apparently desired by Mr. Udall. In column (1) of Table 1 we show the average annual costs of our highest cost 600 mw nuclear alternative from P–3302 with GE plant and fuel costs and 10.55 million acre feet (maf) stream flow. For comparative purposes we also show Mr. Udall's cost estimates for the same case. Column (3) shows the costs of a 550 mw nuclear alternative located on or near the Southern California Coast, with all the added costs desired by Mr. Udall as modified for the reasons stated in the preceding pages. The transmission costs shown are for a transmission line from the planned Mohave plant of Southern California Edison Company in extreme Southern Nevada to the vicinity of Parker Dam[37] adequate to carry the on-peak power needed by the CAP pumps. The idea is that the power supplied by the Mohave plant to the pumps, which would otherwise have gone to the Los Angeles area, is replaced by power generated at the 550 mw nuclear alternative, or by some similar revision of the generation and transmission network.

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[36] See P–3302, p. 18.

[37] It is assumed, based on the Bureau of Reclamation's "Analysis of Mr. Alan P. Carlin's Statement 'An Economic Re-evaluation of the Proposed Marble Canyon Project'" (unpublished), p. 3, where they propose a line from Hoover to Parker Dams for the same purpose, that the Central Arizona Project includes the cost of transmission facilities from Parker to the pumping facilities. It should be noted that most of the power would be required at the Havasu Pumping Plants to be located only a few miles from the Lake.

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Column (4) of Table 1 shows the costs of a 600 mw nuclear alternative located on the Southern end of Lake Havasu near Parker Dam and the proposed Havasu Pumping Plants. The transmission costs shown are for a double circuit line to the Phoenix area to market power not needed by the CAP pumps.[38]

TABLE 1.—*Average annual costs of alternative nuclear powerplants*

CASE P-3302

[In millions of dollars]

Plant size (MW)	GE costs 600 (1)	Udall 600 (2)	Quantified Los Angeles 550 (3)	Quantified Lake Havasu 600 (4)
1. Capital costs	4.54	4.54	4.44	4.53
2. Fuel costs:				
(*a*) Power production	2.40	2.95	2.88	4.29
(*b*) Spinning reserve	.32	.39	.33	
3. Operation and maintenance costs:				
(*a*) Fixed	.84	.84	.77	.84
(*b*) Variable	.21	.21	.21	.32
4. Special nuclear insurance	.31	.31	.28	.31
5. Hydro adjustment		.45	.22	.23
6. Switchyard		.34	.25	.86
7. Transmission		1.20	.37	
8. Reserves			.55	.60
9. Total	9.24	11.23	10.30	11.98

NOTES ON COLUMN

(1) From column (2), Table 3 of Alan P. Carlin and William E. Hoehn, "Is the Marble Canyon Project Economically Justified?" The RAND Corp., P-3302, February 1966, p. 22. Based on General Electric fuel and plant costs, stream flow of 10.55 maf, and an interest rate of 3⅛ percent, as are the reamining columns.

(2) Based on Morris K. Udall, "Analysis of Alan P. Carlin's Testimony—'Economic Feasibility of the Proposed Marble and Bridge Canyon Projects, May 1966,'" May 13, 1966, pp. 7–8.

(3): Line 1: Prime contractor costs of $67.6 million plus 10-percent planning factor plus $5.0 for water conduits into ocean, all at a gross return of 5.59 percent. See Table 1 of P–3302 for further references. Line 2(*a*): Assumes annual generation of 2,123 billion kwh at an average fuel cost of 1.36 mills/kwh (developed in a similar way as in Table 2 of P–3302). Line 2(*b*): Assumes that plant will consume 10-percent of full fuel load requirements for 4,415 hours per year. Line 3: Assumes fixed operating costs of $1.40/kw-yr and variable of 0.1 mil/kwh as in Table 3 of P–3302. Line 4: Developed as in line 4, Table 3, P–3302. Line 5: Five percent of plant capacity at $10/kw-yr. Line 6: Assumes switchyard capital costs of $4/kw (based on the Nine Mile Point costs as given in *Electrical World*, June 14, 1965, p. 97). Operating, maintenance, and interim replacement costs are derived from figures given in Federal Power Commission, Bureau of Power, *Instructions for Estimating Electric Power Costs and Values*, Technical Memorandum No. 1, March 1960, pp. 45 and 96. Line 7: Assumes a 75 mile, 230 kv double circuit line from Mohave plant to Parker Dam with capital costs of $65,000/mile (based on right of way and clearing costs of $5,000/mile and labor, and materials costs of $60,000/mile as given in Federal Power Commission, *National Power Survey, Part II—Advisory Reports*, October 1964, p. 87). Includes a receiving substation at Parker Dam. Operating, maintenance, and interim replacement are based on FPC, Technical Memorandum No. 1, *op. cit.*, pp. 45 and 97.

(4): Line 1: Plant costs of $70.6 million (from Table 1, line 3, P–3302) plus 10 percent planning factor plus $4.8 million for cooling towers, all at a gross return of 5.59 percent. Line 2(*a*): Assumes annual generation of 3,226 billion kwh at an average cost of 1.33 mills/kwh (developed in a similar way as in Table 2 of P–3302). The 3.226 is the sum of the 2.308 generated at Marble plus 0.918 billion for Central Arizona Project pumping during off-peak hours. Lines 3 and 4: Same as in column (2), Table 3, P–3302. Line 5: Five percent of plant capacity at $10/kw-yr. Lines 6 and 7: Includes a sending switchyard at the plant, a receiving substation in Phoenix, and 130 miles of double circuit 345 kv line. Transmission line capital costs are taken as $85,000 per mile (based on $5,000/mile for right-of-way and clearing and $80,000/mile for structures as given in FPC, National Power Survey, *op. cit.*). Capital costs of switchyard, substation, and associated transmission facilities are taken as $5.0 million. Operating, maintenance, and interim replacement are based on FPC, Technical Memorandum No. 1, *op. cit.*, pp. 45, 96, and 97.

[38] At the cost of a few additional miles of transmission line, it would be possible to route the line by way of the CAP pumping stations between Lake Havasu and Phoenix.

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It will be seen that in both cases the benefit-cost ratio is 0.79 to 1.[39] We recognize that this figure is based on a number of uncertainties, but wish to point out that we are only following Mr. Udall's lead in this regard. We also wish to emphasize that this benefit-cost ratio is overstated because it is based on a number of non-quantified assumptions favorable to the Marble Gorge project. These favorable assumptions include the following:[40] (1) Use of General Electric Price List, (3) use of General Electric data optimized for a baseloaded plant, (5) exclusion of the Project's effect on the Canyon's natural beauty, (6) exclusion of cost of an afterbay structure, (8) use of an average annual stream flow of 10.55 maf, and (9) use of the heavily subsidized 3⅛ percent interest rate.

Before Mr. Udall can hope to show more than a 0.79 to 1 benefit-cost ratio, he must first show that whatever further additional costs he feels we have left out exceed the costs of the favorable assumptions remaining in Table 2. At the very least this would require that his added cost exceed the sum of the savings from using (1) our computer code fuel costs, (6) the added cost of an adequate afterbay structure, and (8) the savings (in alternative nuclear costs) resulting from more realistic stream flow projections. Even if his new proposed added costs did all that, he could still claim only a 0.79 to 1 benefit-cost ratio. And even that is likely to fall within the next month and a half as a result of publication of the analysis of the bids on the new TVA nuclear plant and the higher interest rate for Bureau benefit-cost analyses which is likely to become effective at the end of the Fiscal year on June 30.

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[39] The Udall "Analysis" contends that our benefit-cost ratio developed using the nuclear cost data in the AEC study previously footnoted would also be greater than one-to-one if we had included the nonquantified items discussed in the "Analysis." Since the AEC nuclear costs are slightly lower than the all-GE costs used in columns (3) and (4) of Table 2, it can be assumed that the benefit-cost ratio using the AEC costs would be even lower than 0.79 to 1 if it were recomputed on the basis of the increased level of quantification shown here. While it is true that the much discussed AEC study was not developed specifically for benefit-cost analysis, we believe our use of the study's nuclear costs in such an analysis was entirely valid within the bounds of the stated simplifying assumptions made in P–3302. This contrasts sharply with the invalid comparisons of "at site" nuclear and hydro costs made by Mr. Udall using the AEC study during the course of the Subcommittee's May 12 sessions, and the other inaccuracies discussed in the first Section that rule out comparison of the AEC cost figures in *mills per kwh*.

[40] The numbers in parentheses refer to the numbering in the discussion of the favorable assumptions in Section III.

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TABLE 2.—*Benefits and costs of proposed and expanded Marble Gorge project with added quantification*

[Millions of dollars]

	Marble Gorge project			Marble-CAP power quantified Lake Havasu
	P-3302	Udall	Quantified Los Angeles	
	(1)	(2)	(3)	(4)
1. Benefits:				
(a) Power	9.05	11.04	10.11	11.79
(b) Fish and wildlife	.36	.36	.18	.18
(c) Recreation	.32	.32	.04	.04
(d) Area redevelopment	.15	.15	.15	.15
(e) Total	9.88	11.87	10.48	12.16
2. Costs:				
(a) Capital charges	8.45	8.45	9.33	9.33
(b) Operating costs	1.94	1.94	1.94	1.94
(c) Power purchases			.39	3.14
(d) Water losses			1.56	1.04
(e) Total	10.39	10.39	13.22	15.45
3. Benefit-cost ratio	0.95 to 1	1.14 to 1	0.79 to 1	0.79 to 1

IMPORTANT NOTE.—Cols. (3) and (4) overstate the benefit-cost ratio in that they make the following assumptions favorable to the Marble Gorge project: (1) Use of General Electric price list, (3) use of General Electric data optimized for baseloaded plant, (5) exclusion of project's effect on canyon's natural beauty, (6) exclusion of cost of afterbay structure, (8) use of average annual streamflow of 10.55 MAF, and (9) use of subsidized 3⅛-percent interest rate.

NOTES

(1) From col. (4), table 4, of Alan P. Carlin and William E. Hoehn, "Is the Marble Canyon Project Economically Justified?" The Rand Corp., P-3302, February 1966, p. 24.

(2) Based on Morris K. Udall, "Analysis of Alan P. Carlin's Testimony—'Economic Feasibility of the Proposed Marble and Bridge Canyon Projects, May 1966,'" May 13, 1966, pp. 7–8.

(3) Based on 550 megawatts nuclear alternative located on or off the southern California coast with additional quantification of both benefits and costs beyond that shown in P-3302. Line 1a: Line 9, col. (3) of table 1 minus $0.19 million representing the annual loss of revenue resulting from the reduction in energy generation from Glen Canyon powerplant if the Marble Gorge project is built. Line 1b: Half of col. (1). Line 1c: Half of col. (1) minus $0.12 million for the consumers' and producers' surplus foregone as a result of reduction in boating expeditions through the Grand Canyon. Line 2a: Gross return of 3.28 percent on $261.33 million of construction costs and $23.12 million representing interest during construction. Project report figures have been increased to take account of higher 3⅛ percent interest rate and 10 percent inflation in construction costs. Line 2c: Cost of purchasing power to firm the on-peak generation of Marble, as given in U.S. Department of the Interior, Bureau of Reclamation, "Pacific Southwest Water Plan, Supplemental Information Report on Marble Canyon Project, Arizona," January 1964, p. 20. Line 2d: Value of the estimated 30,000 acre-feet that would annually be evaporated from the surface of the proposed Marble Gorge Reservoir at $52 per acre-foot.

(4) Based on 600 megawatts nuclear alternative located at the southern end of Lake Havasu near Parker Dam with additional quantification of both benefits and costs beyond that shown in P-3302. Line 1a: Line 9, col. (4) of table 1 minus $0.19 million. Line 2c: $0.39 million to firm Marble on-peak generation plus $2.75 million to purchase 0.918 billion kilowatt-hours off-peak for the central Arizona project pumps at 3 mills per kilowatt-hour. Line 2d: Value of the estimated 30,000 acre-feet evaporated annually by the proposed Marble Reservoir minus 10,000 acre-feet evaporated for cooling purposes at the Lake Havasu alternative, all at $52 per acre-foot. The 10,000 acre-foot figure was derived from numbers given by H. N. Scholl for a 1,800 megawatt electric thermal plant in Pennsylvania utilizing cooling towers (as reported in "How Keystone Design Solves a Complex Water Problem," "Power Engineering," vol. 70, No. 3, March 1966, p. 38). Mr. Scholl reports that the plant uses 1,700 gallons per minute of water: this can be conservatively taken as 10 gallons per minute per megawatt electric. The 50-percent increase in requirements for nuclear usage would imply 15 gallons per minute per nuclear megawatt electric, or 900 gallons per megawatt-hour. Since our proposed schedule calls for 600 megawatts electric for 3,850 hours and 225 megawatts electric for 3,600 hours, 208×10^7 gallons annually during peaking operation, and 83×10^7 gallons annually for pumping power generation, or 291×10^7 gallons annually overall are required. At 326.7×10^3 gallons per acre-foot, this implies 8,907 acre-feet per year as the water usage. To be conservative, we have increased this by about 12 percent to 10,000 acre-feet per year, which should easily cover any increased evaporation losses from location in the Southwest.

SOME CLOSING OBSERVATIONS

We wish to close by making two observations:

(1) Mr. Udall does not make a serious attempt to defend the ridiculously high benefit-cost ratios still used by the Bureau for the two Projects.[41] We can

[41] Power benefits claimed for Marble are $17.17 million, which at 3 mills/kwh energy charge would imply that the least cost alternative the Bureau could find would have a capacity charge of $18 per kilowatt-year, if the energy charge is 3 mills/kwh.

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well understand why this might be the case. We can also partially understand why the Bureau may not have kept up with the rapidly changing nuclear power picture to the extent required. We do think that they should not have to be dragged into the nuclear age now that the possibilities have been pointed out to them.

(2) At the figure of $10 per kilowatt-year capacity charges and 3 mills per kwh energy charge, the annual revenue for Marble Gorge will approximate $12.37 million annually (assuming the Project report's unlikely 10.55 maf stream flow). As indicated in Table 2, columns (3) or (4), the annual costs of Marble Gorge excluding water losses total $11.66 million. Since the benefit-cost figures have been derived on a 100 year basis, no shorter period of writeoff (as for financial analysis) could reduce this average annual cost figure. Since the net return is no more than $0.71 million per year, the total contribution to the development fund over the 100 year lifetime of Marble Gorge alone *cannot exceed* $71.0 million. It would therefore seem a poor gamble to consider a capital investment of $257 million that has a maximum annual rate of return of less than 0.3 percent above *present* Treasury capital charges of 3⅛ percent.

Mr. UDALL. Mr. Chairman, for the record, I wanted to add, because it is on the same subject, this morning Mr. Ingram made some comment indicating that Imperial and MWD are using three-mill power that they purchase at the present time. I am told by California experts that this purchase is only a minor part of their load. It is not firm power. It is only power if and when available. You can't supply water for people to drink or to irrigate based on a nonfirm power supply, and with that I have concluded my remarks.

(It has been determined that the following is appropriate for inclusion in the record at this point:)

IMPERIAL IRRIGATION DISTRICT,
Imperial, Calif., May 16, 1966.

Mr. NORTHCUTT ELY,
Ely & Duncan,
Tower Building,
Washington, D.C.

DEAR MIKE: Reference is made to our telephone conversation of today regarding last Friday's testimony wherein a Mr. Jeffrey Ingram, representing the Sierra Club, made the statement that Imperial Irrigation District is purchasing energy from Arizona Public Service Company under a contractual agreement for 3 mills.

In the hearings in the afternoon session Mr. Udall, representing Arizona, made the observation in the hearings that this price could not be correct, but was one based on dump energy. This is not the case either. Though we purchase interchange or economy energy from time to time, the price we have contracted with APS is for energy, including capacity, and it is more in the neighborhood of between 8 and 12 mills, than 3 mills as reported by Mr. Ingram.

I am taking the liberty of furnishing you a copy of Imperial Irrigation District's "Power Report" for the year 1965 and ask that you refer to page 12 which compares Parker-Davis hydro, IID's hydro, diesel, steam and other production costs (APS). Under "Other Production," the reference "Participation—Axis (Capacity)" at 8.9136 mills per kwh when added to the Energy charge of 4.0543 mills per kwh is substantially higher than the 3 mills reported. This record has been prepared from billings and monthly operating statements furnished to us by Arizona Public Service Company.

This should clear the record.

Sincerely yours,

R. F. CARTER,
General Manager.

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Mr. HOSMER. Will the gentleman yield?

Mr. UDALL. Yes.

Mr. HOSMER. Also subject to an annual charge.

Mr. UDALL. That is my understanding. Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Hosmer?

Mr. HOSMER. Mr. Carlin, you have made a lot of calculations here, and summarized them in tables 1, 2, 3, and 4 in your testimony, have you not?

Mr. CARLIN. And what?

Mr. HOSMER. Summarized them in tables one through four, inclusive, of your paper.

Mr. CARLIN. These contain most but not all of the calculations that I outlined.

Mr. HOSMER. Nuclear power calculations, I assume, were based on the same type of Government financing that the——

Mr. CARLIN. Exactly.

Mr. HOSMER (continuing). As the other ones?

Mr. CARLIN. Precisely.

Mr. HOSMER. Now, I believe that there was no provision made in your calculations for reserves for the single unit nuclear plant, is that correct?

Mr. CARLIN. Yes, sir.

Mr. HOSMER. And that something around $1,080,000 for the 600-megawatt and $1,485,000 for the 825 plant would have to be added to the cost for this reserve factor.

Mr. CARLIN. Well, this is a figure which I think is not easily quantified. I would have to——

Mr. HOSMER. Worth about——

Mr. CARLIN (continuing). Take a look and——

Mr. HOSMER. Eighteen percent factor. That is—you are an economist. You know all of these things. You know what the figures are.

Mr. CARLIN. Instead of trying to quantify these things, what we did is to make a list, starting on page 11 of the February paper, of the various assumptions we had to make in order to get this thing adequately quantified, both favorable to the project and unfavorable. I think if you turn to the assumptions favorable to the project, starting on page 12, you will find quite large sums on the other side which have not been included either.

Mr. HOSMER. Maybe we will get around to them if you will let me ask my question. You haven't made any allowance for terminal switchyards for these nuclear plants, have you? Any cost allocations, terminal switchplants, nuclear plants.

Mr. CARLIN. No, sir.

Mr. HOSMER. And you haven't made any allowance for transmission costs associated with the pumping functions of the project, have you?

Mr. CARLIN. No, sir.

Mr. HOSMER. And you haven't made any allowance for the 5- to 10-percent hydrothermal adjustment that the Federal Power Commission takes into account in connection with these projects.

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Mr. CARLIN. That assumption is listed on page 11 and would not hold in the case of my conclusions with regard to the Bridge Canyon project.

Mr. HOSMER. You pick and choose what assumptions you want to put in, is that right?

Mr. CARLIN. I have carefully stated why I have made the assumptions I have made. I think they are entirely justified. I think that the Bureau has raised some of these points with regard to my earlier paper. I have tried to answer them, point by point.

Mr. HOSMER. Well, nevertheless, this is a calculation that enters into—as a matter of routine—into these comparisons which you have decided on your own part not to be included. I just want the record to show that.

Now, have you made any allocation at all against your nuclear plants for the cost of your cooling water?

Mr. CARLIN. We include a section talking about that on the bottom of page 11.

Mr. HOSMER. That doesn't show up in your cost in your table when you make a comparison, does it?

Mr. CARLIN. And over to page 12. During the morning to exclude the paper. I was asked to briefly summarize it. This is all I was able to do in the brief time that was accorded me. I am hopeful that, in spite of your request during the morning, my entire paper which shows the assumptions, et cetera, will be included in the record so the people can judge for themselves.

Mr. HOSMER. I don't doubt that it will be, Doctor, but I am still going to get to the fact that you have not in these costs that you came up with for a nuclear plant, factored in any cost for cooling water in these tables.

Mr. CARLIN. If the plant is located on the ocean, the costs are almost negligible.

Mr. HOSMER. Are you talking about loading, putting these plants on the Pacific Ocean?

Mr. CARLIN. That is correct, sir.

Mr. HOSMER. Or the Atlantic Ocean?

Mr. CARLIN. In the Los Angeles area. This is specified in the paper.

Mr. HOSMER. Well, now, you criticized when you first began, the Bureau for not ——

Mr. CARLIN. This is one of the possible places.

Mr. HOSMER (continuing). For not taking the best alternative. Why do you want to put this on the Pacific coast when there could possibly be some place on some other coast where you could peddle electricity for even a higher price? You have disassociated electricity from the project. Now we have gone to the logical question, where can the U.S. Government put in a nuclear plant and sell electricity for the highest profit?

Mr. CARLIN. When you are conducting a benefit-cost study, you are looking at the lowest cost alternative that will do the same thing that the project will do. Therefore, the plant should be located in the

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market area in which the power generated by the project would be sold. That is why ——

Mr. HOSMER. Now, that is in full violation of the chart you have up here about how cheap you can produce nuclear kilowatts and how much you can sell them for. So you have to put this plant in the location in this country where you can get the very highest mills per kilwott-hour for your electricity. Otherwise, you are violating the whole thesis that you dragged in here.

Mr. CARLIN. No, sir.

Mr. HOSMER. You want to put the Federal Government in the power business. I don't see ——

Mr. CARLIN. I have never advocated the Federal Government building any nuclear station whatsoever.

Mr. HOSMER. You want to put them into nuclear power. Why don't you get them in the TV business? That is more profitable. They can build some TV stations.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. I would first like to comment on the criticism of one of the assumptions made by Mr. Hosmer. To my knowledge, the Marble and Bridge Canyon projects do not account for transmission line costs either, and that is justifiable because of the fact that it is supposed to be peaking power and the power shouldn't be going from the dam to the pumping sites because that isn't where the power is to be used according to the Bureau of Reclamation. I think it is a justified assumption.

Mr. CARLIN. Well, sir, one great advantage of having a nonhydro plant is you can locate it at the load center. This menas that you don't have to build these costly transmission lines which are required if you had a hydro site a long way from the load center. This is why the transmission costs are not included.

Mr. REINECKE. I understand that. Your paper indicates some earlier papers, and you indicated that you submitted one last August and that one of these apparently did go to the Bureau of Reclamation. Have you had any comment on that? Well, let me ask you this.

Did your paper submitted last fall indicate a less than 1-to-1 cost-benefit ratio?

Mr. CARLIN. Yes; it did indicate a slightly less than 1-to-1 ratio although it is slightly higher than the figures shown here. It was based on Federal Power Commission nuclear cost projections.

Mr. REINECKE. Did the Bureau comment on that, as to where they disagree with you?

Mr. CARLIN. Yes, they did.

Mr. REINECKE. Where was the principal area of discrepancy in their figuring as opposed to your figuring?

Mr. CARLIN. I have stated on pages 5 and 6 going on to page 7 of the paper what their principal objections are and what my replies

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are. Their principal objections were, one, that the "usual practice" in "project benefit analysis, is to measure the benefit in terms of the cost of achieving the same results by the most likely alternative means that would exist in the absence of the project."

And, two, that "Mr. Carlin has overlooked the cost of transmitting power to the central Arizona pumping plant which is a project function of the Marble Canyon hydro facility."

I could read you ——

Mr. REINECKE. No. I understand. That second one is interesting because apparently the Bureau of Reclamation intends to run those transmission lines even though they have stated that they are not going to use the power to pump for C.A.P.

Mr. CARLIN. That is right.

Mr. REINECKE. It is a rather interesting inconsistency.

Mr. CARLIN. That is one of the most amazing parts of what my colleague and I found to be a most amazing reply from the Bureau.

Mr. REINECKE. Back on table 4 in your tables, Dr. Carlin, page 24, it seems to be the meat of your conclusions in a comparative column showing Bureau of Reclamation, now, the first item under Benefits Being Generated From Power shows quite a discrepancy. That is, Bureau of Reclamation benefits—17 million as opposed to all of the others. That is, yours as well as AEC, on the order of somewhere between 8 million and 9 million.

Can you give us any idea as to where this discrepancy is generated? Why this vast difference?

Mr. CARLIN. My best hypothesis, taking into account the fact that the Bureau has a sum total of three sentences in which they tried to justify their figure, is that what they have done is to take Federal Power Commission data which reflects much higher capital charges than the 3⅛ percent which they used to measure the cost of their own project.

Mr. REINECKE. Well, just that difference in capital costs almost doubles or will in this case double the benefit assumptions derived from those calculations?

Mr. CARLIN. That is only ——

Mr. REINECKE. Is that the principle?

Mr. CARLIN. That is one of major differences, I suspect. The other major one is that they are using gas-fired thermal plants, whereas I am using nuclear plants. And for reasons that are hard to understand, they have said it is necessary to build two alternative plants instead of only one.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. REINECKE. Thank you, Mr. Chairman. Thank you, Dr. Carlin.

Mr. ROGERS of Texas. Doctor, thank you very much for your contribution to the record.

Mr. ROGERS of Texas. Our next witness is Mr. Laurence I. Moss, nuclear engineer.

Mr. Moss.

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STATEMENT OF LAURENCE I. MOSS, NUCLEAR ENGINEER

Mr. ROGERS of Texas. You may proceed, Mr. Moss.

Mr. Moss. Mr. Chairman, I wish to thank this committee for giving me the opportunity to speak, to present some testimony relating to considerations of nuclear power versus power from hydro facilities, because I think it pertains to the discussions that have been held.

With your permission, I would like to request that my written statement be included in the record as if read, and I then will briefly comment on a few points.

Mr. ROGERS of Texas. Without objection, your statement will be included in the record the same as if read.

Mr. HOSMER. Reserving the right to object, Mr. Chairman, I want to make my same pro forma objection on the basis of the fact that this is repetitious and I ask that he withdraw in light of the reasons heretofore given by the Chair for overruling my point of order and reservation.

Mr. ROGERS of Texas. Well, the Chair would say this. The gentleman has the right to object if he doesn't want the statement in and no reasons are necessary. If he objects, he objects. If he doesn't, he doesn't.

Mr. HOSMER. I stated that I would reserve my right to object. I did not object for the reasons ruled by the Chairman earlier.

Mr. ROGERS of Texas. Well, this Chair didn't rule on it. This Chair is ruling right now that if you want to object, you have to object now. If you don't, the statement is going in.

Mr. HOSMER. The ruling was made while the chair was temporarily occupied by the Chairman of the full committee this morning.

Mr. ROGERS of Texas. I appreciate that, but this is an entirely different situation. If the gentleman wants to object, he can object. If he doesn't, he should say so.

Is there objection to the unanimous consent request to include the statement of the gentleman, Mr. Moss, in the record the same as if read in full? If not, it will be included, Mr. Moss. And you may proceed.

Mr. Moss. Thank you. I would like to thank Mr. Udall for giving me permission to use the chart which he referred to on Monday, and which is here before us. In it, he has demonstrated the effect of load factor on the cost of power from nuclear fuel, fossil fuel, and hydro installations.

I have a few comments about that chart which I think will illustrate some points.

(The chart follows:)

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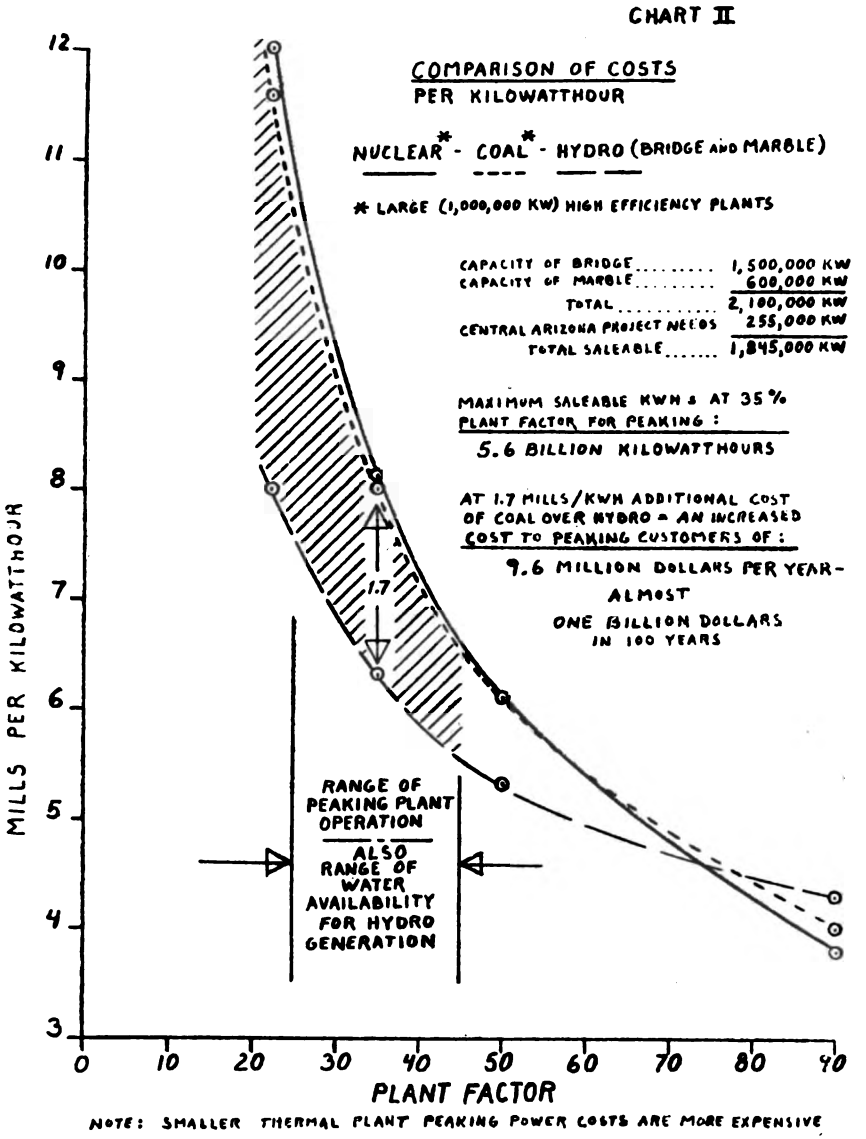

The first point that I want to mention is that you see that in the range of plant factors at which Bridge and Marble Canyon will operate, around 35 percent, according to Mr. Udall's testimony, the cost of hydropower will be slightly over 6 mills per kilowatt-hour. That is the cost of generating power at Bridge and Marble.

Now, you will remember that in the record of the hearings held last year, Mr. Dominy testified that these installations, particularly Bridge, would be used to sell commercial peaking power at rates that

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he said would be approximately 6 mills per kilowatt-hour. The question immediately arises, if the cost of generating power is 6 mills per kilowatt-hour and the selling price is 6 mills per kilowatt-hour, how can there be any surplus available to put into a development fund?

The immediate conclusion one would make is that there isn't any surplus and that at least during the payout period, these dams do not make a contribution to either the fund or to pay for the capital cost of the central Arizona project.

In this regard, I think Mr. Ely was mistaken yesterday when he testified that there would be a significant contribution, with accruals to the development fund occurring at an earlier time with Bridge and Marble than without. Mr. Ingram has shown in his charts that this is not the case. The accruals to the development fund would be made at an earlier time without the dams.

The data presented by Mr. Udall is also in agreement with the data shown in the consolidated payout studies prepared by the Bureau of Reclamation. By making the calculation in a more detailed fashion than I have indicated just by talking about selling price and cost, one finds that using a 50-year payout period and the Bureau's estimates of net operating revenues, with Marble Canyon Dam by itself, the result of operation of Marble Canyon would produce a deficit of $0.9 million per year with respect to the development fund or to paying off the central Arizona project.

With both Marble Canyon and Bridge Canyon, there would be a small surplus of $3.5 million a year to apply to either one or the other of those purposes.

The consolidated payout sheets presented by the Bureau, by applying Hoover and Parker-Davis revenue to reducing the outstanding ablance of the capital investment in the two proposed dams, result in the appearance of a larger contribution from those two dams than is actually the case if each of the proposed dams is analyzed on the basis of paying its own way over the 50-year payout period.

In examining these consolidated payout studies, it is easy to see the real source of the muscle behind payout for the central Arizona project and payments into the development fund. As Mr. Ingram said, it is coming from about $12.6 million per year in excess revenue being dumped into the project and the fund, starting in 1991, from Hoover Dam plus $3.8 million per year from Parker and Davis Dams, starting in the year 2005.

Now, the other day Mr. Dominy said that maybe they won't be able to get 4 mills per kilowatt-hour for peaking power sales from Hoover Dam after the payout period, and maybe if they couldn't get it, then the kind of analysis that Mr. Ingram has presented would not hold up; and you couldn't do without Marble and Bridge.

Well, the power rates from Hoover Dam are renegotiated each year. Right now, according to the testimony presented yesterday, Hoover power is being sold for 2.4 mills per kilowatt-hour. This is monthly peaking power, according to Mr. Dominy's testimony. Now 2.4 mills is obviously lower than 4.0 mills. But if the Bureau cannot get 4 mills for Hoover peaking power after the payout period it seems unreasonable to expect they will be able to get the 6 mills per kilowatt-

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hour or more that they need from Bridge and Marble in order to make them pay off.

The projects without the proposed Grand Canyon dams would be far less vulnerable to reductions in the price of power, both baseload and peaking power, over the years, because the investment in Hoover and Parker-Davis will be paid off in a fewer number of years. If a new investment is made in the Grand Canyon dams, then with the 50-year payout period an average selling price of 6 mills per kilowatt-hour must be realized in order for payout to be achieved.

It is a big risk to make that large an investment with our present uncertainty as to the impact of new technology on the downward trend in power prices.

I have one other observation to make about Mr. Udall's chart. Notice that at high load factors, the curves for fossil fuel and nuclear power start out below the curve for hydro. Mr. Udall is saying that at a 90-percent load factor, nuclear power and fossil fuel power is actually cheaper than hydro power, but as you go to smaller and smaller load factors, then the increase in the cost of fossil fuel and nuclear power is greater than the increase in cost of power from a hydroplant.

If you think a moment, you realize that there is something very puzzling about this. The hydroplant has a high capital investment and a very low operating cost, whereas the nuclear and fossil fuel plants have rather low capital investments but higher operating costs because they have to pay for fuel. And I think you all realize that in any situation where you have a choice between a high capital investment system and a low capital investment system with high operating costs, as you cut down on the plant factor the system with the high capital investment, in this case the hydroplant, will always increase in unit costs more quickly because you have a greater amount of fixed costs, the investment in the plant, to pay off regardless of the amount of production of electricity.

What I think has happened here, and Mr. Alexander who I understand helped Mr. Udall with this chart may be able to comment, is that the curve you see for nuclear power and the curve you see for fossil fuel power were probably constructed on the basis of using capital charge rates typical of that which a private utility would have to use, 12 or 13 percent, rather than the 3 to 4 percent capital charge rate used for the hydro curve. I think that when you look into this, you will find that when Mr. Udall testified on Monday, "Now, the figures are here on the assumption that the Federal Government has built a steamplant, what would the cost be, and what would they contribute to a basin fund," he was probably mistaken. And the AEC study which Mr. Udall entered into the record yesterday, indicates, in fact, that a nuclear plant built to give a 35 percent plant factor would produce power at 3.8 mills per kilowatt-hour, much less than the cost of power from hydro. Thus the nuclear cost curve would everywhere lie below the hydro cost curve. And this increment of 1.7 mills per kilowatt-hour on the chart which was used to "prove" that the people buying this power would have to pay an extra $1 billion in 100 years is actually an increment which is a negative one, and building a hydro plant instead of the nuclear plant would mean that the people buying

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the power would pay $1 billion plus or minus a few hundred million dollars, more for hydro than for nuclear.

I have looked at Mr. Carlin's study and made my own analysis of it. I want to comment that most of the assumptions he makes are conservative assumptions.

For example, in using the GE price list, he is using numbers for capital costs which are about 10 percent higher than GE and Westinghouse have been coming up with in competitive bidding. And this gives Mr. Carlin somewhat higher benefit-cost ratios than he would otherwise get. That is, the dams look a little bit better in his analysis than they would otherwise.

Also, he operates the nuclear plant at only a 35-percent load factor to match the power characteristics of the dams, but the reason the dams have to operate at a 35-percent load factor is that they are water limited. With a nuclear plant you can keep on putting more fuel in and as long as you can sell offpeak power at some incremental operating profit, it would be to your advantage to sell it and operate the reactor continuously. Since the operating cost of a nuclear plant of the type that Mr. Carlin is talking about is of the order of only 1.5 to 2 mills per kilowatt-hour or less, you could sell offpeak power at 2½ or 3 mills per kilowatt-hour and make quite a god profit. The result would be to make the nuclear plant look much better in comparison with the hydropower.

Mr. HOSMER. What was that? Two and a half mills?

Mr. Moss. I say, offpeak power can be sold to yield an operating profit at a very low selling price and——

Mr. HOSMER. From a nuclear plant.

Mr. Moss. From a nuclear plant, that is right. The same kind of nuclear plant that Mr. Carlin used in his analysis, because of the low operating costs of the nuclear plant.

Mr. HOSMER. You are not producing any 2½-mill power, are you, in nuclear——

Mr. Moss. I am talking about incremental operating costs after the capital investment in the nuclear plant is——

Mr. HOSMER. Based on the 10-percent fuel allowance factors, just keeping your turbines running, which anybody knows there isn't a a reactor operator in the United States who wouldn't get his license jerked in 15 seconds if he tried to operate a reactor under the circumstances that you are hypothecating.

Mr. Moss. I didn't understand the question.

Mr. HOSMER. I said there is nobody—the AEC won't let you operate a reactor like you are trying to tell this committee that a reactor would be operated.

Mr. Moss. In the situation I am describing——

Mr. HOSMER. And on this basis, and the same thing for what Carlin is——

Mr. Moss. In the situation I am describing——

Mr. HOSMER. You are misleading——

Mr. ROGERS of Texas. Mr. Moss, you finish your statement and then we will start the questions and answers.

Mr. Moss. OK. The situation I have just described is one in which the reactor would be operated continuously. During onpeak hours

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the power would be sold at higher rates. During offpeak hours the power would be sold at a lower rate which would yield an operating profit.

I have commented in my testimony on the supply of nuclear fuel, that there is no indication that we will be running out of nuclear fuel in the next few years, and I won't repeat that right now.

I have described the use of pumped storage in conjunction wih a nuclear reactor. Pumped storage facilities provide a means of converting base-load power to peaking power. In the long run the maximum price differential between those two kinds of power will be set by the cost of that conversion. Since pumped storage plants—like the Cabin Creek plant near Denver, one being built in Massachusetts, and one oustide of St. Louis—can be built with a capital investment of about $80 per kilowatt, it turns out that this conversion can be accomplished for a total cost of less than 2 mills per kilowatt-hour. This should be regarded as something of a maximum differential between those two kinds of power.

We shouldn't think of peaking power as something completely exotic and not interchangeable, at a reasonable cost, with other kinds of power.

In conclusion, I think that the Bureau, in light of recent developments in the nuclear industry relating to increase public acceptance, utility acceptance, and lower costs, must definitely consider nuclear power as a feasible alternative to power from Marble and Bridge, and should consider it in cost-benefit studies as Dr. Carlin has done.

Thank you.

Mr. ROGERS of Texas. Thank you, Mr. Moss.

Mr. Aspinall?

Mr. ASPINALL. Mr. Moss, will you name for me the nuclear power reactors which are in existence at the present time and are successful in producing power in the cost range that you suggested?

Mr. Moss. The first reactor that will produce power in the cost range that I have talked about is the Oyster Creek plant which will not be operating until late this year or early next year, and that will produce power——

Mr. ASPINALL. What has to be done before we are sure it can operate anything at all like you suggest?

Mr. Moss. Let me say that when a private utility or Government agency has to make a decision as to whether to add nuclear power or another kind of power to its system, it has a degree of protection if it orders a nuclear plant to the extent that the capital costs I have spoken of here are based on fixed-price contracts with General Electric and Westinghouse, and the fuel cycle costs are guaranteed for 12 years. If the costs are not as expected, it is General Electric and Westinghouse that must pay the bill, not the private utility or the Federal Government.

Mr. ASPINALL. But there isn't such a reactor in existence; is there?

Mr. Moss. As I say——

Mr. ASPINALL. With all the money we have spent on trying to get power produced economically from the use of nuclear energy, we just don't have anything yet. This is our projection; is it not?

Mr. Moss. It is enough of a certainty so that in the first 15 weeks of this year, private utilities ordered or made definite plans to order between 8,815 and 12,315 megawatts of installed nuclear capacity.

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They felt confident enough in that projection to order that amount, which is pretty close to the present combined peakload demand of the entire southwestern system we are talking about here. Southern California plus Arizona and a few other areas. That is how much power capacity was ordered in 15 weeks.

Mr. ASPINALL. I think the gentleman from California has a question as to whether anyone has gone on record as authorizing the money to be spent for these plants for production of peaking power?

Mr. Moss. I think Mr. Hosmer's point relates to the technical feasibility of operating a nuclear reactor in a peaking mode.

Mr. ASPINALL. My last question was whether any utility is proposing to use these reactors for the production of peaking power.

Mr. Moss. The answer to your question is "No," and the reason why it is no is that a utility will always choose to put on their system, as the load picks up during the day, those plants which have the lowest incremental operating costs of all the plants not yet being utilized. Since the nuclear plants have the lowest incremental operating costs, they are therefore base loaded, operated continuously.

Mr. ASPINALL. Well, it is still in the future. Nothing has been proved as yet. I wish it was quite as rosy as some of you seem to think.

I have sat on the Joint Committee on Atomic Energy now a good many years and I don't see it at the present time.

That is all, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Saylor.

Mr. SAYLOR. Mr. Moss, I just want to commend you for your statement.

I will reserve the balance of my time.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Mr. Moss, you refer on page 7 of your statement to the Atomic Energy Commission study that was put in the record and state that you agree with its conclusions.

Now, this report compared comparable nuclear alternates to Bridge and Marble with hydro at a 3-percent money factor and a 4-percent money factor, and in both cases the hydro was considerably cheaper.

Would you care to comment on that?

Mr. Moss. Yes, I would. In my statement I quoted from the AEC study and said that the conclusions were in general agreement with Mr. Carlin's study.

Now, I don't mean to imply I am in complete agreement with everything that was done in the AEC statement, because I think Mr. Carlin has done a more detailed analysis than was done by the AEC. But with reference to your question about the conclusions of the AEC study, you will note that in that study it is indicated that the cost of power from the hydroplant is 2.4 mills per kilowatt-hour, from the nuclear plant 3.8 mills per kilowatt-hour. No transmission costs were included for either one.

In the footnote on page 9 of the AEC study, it says that if the transmission costs are included, the cost of power delivered to the load center would increase to 4.5 mills per kilowatt-hour for Marble Canyon power and 4.1 mills per kilowatt-hour for Bridge Canyon power.

Mr. UDALL. Go ahead.

Mr. Moss. The nuclear plant does not have to be located in northern Arizona. That is one of its advantages. It can be located near the

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load center where the power is to be used, in this case, southern California. That is where most of the Bridge Canyon and Marble Canyon power would be used. And the transmission costs for a plant located near a load center are generally of the order of 0.1 to 0.15 mills per kilowatt-hour.

If you add that to the 3.8 mills for the nuclear plant, you get something around 4 mills per kilowatt-hour, less than the delivered price of power from Marble Canyon and from Bridge Canyon according to the AEC study.

Mr. UDALL. Let me make one thing clear. The quote you use in your statement from that AEC report is not in fact a conclusion at all, and you say you agree generally with the conclusion, but the quote you used is found on page 3 of that document under the title of "Simplifying Assumption." Isn't that correct?

Dealing with transmission costs and not the overall study.

Mr. Moss. The AEC said they were not in a position to evaluate comparative transmission costs because there had been no proposal for a particular site for the nuclear installation.

Mr. UDALL. I understand.

Mr. Moss. So, therefore, they avoided the question entirely.

Mr. UDALL. Mr. Chairman, I think in the interests of time I would like to ask unanimous consent that I be given until Monday to file a very brief analysis of the rather technical matter that Mr. Moss has brought before the committee today.

Mr. ROGERS of Texas. Without objection, so ordered.

Mr. SAYLOR. Reserving the right to object, Mr. Chairman——

Mr. ROGERS of Texas. The gentleman reserves the right to object.

Mr. SAYLOR. I will not, but I would hope he would submit his comments to Mr. Moss, so that he might make some criticism or comment or concurrence, and submit them along with the papers that you have.

Mr. UDALL. I would amend my request accordingly.

Mr. ROGERS of Texas. Without objection, the unanimous consent request, as amended, will be granted.

Mr. UDALL. And I would conclude by saying to you that this is all a very puzzling thing. Here is the Bureau of Reclamation which has had a great success in the West—I don't know where the West would be without it—and they come in with their experts and technicians who have had many years of experience. They tell us this is black and you tell us it is white.

I am reminded of one of the Kennedy books which tells of the time he sent a State Department man and a general to Saigon and they came back and reported. One said everything was lovely, there was stability, the military was good, the morale high, the Government democratic, and we ought to do so and so, and the other one reported exactly the opposite, and President Kennedy said, "Gentlemen, were you in the same country?"

And I wonder, listening to the evidence today from the Bureau of Reclamation and our own Arizona and California experts, whether we are in the same country sometimes.

Thank you, Mr. Chairman.

(The material referred to follows:)

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ANALYSIS OF LAURENCE I. MOSS'S TESTIMONY, "CONSIDERATION IN THE USE OF NUCLEAR POWER AS COMPARED WITH POWER FROM THE GRAND CANYON DAMS," MAY 1966

(Morris K. Udall)

Nuclear power and energy is more expensive than Marble or Bridge Canyon hydro-electric power and energy. This fact is attested to by the Atomic Energy Commission in its report to the Bureau of the Budget entitled, "A Specific Comparison of the Economics of Nuclear Electric Power and Hydro-electric Power—Bridge and Marble Canyon Projects," dated February 1965.

Table 6 of the Commission's report shows total energy cost for the Marble Canyon hydro-electric plant to be 2.4 mills per kilowatt hour and for a nuclear alternative to be 3.8 mills per kilowatt hour. Bridge Canyon hydro-electric plant the total cost was shown as 2.2 mills per kilowatt hour, and for a nuclear equivalent 3.8 mills per kilowatt hour.[1] These are "at-site" or "at-plant" costs.

Mr. Moss, in his answer to Mr. Udall's question[2]—that with either 3 or 4 percent money that power from Bridge and Marble was considerably cheaper than a nuclear alternative, agreed that the cost of power from the Marble Canyon hydro-electric plant was 2.4 mills and for a nuclear alternative it would be 3.8 mills per kilowatt hour. He further admitted that, "No transmission costs were included in either one." Mr. Moss went on to say, "In the footnote to this page 9 of the AEC study, it says that if the transmission costs are included, the cost of power delivered to the load center from Marble and Bridge would increase to 4.5 mills per kilowatt hour for the Marble Canyon power, and 4.1 mills per kilowatt hour for the Bridge Canyon power."

Mr. Moss then proceeded to the same unwarranted conclusion that Mr. Carlin reached, namely, that you would locate the nuclear alternative at a load *center* so that little or no transmission would be required. He threw in 15/100 of a mill per kilowatt hour to add to the cost of the nuclear alternative—apparently for local distribution, but he failed to add in-plant switchyard costs so there would be no way to get the power out of the nuclear plant, and completely ignored the necessity of transmitting the peaking power to the several states of the Southwest.

What these gentlemen are attempting to get the Committee to believe is that one, single unit, nuclear plant in Southern California with only local transmission in the Los Angeles area would somehow supply the peaking requirements which the Bridge and Marble projects were designed to generate and *to deliver* to load centers in California, Nevada, Arizona, New Mexico, and Utah. It is our contention, no matter where in these five states that a nuclear alternative or alternatives would be located, or even if you put one in Arizona and one in California, that substantially the same expenditure would be necessary to transmit the peaking power from the nuclear alternatives to the same load centers as peaking power from the hydro plants will be delivered. The following table demonstrates the need for transmission facilities by showing the amounts of peaking power which will be required to be delivered to each load center:

Estimated distribution of peaking capacity Bridge Canyon and Marble Canyon Projects

[Thousands of Kilowatts—at Source]

1975	
Area:	*Amount*
Los Angeles	420
Southern California (Colorado River to Pacific)	785
San Diego	130
Arizona (statewide)	50
Phoenix	140
Tucson	45
Southern Nevada	70
Bureau of Reclamation (Arizona-Nevada)	70
Utah	75
Northern New Mexico	90
CAP Pumping (Near Parker, Arizona)	225
Total	2,100

[1] Table 6, page 9 of the February 1965 Report.
[2] See p. 1546.

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Accordingly, using AEC's figure of 1.9 mills per kilowatt hour for transmission and their estimates of the at-site cost of power, we come up with a total delivered price of the peaking power to be as follows:

	Hydro	Nuclear
Marble Canyon:		
Power cost total (mills per kilowatt-hour)	2.4	3.8
Transmission cost	1.9	1.9
Delivered cost	4.3	5.7
Bridge Canyon:		
Power cost total (mills per kilowatt-hour)	2.2	3.8
Transmission cost	1.9	1.9
Delivered cost	4.1	5.7

And that isn't all. Neither the AEC, Mr. Carlin, nor Mr. Moss evaluated the following items, the very real cost of which makes the nuclear alternative more costly and the Bridge and Marble plans more attractive:

(a) No provision in the nuclear alternatives for purchasing reserve capacity to make the power from a single unit nuclear plant be as reliable as power from a multi-unit hydro plant.

(b) No provision for the 5 to 10 percent adjustment in favor of hydro-electric plants which is the standard allowance used by the Federal Power Commission.

(c) No provision for cooling water costs of the nuclear alternative—for a 600 mw nuclear plant in Arizona this would be about $1 million per year.

(d) No provision for evaporation loss in the two reservoirs of any pumped storage project.

(e) No provision for the one kwhr in three that is lost in the pumped storage process.

In another area of his testimony nuclear Engineer Moss stated, "* * * it seems unreasonable to expect they (the Bureau of Reclamation) will be able to get the 6 mills per kilowatt hour or more that they need from Bridge and Marble in order to make them pay off."[3] In this connection I place great reliance upon the testimony of Mr. Hennen Forman, Vice President of the Arizona Public Service Company, when he testified before the Committee, "Consequently—I believe that the peaking power contemplated for Bridge Canyon Dam and Marble Canyon Dam can be marketed at the price presently estimated."[4]

Mr. Forman represents a statewide utility which will be a significant purchaser of the output of the Bridge and Marble Canyon projects—and at the same time will be participating in the construction of major coal burning base load plants—of several million kilowatts capacity. Significantly, this cost conscious utility is not planning the construction of one kilowatt of nuclear capacity. This would seem to substantiate Mr. Moss's admission when he was asked by Mr. Hosmer[5] why nuclear plants were not being used for peaking purposes, he replied, "They are not buying for peaking purposes for *good economic reasons*, not for technical reasons."

I know that Mr. Forman's conclusions in this respect are concurred in by the Salt River Project, another major electric utility in the state of Arizona. Their long-range plans contemplate the use of coal fired base load energy integrated with hydro-electric peaking power from Bridge and Marble Canyon projects.

I must conclude from the foregoing that:

(a) A nuclear alternative to the Bridge and Marble Canyon hydro-electric plants will be substantially more expensive, either at site or delivered to load centers.

(b) The difference in favor of Bridge and Marble widens considerably when all real and necessary costs of the nuclear alternative are included.

(c) A cost conscious utility executive in the Southwest believes that the output of Marble and Bridge is marketable at the currently estimated total price of $10.00 per kilowatt year and 3 mills per kilowatt hour.

[3] See p. 1542.

[4] Page 629 of the Hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, 89th Congress, 1st Session, on HR 4671 and similar bills.

[5] See p. 1553.

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Comments on Morris K. Udall's Analysis of the Testimony of L. I. Moss, by L. I. Moss

This is to comment on Congressman Morris K. Udall's "Analysis of Laurence I. Moss's Testimony *Considerations in the Use of Nuclear Power as Compared with Power from the Grand Canyon Dams*," May 1966. For the sake of brevity, Mr. Udall's statement will be referred to herein as *Analysis*.

Analysis is a remarkable document in several respects. First, no mention is made of what, in my testimony, I stated was probably the most important (and damning) point of all: The proposed Grand Canyon dams are superfluous to the financing of the Central Arizona Project and the Colorado River Basin Project. If the Projects are feasible with the Grand Canyon dams they are equally as feasible without them. The lack of comment apparently signifies tacit acceptance of the thesis that the figures presented by the Bureau of Reclamation to prove that the dams are needed to finance the Project prove instead just the opposite. The actual source of revenue will consist of surplus monies from the operation of the existing Hoover, Parker, and Davis Dams after the end of each of their payout periods. Since this is the case, the most important question for the committee to ask is "Who wants these dams, and why are they wanted?" The proponents of the dams have not yet answered that question, despite all the testimony they have given. I cannot believe that the committee would report out a bill providing for either one or both of the dams until a satisfactory answer to that question is obtained. I do not believe a satisfactory answer exists, unless a make-work project to give sustenance to northern Arizona and the Bureau of Reclamation can be interpreted to be in the national interest.

A second remarkable aspect of *Analysis* is the thesis that (1) power from the nuclear alternative must be delivered to exactly the same load centers, distributed over five states, as would be power from the dams, and (2) transmission costs do not depend on the relative locations of the power supply and the load centers. This thesis has the advantage of simplifying the problem of selecting an optimum alternative. It has the disadvantage of being absurd. It is absurd because both the present and planned future fossil fuel and hydro generating capacity (not including the Grand Canyon dams) within the states of Arizona, Nevada, Utah, and New Mexico are greatly in excess of the present and projected peakload demands of those states. The reason for the excess capacity is the export of surplus power to Southern California. Whenever new large-size plants are proposed for the four states, it is the intent of the power producer to market a majority of the power in Southern California. The capacity distribution data listed in *Anaylsis*, for example, indicate that 1335 Mw (63.5%) of the total of 2100 Mw of the power that would be generated at the Grand Canyon dams are intended for load centers in Los Angeles, San Diego and the remainder of Southern California. (It should be noted that the "remainder of Southern California," for all practical purposes, refers to the load centers at the population centers near the coast.)

Consequently, if a nuclear plant alternative were to be located on or near the coast in Southern California, it would be neither necessary nor desirable to transmit a portion of the power to the four states to the east. Instead, *less power would be exported* from those states to Southern California. Power would be consumed nearer to the locations of the generating plants. No new transmission lines between California and the states to the east need be constructed; existing lines would be less heavily used for power export purposes but would be available for reserve-sharing and for flattening out system peakloads. Since the net result of the above mode of operation would be a lower cost of power delivered to consumers, it is to be expected that the various power-producing and marketing entities in the region could negotiate the necessary power exchanges with terms that would be beneficial to each of them.

Even if it were necessary to transmit power from the nuclear plant to all five states (and it most definitely is not), it cannot be said, as is claimed in *Analysis*, that "no matter where in these five states that a nuclear alternative or alternatives would be located * * * that substantially the same expenditure would be neecssary to transmit the peaking power from the nuclear alternatives to the same load centers as peaking power from the hydro plants will be delivered."

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Optimizing a power generation and transmission system involves a complex analysis. Costs are very much dependent on plant location. Usually the optimum locations are found to be near the major load centers of the system if, as is the case with nuclear plants, generating costs are not a strong function of location. With such locations, less power need be transmitted long distances, and the required capital investment in transmission facilities is correspondingly reduced. The cavalier fashion in which this subject has been treated in *Analysis* is indicative of the kind of self-serving evidence we have come to expect from the proponents of the dams.

I am not proposing that the Federal Government build a nuclear plant as part of the Colorado River Basin Project. We have shown that the Project is feasible with no new power plants. The point is that if the benefit-cost studies of the Bureau are to have any validity, the delivered cost of power from the dams must be compared with the delivered cost of power from the *lowest-cost alternative.*

A third disquieting aspect of *Analysis* is the manner in which excerpts of my testimony have been taken out of context to reverse the meaning of my statements. For example, I am quoted as saying ". . . it seems unreasonable to expect they (the Bureau of Reclamation) will be able to get the 6 mills per kilowatt hour or more that they need from Bridge and Marble in order to make them pay off." This statement is then contrasted with the testimony of Mr. H. Foreman of Arizona Public Service Company to indicate an apparent contradiction. My full statement, however, begins with the words "But if the Bureau cannot get 4.0 mills (for Hoover peaking power) after the payout period . . ." In other words, peaking power is peaking power, and, except for small differences in at-source prices intended to equalize delivered cost, the Bureau should be able to sell Hoover and Parker-Davis power at about the same price as power from the Grand Canyon dams.

Another example is the use of my statement "They are not buying for peaking purposes for good economic reasons, not for technical reasons" as an admission of the higher cost of peaking power from nuclear reactors. The immediately preceding remarks made clear, however, that the economic reason referred to was the *lower* cost of producing nuclear power than power from other plants in the utility's system. Because of this, the utility chooses to operate the nuclear plant both off-peak and on-peak, i.e., continuously, in preference to operation of other plants in the system. When nuclear plant capacity increases to the point where it constitutes a majority of the system capacity, then nuclear reactors (the older ones, assuming a continued decline in operating costs for new plants) will be used to supply peaking power. There is no technical reason why nuclear plants cannot be operated to meet cyclical load demands. If members of the committee have any doubts on this point, I suggest that they request data on the operation of submarine reactors from the AEC.

Analysis contains a list of items which it is alleged were not considered in Dr. Carlin's and my analyses. These items were considered. In the case of the loss in energy involved in pumped storage, the same cycle efficiency given in *Analysis* was used in our calculations. The other items were listed, in Dr. Carlin's paper, as assumptions unfavorable to the dams. A detailed discussion of these items was given. It was concluded that the many items, also listed, that were *favorable* to the dams would result in the overall analysis being, on balance, more favorable to the dams than if all items had been quantified.

In response to the criticism of Dr. Carlin's testimony presented in Mr. Morris K. Udall's analysis, Dr. Carlin has recalculated the benefit-cost ratios with these items (on both sides) included. He finds that the ratios are indeed lower than in the previous calculation, and his former simplifying assumptions were conservative in that they overstated the benefits from the dams.

In conclusion, Congressman Udall has presented no new information in *Analysis* to cause either Dr. Carlin or myself to modify our former positions. The Bureau of Reclamation has not chosen the lowest cost alternative in their benefit-cost studies. The detailed cost of power from the proposed Grand Canyon dams would be greater than the delivered cost of power from nuclear reactors located near the load centers. The Grand Canyon dams are useless appendages to Central Arizona project and the Colorado River Basin project.

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Mr. ROGERS of Texas. Mr. Hosmer.

Mr. HOSMER. I may have an explanation for Mr. Udall by way of congratulations, following Mr. Saylor's, to commend Mr. Moss on a masterful exercise in creative environment. You can come up with these conclusions when you take a hypothetical, nonexistent nuclear plant or a brace of them, totally isolated from a grid, overlook the variations in demand and other real-life problems of the electric utilities, and bend your figures around to prove why you shouldn't build a dam and should waste water.

Now, Mr. Moss, you are an assistant project manager. What do you assist in managing out at AI?

Mr. Moss. I assist in managing one of the programs at AI which——

Mr. HOSMER. I asked you which one.

Mr. Moss. The aerospace nuclear safety program.

Mr. HOSMER. That——

Mr. Moss. It has to do with——

Mr. HOSMER. With nuclear safety in outer space, is that it?

Mr. Moss. It has to do with evaluating the nuclear safety of SNAP reactor which involves——

Mr. HOSMER. We are talking about thermal reactors in this world, aren't we?

Mr. Moss. Yes, sir. We are talking about thermal reactors.

Mr. HOSMER. Have you had much experience with the sodium reactor experiment out there?

Mr. Moss. I was not assigned to that project, but I am familiar with it.

Mr. HOSMER. How about the piqua reactor?

Mr. Moss. I was not assigned to that project.

Mr. HOSMER. Both of them turned out fairly sour from time to time, did they not?

Mr. Moss. They have had their difficulties.

Mr. HOSMER. Mr. Aspinall and myself sit here in our other committee year after year listening to bright young scientists tell us how great these nuclear plants are going to be, and when they come to put the nuts and bolts together, all the problems arise.

Now, you have taken this chart over here and started to tell us that instead of a peakload operation, we are going to have to get into a baseload operation, at least to have any comparison with your figures, aren't we?

Mr. Moss. No, I haven't said that.

Mr. HOSMER. You are talking about a baseload operation of a nuclear plant.

Mr. Moss. No. The numbers I gave when I talked about the chart were for peakload operation of the nuclear plant. Just as the AEC study is for peakload operation.

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Mr. HOSMER. On the basis of this other fellow, your friend's remarks, here earlier today? Ingram? What was that fellow who made the study at Rand?

Mr. Moss. Mr. Carlin? The cost-benefit study?

Mr. HOSMER. Yes.

Mr. Moss. I commented that Mr. Carlin's study was conservative in that he assumed that the nuclear plant would be used only for peakload operation.

Mr. HOSMER. Well, then, as a safety engineer you ought to know the import of the question I asked you before, which is, namely that the AEC isn't going to let any reactor operate up and down on a peakload basis like this.

Mr. Moss. I am not familiar with any technical reason why this can't be done.

Mr. HOSMER. Have you ever heard of thermal stresses?

Mr. Moss. Yes.

Mr. HOSMER. You get plenty of them in a reactor, don't you?

Mr. Moss. You get thermal stresses in any system with temperature gradients.

Mr. HOSMER. You just answered the chairman of this committee and you said you didn't know of anybody that was buying a nuclear plant for peaking purposes. Obviously, they are not buying for peaking purposes and for good technical reasons, and for good economic reasons.

Mr. Moss. They are not buying for peaking purposes for good economic reasons, not for technical reasons.

Mr. HOSMER. I think you are in error there, sir. If you are, and we have to operate this plant on a baseload basis out wherever it is going to be built, who is going to come in with the peaking power?

Mr. Moss. Pumped storage facilities, as I have discussed in my testimony.

Mr. HOSMER. But you didn't talk about where this was. Are you going to locate the plant at the—where you have got the geographical, the geological characteristics for storage, or are you going to locate it——

Mr. Moss. I imagine——

Mr. HOSMER (continuing). At the load center, and pay a lot of line costs?

Mr. Moss. I imagine that an economic analysis would show that as long as the nuclear plant was located within, say, 50 miles or so of the pumped storage location, that it would be a feasible operation. I might——

Mr. HOSMER. How many sites like that do you find out here in this area?

Mr. Moss. Well, there is one right near the main load center we are talking about, Los Angeles. This has the Castaic Reservoir as

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a lower terminus, and the Pyramid Reservoir as the upper terminus for pumped storage.

Mr. HOSMER. You are going to take this away from the Colorado area, take it out to Los Angeles? Is that right?

Mr. Moss. I think that I made the point before that the sale of Bridge and Marble Canyon power is mainly intended to supply the growth in energy demand in the Los Angeles area.

Mr. HOSMER. You made that point last year. Everybody else did last year. And all over again this year. It is repetitious at this point.

Mr. Moss. One of the advantages of the nuclear plant is that it can be located near the load center and you need not incur higher transmission costs.

Mr. HOSMER. Ever heard of the Malibu case?

Mr. Moss. Yes.

Mr. HOSMER. What happened there? They can't get the reactor in there, can they?

Mr. Moss. As I bring out in my testimony, there have been cases of reactor siting which have been successfully contested by members of the general public, Bodega Bay is one example. Malibu may be a similar example.

On the other hand, there have been cases where relatively little public opposition has been generated——

Mr. HOSMER. But the Advisory Committee on Reactor Safeguards gets into the matter of geology and nuclear safety and you haven't got over the hurdle of nuclear safety anyplace in southern California except——

Mr. Moss. San Onofre, where many more nuclear plants could be located.

Mr. HOSMER. At San Onofre you run into another practical problem, but you won't get it solved unless you go to the President of the United States, himself, like we had to to get the San Onofre plant site away from the Marine Corps. You used mills per kilowatt cost in one plan and at another place, cost of kilowatt capacity installed. We are talking about a hydroproject here, hydroprojects that are going to last for 100 years with one investment. Why don't you include three whole sets of nuclear plants since over that period of time that is how many you are going to have to go into to get the same number of kilowatts.

Mr. Moss. They are included in the cost figures I have talked about. The nuclear plant is assumed to have a 30-year life. At the end of that time you build a completely new nuclear plant.

Mr. HOSMER. That is right. Go through all this investment, start paying interest again.

Mr. Moss. Even with all that, it turns out it is cheaper. That is the point.

Mr. HOSMER. That is incorrect.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Skubitz.

Mr. SKUBITZ. I reserve my time.

Mr. ROGERS of Texas. Mr. Burton.

Mr. BURTON of Utah. I reserve my time.

Mr. ROGERS of Texas. Mr. Reinecke.

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Mr. REINECKE. Thank you. I have been amused at the colloquy because it was not long ago when I was challenging the validity of some of the reports I had heard about nuclear fuel plants and it was the gentleman from California that we just heard from that said that there were adequate plants operating as off-the-shelf type of plants. And I might say that was backed up by another gentleman from California, the chairman of the Joint Atomic Energy Committee——

Mr. HOSMER. I might say to the——

Mr. RODGERS of Texas. Unless the gentleman yields, now, let's proceed in regular order.

Mr. REINECKE. I think it might be well to comment also on the nomen that has been applied of water wasters to you gentlemen so many times. I think it was stated recently that the thermal plants, where the nuclear or fissil fuel would use about half the water, compared to the loss by evaporation from the reservoirs, if two lakes were built. So I think we can hardly name this approach as being a water wasting method.

Furthermore, I think the point you brought out regarding the 6-mill power is valid. It is my understanding that we are not able to sell 6-mill power from Glen at the present time.

Do you have any figures on that, Mr. Moss?

Mr. Moss. Yes. I think I have something on that.

Mr. REINECKE. I know specifically of a contract for 25,000 kilowatts I believe at 4 mills in the Imperial District.

Mr. Moss. Mr. Skinner of the MWD commented on purchases of Glen Canyon offpeak power, on pages 1599 to 1614 of the AEC authorizing legislation of the 1966 hearings of the Joint Committee.

He was asked by Mr. Conway of the Joint Committee, "What does Edison charge you for the offpeak power?" And Mr. Skinner said, "I believe it is about 5 mills." And then he continued, "We are buying at offpeak rates. Fortunately, while we buy it at offpeak rates, we use it at onpeak hours and offpeak hours."

And then he went on, "Right now we are getting Glen Canyon power for 3 mills, so that the use of Edison power in the last couple of months has been very minute."

Mr. REINECKE. On the subject of nuclear fuel, I don't profess to be much of an expert in this regard, but in figuring the cost of nuclear fuel at these nuclear generating plants, isn't it true that the fuel cost is figured on a full-load basis?

Mr. Moss. In Mr. Carlin's analysis, he assumes the plant was at full load only during the time it was used for peaking power. During the rest of the time it was at a 10-percent-of-full load to keep the entire system hot to avoid the thermal stress problem that Mr. Hosmer was referring to. So Mr. Carlin was incurring a fuel cost during the time he was not selling any power just to avoid that thermal stress problem.

Mr. REINECKE. You see, I had the impression somewhere that the cost of this was at full power. I think on this whole argument, it resolves itself pretty much, at what point the nuclear plants can be used, and you have indicated such as pumped storage being one opportunity to operate them at full capacity while providing a peaking load curve to the power system.

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It just occurred to me that another possibility that the gentleman from Arizona might look into is building a combination desalting and electrical generating plant and perhaps using that steam to desalt some of the brackish water in western Arizona. We might be able to sweeten the Colorado River water a little bit before we put it into the CAP.

Mr. UDALL. I thank the gentleman for his suggestion. It is very comforting.

Mr. REINECKE. I believe that is all the questions I have at this time.

Mr. ROGERS of Texas. Do those who reserve their time desire to be heard?

Mr. SKUBITZ. Mr. Chairman, of course, this field is entirely foreign to me. This young gentleman has raised some interesting questions.

I am wondering whether it wouldn't be advisable for this committee to get some of the experts down here from the Atomic Energy Commission or some of the experts from General Electric or Westinghouse to discuss this whole issue with this committee. I throw that out for——

Mr. ROGERS of Texas. Yes, I think——

Mr. BURTON of Utah. The chairman will throw it out, too.

Mr. ROGERS of Texas. I think that further informtaion will be sought, let me say to the gentleman from Kansas.

Mr. SAYLOR. Mr. Chairman——

Mr. SKUBITZ. I yield to the gentleman from Pennsylvania.

Mr. SAYLOR. This morning the chairman of the full committee directed a question to Mr. Brower of the Sierra Club, wanting to know the membership of that organization and the amount of money that was expended by the Sierra Club in their publications against this project.

Now, I find in the official record on the hearings that were held from August 23 to September 1, 1965, that pursuant to a request by the chairman of the full committee the membership of all the national conservation organizations are listed by States, and that has been inserted in the record.

Now, in view of the fact that the chairman has requested that the Sierra Club put in the amount of money, I make the unanimous-consent request that everybody that has appeared here in behalf of any organization submit the organization they belong to and the amount of money they have spent, including the central Arizona project, and how much money they spent to publicize this thing all over the country, and let's find out; if we are going to match dollars, we should find out those who have spent all their money to justify the Department's position, and find out those who spent money in opposition. Let's find out how much was spent to sell this bill to the public.

Mr. ROGERS of Texas. If the gentleman is serious, that is an awful lot of unanimous——

Mr. SAYLOR. I realize that. If it is sauce for the goose, it is sauce for the gander, and Mr. Brower said they were perfectly willing to furnish it, and if the opponents are willing to furnish it, I challenge the proponents to furnish it.

Mr. ROGERS of Texas. The challenge is——

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Mr. SAYLOR. Unanimous-consent request that the chairman direct he staff to send a letter to everybody to submit this information.

Mr. ROGERS of Texas. I would think that it would be better if the gentleman from Pennsylvania would make his unanimous-consent equest by naming those organizations that he has in mind.

Mr. SAYLOR. Give me a list of the witnesses and I will start right off.

Mr. REINECKE. Will the gentleman yield?

Mr. ROGERS of Texas. The time of the gentleman from Kansas is going to expire.

Mr. SAYLOR. I will take it up on the second round. [Laughter.]

Let's start right off by asking that the Colorado Water Conservancy Board submit all of theirs.

Mr. ROGERS of Texas. Is there objection?

Mr. UDALL. Mr. Chairman, reserving the right to object, and I think I probably will object to all of these at this time. I can't totally dispute the logic of what my friend from Pennsylvania says, that things cut both ways, and we ought to talk about them on both sides but his comes up in the middle of the testimony of a witness who has really nothing to do with this overall problem the gentleman raises. I would be happy to work with him and the chairman of the full committee and discuss this and probably withdraw any objection at that time. But in the context we find ourselves right now, I feel constrained to object.

Mr. SAYLOR. Let's make the record—let's find out just how broad this thing is. I would like to ask unanimous consent that all of the money spent for the California Water Resources Department and the Metropolitan Water District of California be included.

Mr. UDALL. On the second round, I object.

Mr. ROGERS of Texas. The objection is heard.

Mr. SAYLOR. I would like to ask——

Mr. ROGERS of Texas. If the objection is going to be heard, the chairman would suggest that the gentleman lump them all. [Laughter.]

Mr. SAYLOR. I will include the Upper Colorado River Commission, representatives of the New Mexico Interstate Stream Commission, Idaho Water Resources Board, Havasupai Indians, Southwest Wyoming Industrial Development Co., Washington State Department of Conservation, Oregon Water Resources Board, Southwestern Water Conservancy District. That is those people from Texas who were here to testify. And I guess we ought to have, in addition, since it is going to be objected to and we can't get it in, I think we ought to find out the total amount the Interior Club of Washington has spent in preparation of this.

Mr. ROGERS of Texas. Is there objection?

Mr. UDALL. There is objection.

Mr. ROGERS of Texas. Objection is heard.

The time of the gentleman has expired.

The gentleman from Utah, Mr. Burton.

Mr. BURTON of Utah. No, sir. I have no questions.

Mr. ROGERS of Texas. Thank you very much, Mr. Moss, and Dr. Carlin, for your presentations.

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(The statement of Mr. Moss, above referred to, follows:)

TESTIMONY ON H.R. 4671 OFFERED BY LAURENCE I. MOSS—CONSIDERATIONS IN THE USE OF NUCLEAR POWER AS COMPARED WITH POWER FROM THE GRAND CANYON DAMS

My name is Laurence I. Moss. I am a nuclear engineer with seven years' experience in the nuclear industry. My undergraduate work was taken in chemical engineering at Massachusetts Institute of Technology; my graduate work was in nuclear engineering at that same school. At present I am an Assistant Project Manager at Atomics International. My testimony today was not prepared as part of my duties for Atomic International.

A primary reason for my apearance is that in reading the record of the hearings held from August 23 to Septmber 1 of last year,[1] I found many references to nuclear power, some of them contradictory. Yet no nuclear engineer came forward at that time to testify before the committee. I believed it might be helpful, therefore, to discuss the present status of nuclear power to the extent that it may be relevant to benefit-cost studies and the consideration of possible alternatives for the Marble Gorge and Bridge Canyon dams. I hope that my comments will be informative, particularly to those members of the committee who are not already well informed by virtue of service on the Joint Committee of Atomic Energy, and also that my comments will help to make a more complete record.

BUREAU OF RECLAMATION'S PAYOUT STUDIES PROVE MARBLE DAM UNNECESSARY

Before beginning a discussion of the status of nuclear power, however, I would like to make an observation that has nothing to do with any special comptence I may have in that field. In fact, I would say that the level of knowledge required was about that of elementary school arithmetic. It is that the figures presented by the Bureau of Reclamation purporting to prove that Marble Gorge Dam is necessary for the financial feasibility of the Central Arizona Project and the Lower Colorado River Basin Project prove quite the opposite. If, as the Bureau says, the Central Arizona Project is feasible with Marble Dam, it is equally feasible without it.

Now I am quite aware that a great many people have been claiming that the key to the financial success of the CAP is a so-called "cash register" dam at Marble Gorge which would provide the revenue, by means of power sales, to pay off the cost of the water distribution system. To illustrate that this is not the case, I will use the Bureau's numbers to make a simple calculation.

In testimony before this committee, the Bureau stated that 2.123 billion kwh per year was the quantity of electrical energy that would be generated by Marble Dam minus transmission losses to the load centers. It was further stated that this energy would be sold at an average price of 6 mills per kwh. Multiplying the two numbers gives an annual gross revenue from power sales of $12.8 million per year.

The capital charges for the reimbursable portion of the Marble Project, based on 3.125% interest and a one hundred year depreciation, are $8.45 million per year. The operating costs are given as $1.94 million per year; this the total cost is $10.39 million per year. Subtracting this from the gross revenue gives $2.4 million available each year for financial assistance to the repayment of irrigation costs of the Central Arizona Project or for accrual to the development fund. It may be noted that if the same calculation is repeated for an interest rate of 3.222% with a 50-year depreciation, which are the figures cited by the Bureau for use in payout studies, then only $0.36 million per year in surplus revenues would be available for the above purposes during the payout period.

Now it doesn't take much analysis to conclude that even $2.4 million per year will not be of much help in repaying the $477 million of reimbursible costs of the Central Arizona Project. By reference to the Bureau's Consolidated Payout Study (table opposite page 127 of the *Hearings*), it becomes immediately obvious where the real muscle behind payout exists. It consists of the additional $12.7 million in net operating revenue produced each year beginning in 1991 by Hoover

[1] U.S. Congress, House Committee on Interior and Insular Affairs, Lower Colorado River Basin Project, Hearing before Subcommittee, 89th Congress, 1st Session, August 23 to September 1, 1965.

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Dam power sales (after the end of the payout period for that dam), and secondarily, beginning the year 2005, an additional $3.8 million per year applied from Parker and Davis Dam power revenues. In the Bureau's table, Hoover revenues are immediately applied to reduce the unpaid balance of the Marble investment. This has the effect of reducing the total interest charge on that investment from what it would be if Marble were self-liquidating. It gives the appearance of a more substantial contribution to the development fund from Marble than is actually the case. I might add that it has the further effect of postponing accruals to the develpment fund for ten years. If Marble were not built, Hoover revenues could be accrued to the development fund and/or used to reduce the unpaid balance of the reimbursible portion of the General Arizona Project beginning in 1991.

If Marble were not built, it would be necessary to purchase electrical energy for powering the Central Arizona pumps. This, of course, would constitute an operating expense, the magnitude of which would depend on the cost of purchased power. I understand that Mr. Jeffery Ingram's testimony presents the results of detailed calculations of payout without the Marble Project, so I will not repeat them here, except to summarize by indicating that with the pessimistic assumption of the cost of power at 5 mills/kwh, about $300 million will be accrued in the fund at the end of the 50 year payout period. With a rather more optimistic assumption of the cost of power at 3 mills/kwh, including extra revenue obtained from the sale of water that does not evaporate from reservoirs which are not built, the development fund reaches about $800 million at the end of the same period. It should be noted that West Associates can deliver power to the Los Angeles area from their coal-fired plant in the Four Corners area at a cost of less than 5 mills/kwh. Delivered to the pumping plants in Arizona either from the Four Corners or from the Mojave plant in Southern Nevada, the cost of power should be less. Moreover, the trend of power costs is downwards.

If have commented at some length on this particular point it is because in the welter of numbers and claims and counter claims and discussion of alternatives it is easy to lose sight of the most essential figures of all. If, as the Bureau says, the Lower Colorado Basin Project is feasible with the Marble Dam, it is equally or more feasible without the Marble Dam. Nothing else in the Project need be changed. Without Marble the development fund will begin to accrue at an earlier time, at the end of the 50-year period it will probably contain more money, and the financial integrity of the basin account will be less vulnerable to the expected lowering of electrical power prices.

NUCLEAR POWER: "IT'S A BUSINESS NOW. IT'S FOR KEEPS."[2]

Ten or fifteen years ago it was the fashion to give forth optimistic predictions of the role of nuclear power in the coming years. Predictions of imminent technological breakthroughs that would make nuclear power competitive with power from conventional plants were constantly being made. It became apparent, however, that a great deal of research and development work, of learning through experience, and of capital investment to achieve economies of large-scale production would be required for the nuclear industry to compete with the mature technology of conventional power plants.

A period of general pessimism ensued. Many felt, as did Congressman Morris Udall, that

"* * * all the conservationists were telling Congress then that atomic power was just around the corner and that we didn't need the dam then. Now we are told ten years later that we don't need the dams, atomic power is right around the corner again, and Arizona has to wait fifteen or twenty years for this to occur. And I still don't think that it is right around the corner."[3]

With little fanfare this situation has been radically changed. Perhaps the best measure of that change consists of firm orders placed by electrical power utilities for nuclear plants. In 1964 there were none. In 1965 a total of 5704 Mw of installed capacity were ordered.[4] In the first 15 weeks of 1966 a total of between 8815 and 12,315 Mw of electrical capacity were either ordered or pending.[5]

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[2] Chauncey Starr, quoted in *Newsweek*, April 18, 1966, p. 86.
[3] *Hearings, op. cit.*, p. 837.
[4] Nucleonics, Vol. 24, No. 3, p. 17, March 1966.
[5] Nucleonics Week, Vol. 7, No. 15, p. 1, April 14, 1966.

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Now this is a lot of power to order in a 15-week period. To put it in perspective, the estimated 1966 peakload (including a 15% reserve) of FPC Market Areas 47 and 48, which incluudes most of Southern California and all of Arizona as well as certain adjacent areas, is less than 14,000 Mw.[6]

NUCLEAR POWER PLANT COSTS

These nuclear plants are being sold at fixed prices and with guaranteed fuel cycle costs. The plant costs of these units are approaching, and even dropping below, $100/kw, which is at the bottom of the range of costs of coal-fired steam plants and, of course, far less than the cost of the proposed hydro facilities at Marble and Bridge. For example, the 809 Mw Cordova station and the 800 Mw Dresden-III station will each cost $99/kw.

The fuel cycle costs range from 10¢ to 15¢/million Btu. Even after accountaing for the somewhat lower efficiency of these plants when compared to the higher temperature fossil fuel plants, the fuel costs are comparable to those of mine-mouth coal. The average price paid by TVA, in the heart of a coal mining region, was 16.6¢/million Btu in 1965. TVA's mine-mouth Paradise station bought coal in 1965 for 13¢/million Btu; it had the lowest costs in the TVA system.

It used to be said, and not very long ago, that it would be many years before nuclear plants could compete in those areas of the United States that had low cost supplies of fossil fuel or readily developable hydro sites. The extent of the shift in nuclear power economics is such that this no longer appears to be the case.

When the benefit-cost studies of the Marble and Bridge projects were made by the Bureau of Reclamation, the competitive position of nuclear power and the degree of its acceptance by the utilities was not as evident as it is today. It is no longer possible, though, to ignore the growing role of nuclear power, especially insofar as electricity from the proposed dams will not be available until 1975, when, according to Fred J. Borch, the president of the General Electric Company, there will be 50,000 Mw of installed nuclear capacity.[7]

BENEFIT-COST STUDIES OF DAMS VS. NUCLEAR POWER

Benefit-cost studies have been made by Drs. Alan P. Carlin and William E. Hoehn comparing Marble and Bridge dams with the alternative of a nuclear power plant located near a load center. The results are presented in Rand Corporation paper P–3302 and in Dr. Carlin's testimony at these hearings.

Several of the assumptions made in the paper are conservative in that they overestimate the cost of nuclear power. The General Electric price list is used for the plant cost, when in fact G.E. often discounts their price list by 10% or more in competitive bidding. Also, Drs. Carlin and Hoehn chose to operate the reactor at low load factors in order to yield a power production curve exactly comparable to that of the dams operated to supply peaking power. In reality, if the nuclear plant were built, off-peak power would be sold at competitive rates so that the plant could be base-loaded. (The hydro plants, being water-limited, cannot do this without making a proportionate reduction in their peaking power capabilities). The sale of the off-peak power would materially increase the benefit obtained from the nuclear plant. I understand that Dr. Carlin may present at these hearings some results based on this mode of operation.

Despite these pessimistic assumptions, the benefit-cost ratios for the Marble Project calculated in the paper are all less than unity; that is, power from the dams is more costly than power from the nuclear plant.

These results are in general agreement with the conclusions of the Atomic Energy Commission in their report "A Specific Comparison of the Economics of Nuclear Electric Power and Hydro Electric Power—Bridge and Marble Canyon Projects," February 1, 1965, in which it was stated:

"* * * the cost data apply to generation at the dam site or nuclear plant site and *no* costs are included for transmission. Once again, this is a simplifying assumption which could place the nuclear plant at a relative disadvantage. If transmission and cooling water costs had been included in the comparison, a nuclear alternative could be more economic (in M/KWH) if its transmission and

[6] A. H. Foreman, *Hearings, op. cit.*, p. 630.
[7] Nucleonics Week, Vol. 7, No. 18, May 5, 1966.

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cooling water costs for the particular site location were equal to or less than 33% and 16% of the Marble and Bridge transmission costs, respectively." A nuclear plant located near a load center would in all likelihood meet these conditions.

THERE IS NO SHORTAGE OF NUCLEAR FUEL

It has been stated by some that we will soon run out of our supplies of nuclear fuel, perhaps as early as 1990, and that it would thus be foolish to depend on nuclear power to furnish a significant portion of our energy requirements. The limited known reserves of ore from which uranium can be cheaply extracted is usually cited as proof of this.

I am reminded of the situation in the petroleum industry. For about the last fifty years there has always been of the order of a 20-year supply of oil in known reserves, and for each of the last fifty years there have been people claiming that in just 20 years there would be no oil remaining. Of course we know that exploration has resulted in the discovery of new supplies which today account for a much larger quantity of oil in reserve than we have ever had, but still roughly a 20-year supply at our higher rates of consumption.

The point is that the quantity of known reserves is more a function of the operating policies of the companies engaged in mineral extraction than it is in the amount of available supply. There is little incentive to spend present-day dollars on exploration when the resources that may be discovered will not be utilized for thirty, forty or fifty years or more.

In the case of the uranium mining industry a period of intensive exploration followed World War II. A situation of over-supply developed in which uranium prices became depressed. The situation became even more acute with the cutback in weapons production. In 1962 the AEC entered into an agreement with the leading uranium mining companies, in which the government guaranteed to buy a fixed quantity of uranium each year for the next several years at a specified price. The purpose of the agreement was to maintain a viable uranium extraction industry and prevent the withdrawal of several of the companies from the field. In this kind of an atmosphere it is not difficult to understand why little new exploration was conducted. It is to be expected that the forthcoming increase in demand will spark renewed interest in exploration.

Present day power reactors are thermal convertors in that the energy available in the fissionable isotope of uranium (U–235) is turned into heat which is then converted to electrical energy. In so doing they are relatively inefficient in utilizing the nuclear fuel resources potentially available. With the successful development of "breeder" reactors, which in the process of generating energy from U–235 also produce more fuel from the non-fissionable isotope U–238 (or from thorium), it will be possible to effectively increase the energy potential of known reserves by a factor of 50 to 100. Also, the breeder reactors being developed now will be able to use the plutonium that will be generated in the converter reactors now being ordered. Hopefully there will be a smooth transition from one reactor type to the other. Whether or not this will occur is a function of the success of the development of breeders, but such success is not necessary for maintenance of the economic competitiveness of nuclear power within the time period under consideration here.

When one talks about the supply of anything, it is necessary to refer also to the price at which a given quantity may be available. For example, there is a huge quantity of uranium in extremely dilute form in sea water. The cost of its extraction would be high. The price of the uranium would be many times what it is today. Nevertheless the results of recent studies indicate that even at this price, when used efficiently in breeder reactors, the net fuel cost does not increase to the point where nuclear power would become economically unattractive. Obviously, we are a long way from needing to extract uranium from sea water, but it is useful to keep that supply in mind when one speaks of our known reserves.

THE SAFETY OF NUCLEAR POWER PLANTS

A good deal has been said on the subject of the safety of nuclear power plants. It is beyond the scope of my testimony to go into this in great detail. Since the feasibility of siting nuclear plants near load centers has been mentioned, however, there are a few points that I wish to cover.

The first is that during routine operation of a nuclear plant less radioactive material will be released to the environment than during the operation of a coal-

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fired plant of the same size. This is because the radioactive waste from the nuclear plant is essentially all contained, whereas the coal-fired plant releases combustion products which contain trace amounts of radioactive material.

But what of the case of an accident? A nuclear plant is designed so that in the event of a so-called "maximum credible accident" there will be no somatic injuries to members of the general public. In order to have a "maximum credible accident" the simultaneous occurrence of a complex series of failures must be assumed. Such a series of failures borders on the incredible. The usual "maximum credible accident" of the nuclear plants being built today consists of a loss of the water coolant and the melting of the fuel elements in the core. Radioactive fission products escape into the primary system. It is assumed that the primary system has already been ruptured so the fission products escape into the reactor containment vessel. The plant is designed so that even should this occur the radiation dose received by a person at the site boundary will not produce a somatic injury.

This is an exceptionally cautious approach for a new industry to take. Historically, new technologies have developed with little consideration for the safety of the public, and only when hazards became obvious were safety constraints imposed. The exceptionally fine safety record in the nuclear industry is proof of the success of the conservative approach that has been taken.

Most nuclear plants face little public opposition. A few have been vigorously, and at times successfully, opposed. Occasionally the nature of the public concern is not primarily one of safety but has to do with a difference in judgment as to the highest and best use of the land being proposed for the plant site. We should not confuse this kind of opposition with that based on concern for safety. At Bodega Bay, for example, there were many who felt that the area could best be used for park purposes. Also, the argument that it was obviously safer to build a nuclear plant away from an earthquake fault than immediately next to one was difficult to counter. In the case of the proposed Malibu plant there are many people in opposition who would be equally opposed to a bowling alley at that location. Their concern is more for esthetics than for safety. The cases of the Humboldt Bay and San Onofre plants are examples of relatively little public opposition to the introduction of nuclear power. I think this is an important distinction to make. It helps explain why, despite the many pessimistic forecasts made at the time of the withdrawal of the application for a reactor at Bodega Bay, the nuclear industry has gone on to record spectacular increases in sales.

NUCLEAR PLANTS AND PUMPED STORAGE

The nuclear plants being built today will be base-loaded because they have the lowest incremental operating costs of any generating plant on the systems to which they will be added and they are not fuel-limited as are the proposed hydro plants at Marble Gorge and Bridge Canyon. The decision to base-load rather than peak-load the nuclear plant is an economic decision, not a technical one.

The power level of a nuclear reactor can be changed very rapidly. In a typical nuclear plant the rate of change of power is limited not by the reactor but by the conventional equipment associated with the conversion of the energy in the steam to electricity. To bring a system from 10% to 100% of full power takes no longer than a few minutes.

An interesting possibility is to combine a nuclear reactor with a pumped storage facility. The reactor would operate continuously; during off-peak hours it would pump water from a lower reservoir to an upper reservoir. During the hours of peak demand the electricity generated by the reactor along with the electricity generated by water dropping from the upper reservoir to the lower reservoir would both be sold. Since the reactor would be operating continuously, and since the pumped storage facility would have all the quick-start advantages of any conventional hydro facility, the combination would be unusually flexible in terms of rapid response to emergency demand. A 762 Mw reactor combined with a 588 Mw pumped storage facility could supply all of the electrical energy with the same load factor that would be supplied by the 1500 Mw Bridge Canyon Dam (transmission of power from dam site to load center involves a 10% loss of power). Since both the capital cost and the fuel cost of the reactor plant are low, and since the capital cost of the pumped storage facility would be of the order of $80/Kw if a reasonable site could be found, the combination would deliver peak power at a lower cost than peak power from Bridge Canyon. Dr. Carlin's testimony will present the result of detailed calculations on this matter.

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There is a further observation to make relative to pumped storage plants. Their function is to convert base-load power to peak-load power. In the long run, the cost of this conversion sets a maximum differential in price between these two types of power. With capital costs of pumped storage facilities of 500 to 1000 Mw capacity at $80/kw, the total cost of the conversion including operating expenses is less than 2 mills/kwh. It is thus unrealistic to expect that the market price of peaking power will stay at or above 6 mills/kwh if the price of base-load power drops much below 4 mills/kwh. Many of the nuclear plants being built today will generate power for less than 4 mills/kwh.

SUMMARY

I have not attempted to be comprehensive in this brief review because to be so would involve matters beyond the scope of the committee's interest. Rather, I have attempted to address myself to those specific points which came up in previous hearings and which were matters of some disagreement.

The matters discussed may be summarized as follows:

(1) Nuclear power is now competitive with power produced by more conventional means including hydro. Planned additions to any power system should include a study of the feasibility of nuclear power in order for such studies to be comprehensive. The impressive number of recent orders for nuclear plants is an indication of their economic competitiveness.

(2) Nuclear reactors are safe. They can be located near load centers. When questions of proper land use have not been an issue of siting of nuclear plants, in most cases relatively little public opposition has been generated. Nuclear plants, involving as they do a "clean air" type of operation have advantages not matched by fossil-fuel-burning plants. As this becomes more generally recognized there is every reason to believe that the degree of public acceptance of nuclear power will increase.

(3) Pumped storage plants provide a means for conversion of base power to peak power. The price differential between these two types of power will, in the long run, be set by the cost of such conversion. Since this appears to be less than 2 mills/kwh it is unrealistic to expect the price of peak power to memain at 6 mills/kwh if the price of base-power drops much below 4 mills/kwh. A combination of a nuclear power plant and a pumped storage plant will provide all of the advantages of the hydro plant with respect to rapid response to emergency demands and do it at a lower cost.

And finally, although it does not pertain to nuclear power, perhaps the most important observation is that the Bureau of Reclamation's figures purporting to prove that Marble Gorge Dam is necessary to provide revenues to pay for the Central Arizona Project instead quite the opposite. The expected revenues from the Marble Gorge Project are insignificant during the entire payout period. In the Bureau's calculations the money for payout is actually coming from Hoover Dam revenues and later from Parker and Davis Dam revenues after the completion of the payout periods for each of those dams. If, as the Bureau says, the Lower Basin Project is feasible with Marble Canyon, it is equally or more feasible without it.

Mr. ROGERS of Texas. Our next witness is Mr. Robert O. Marritz, National Rural Electric Cooperative Association of Washington, D.C.

Mr. Marritz, if you will come forward, we will recognize you.

STATEMENT OF ROBERT O. MARRITZ, NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION, WASHINGTON, D.C.

Mr. MARRITZ. I will try not to take up too much of the committee's time. I know it has been a long week. My name is Robert Marritz. I am the assistant staff counsel and engineer for the National Rural Electric Cooperative Association. NRECA is the national trade association of about 1,000 rural electric systems in 46 of the United States.

At our annual meeting this year, delegates approved unanimously the resolution which appears in the statement. I won't bother reading

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it but it does support the project and Bridge and Marble Canyon dams specifically.

Mr. ROGERS of Texas. Mr. Marritz, without objection, your entire statement will be included in the record.

Mr. MARRITZ. Thank you.

Mr. ROGERS of Texas. It will be included the same as if read in full and you may summarize.

Mr. SAYLOR. Reserving the right to object——

Mr. ROGERS of Texas. The gentleman reserves the right to object.

Mr. SAYLOR. Where is the resolution?

Mr. MARRITZ. Pardon me?

Mr. ROGERS of Texas. He was wanting to know where the resolution was.

Mr. MARRITZ. It is on the first page of the statement.

Mr. ROGERS of Texas. You may proceed.

Mr. SAYLOR. Mr. Chairman, reserving the right to object, I would like to comment that if my name was Hosmer, I would make some snide comments about it being redundant, but I won't. I think you are entitled to make your statement and I withdraw my reservation.

Mr. MARRITZ. Thank you, sir.

Mr. ROGERS of Texas. If there is no objection, the statement will be included.

Mr. MARRITZ. I appreciate that.

I would like to point out that rural electric systems are still doing a very difficult job in a very thin service area. It is very unremunerative. In Arizona 14 REA co-ops average only 4.36 consumers per mile and throughout the lower Colorado Basin similar densities are found.

In Nevada the REA borrowers average less than two consumers per mile of line.

In large part it is the nonprofit operation of the co-ops and the availability of low cost wholesale energy which keeps them in business.

Moreover, the availability of water for the members of these co-ops in rural areas keeps the people there and keeps them consuming electricity and helps to increase the tax base.

So to the degree that you do not provide water for these people, they will leave the farm. They have left the farm, I am informed, in many of these areas in which our co-ops serve.

Fortunately for consumers of our systems in these States, however, most of them have been able to obtain wholesale electric energy at reasonable rates. This is due in large part to the effect of Federal power which is sold from the Bureau dams in the Southwest.

In fiscal 1965, for example, the systems in the four-State area purchased 300 million kilowatt hours and paid into the Federal Treasury $1.5 million for it. However, their loads are doubling every 7 to 10 years, so the amount of energy they need to keep their consumers supplied increases commensurately.

Now, of the total cost of this project of approximately $1.3 billion, I would like to point out that Bridge and Marble provide for roughly 90 percent reimbursability. This I think is a significant factor because you don't have this situation without the power installed at Bridge and Marble. In this sense the dams are cash registers. I know the

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point has been made before but I think it cannot be made too often, that if the Federal Government simply builds these dams or installs the Central Arizona unit without the dams, there is not this highly reimbursable feature which we find in the present bill.

Now, the peculiar nature of the power generated by Bridge and Marble would be a tremendous asset, I believe, to all power systems in the Pacific Southwest. The west pool which is composed of investor-owned companies and our rural electric systems and public power districts is planning to install approximately 36 million kilowatts of steam capacity, primarily, between now and 1985. This will operate in a base load fashion so that the utilities, in order to meet their peak demands, need power such as they would purchase, presumably from Bridge and Marble Canyon Dams. These dams would be operated on a 35-percent plant factor. They could be advantageously scheduled to complement all base load capacities in the region including nuclear or low-cost coal-fired capacity.

Now, I would like to make a few comments with reference to the previous witness' statement which seemed to me at several points to be comparing apples and oranges.

You just cannot compare a nuclear unit in any sense with a hydro project such as Bridge or Marble Canyon because inherently you operate these hydro units on a low-load factor basis. And the nuclear plant is uneconomic operating in this fashion. The witness conceded as much. So his alternative plan, alternative to the witness which preceded him, to sell off-peak power from these units, failed to make any sense to me because you can't sell off-peak power from a unit which is base loaded.

If it is operated around the clock, it has no off-peak power, no incrementally generated power to sell.

To any suggestion that conventional hydro projects are being outmoded by the new, large coal and nuclear fuel plants, I would point out that in 1965 the Federal Power Commission received some 170 applications for major and minor hydroelectric licenses and amendments to licenses, and in the same year the FPC acted on 149 such applications. They granted 141 of them, and applications pending at the end of the year were for projects—hydroelectric projects—totaling 5.3 million kilowatts.

These applications were predominantly filed by investor-owned companies which are not noted for foolhardy plans.

There can be no question about the tremendous growth which is taking place in the Pacific Southwest and the concomitant need for water and electricity which this growth has created. The FPC indicates that in region VIII alone there is going to be needed 32 million kilowatts of new capacity between now and 1980, so this 2 million kilowatts which is proposed to be generated at Bridge and Marble will certainly not be excess to the needs of the region.

I would like to also address myself briefly to the so-called preservation issue, to the effect that Bridge and Marble Canyon and particularly, Bridge Canyon, would destroy the character of the Grand Canyon. We don't believe that this complaint is borne out by fact, inasmuch as the primary erosion by the river would continue to take place, albeit in a regulated fashion, by releases through Marble and

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more importantly, the secondary erosion, which is the predominant type of erosion taking place today in the canyon, would continue unabated in any way whatsoever by construction of either dam.

As for Bridge Canyon, it would not, of course, as I am sure witnesses have made the point before me, back up water within the Grand Canyon National Park but only along the extremely remote and rather inaccessible western border of the park.

Now, I was curious as to approximately how many people visisted the main part of the park when we all know every well from the north and south rim, where the highways go, and how many visitors were in the more remote western part of the park. And I tried to ascertain this by calling the National Park Service and there is a table included in my statement with visitor days figured at the respective points.

I found out that at this western part of the park, where the level of the river would be raised somewhat for 13 miles, most of the visits are made through an agency known as the Havasupai Tourist Enterprise which conducts tours through the area, so in an effort to determine their opinion of the effect of the dam construction, I contacted the manager of the enterprise, a Mr. Reed Watahomigie, who expressed the opinion that Bridge Canyon would in no way interfere with the tours he conducts, and moreover, that its probable effect would be to increase the access of people to the canyon at that point and increase tourism.

Consequently, it seems clear to us that the construction of two dams would increase accessability to the respective portions, the controversial portions, of the canyon.

Further, we consequently believe that the Budget Bureau's and the Department of Interior's suggestion that the construction of Bridge Canyon be deferred and further studied is not advisable and should not delay its authorization and construction.

For the above reasons we respectfully urge the committee to consider approval of Bridge Canyon as part of the total construction proposed by the Colorado River Basin project, H.R. 4671.

One further point with respect to the importation of water. Although our association is not expert in and does not deal with water problems, we believe that a dual-purpose plant, perhaps located at the Gulf of California, could subsequently provide water for the region and electricity, but in no way would substitute for Bridge and Marble Canyons.

In conclusion, I would like to reiterate three points which, as we see it, are critical to the legislation being considered now.

First, to the critical need for water in the Pacific Southwest and for future power supply.

Second, to the fact that Bridge and Marble Canyons would act as cash registers for the entire project, marketing electricity at rates sufficient not only to repay their own cost, but helping to pay for all reimbursable features of the project.

And finally, to the fact that neither Bridge nor Marble Canyon would in any way change the main gorge of the Grand Canyon National Park.

Consequently, we respectfully recommend authorization of the Colorado River Basin project described by H.R. 4671, including Bridge and Marble Canyons.

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Mr. ROGERS of Texas. Mr. Marritz, I have had to be absent, but I sort of was wondering in this argument between nuclear power and hydropower, I haven't heard the point mentioned that—by someone in favor of hydropower, and I was wondering why, and I was thinking of the instantaneous availability of power from a hydro source.

Mr. MARRITZ. Mr. Chairman, that point is in my written statement. I did not make it. I thought it would have been made before, but it is in my prepared statement.

Hydro capacity is, of course, kept spinning and is ready to go on the line instantaneously, and to the extent it is not scheduled for use at a given time, would be available to be shipped in case it was needed to avert a disaster such as occurred in the Northeast, and if the Northeast had had more spinning capacity last November 8, most experts agree that the blackout could have been substantially averted.

Mr. SAYLOR. What was that?

Mr. ROGERS of Texas. We will have a report on that for you——

Mr. MARRITZ. I am sure the chairman knows——

Mr. ROGERS of Texas (continuing). At the end of this entire matter. We are going to find out whether the experts are expert or not.

Mr. MARRITZ. Yes.

Mr. ROGERS of Texas. Did you want me to yield to you?

Mr. SAYLOR. No.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. I would just advise the chairman of the subcommittee that a very learned member of this committee from Arizona commented on this very point in his testimony last Monday. I thought it was a rather brilliant statement at the time I heard it.

Mr. ROGERS of Texas. If the gentleman will yield, he had so many brilliant statements that I got blinded there. [Laughter.]

Mr. UDALL. I thank Mr. Marritz for coming. I thought he made a very excellent statement. We are proud to have the support of the great REA systems of this country on this legislation. I wanted to say that I enjoyed your testimony much more than I enjoyed that of the two prior witnesses.

Mr. MARRITZ. Thank you, Congressman Udall.

Mr. SAYLOR. Mr. Marritz, when was your national convention?

Mr. MARRITZ. The national convention was in February of this year.

Mr. SAYLOR. The reason I asked is that you adopted a resolution and you presented it to this committee, approving a bill that is no longer before us because the bill that your resolution unanimously supports appears on pages 1 through 27 of H.R. 4671, and Mr. Udall, on April 25, 1966, struck out everything after the enacting clause and wrote a whole new bill. So we will have to wait until next year when your convention meets to get approval of the new bill.

Mr. MARRITZ. Congressman Saylor, at the risk of being fired, let me say that our resolution was intended to apply, I believe, to the power aspects of the bill which have not materially changed.

Thank you.

Mr. SAYLOR. Well, now, I am not about to get you fired. I am just glad to see that this was adopted unanimously. And the reason I am also glad to see it was adopted unanimously is that your organization

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has condemned me time and time again and every time they do it, they do it unanimously. I am glad to see that you are a representative of an organization that, if you are for something, you are for it unanimously, and if you are against something, you are against it unanimously. [Laughter.]

Now, this is the kind of an organization that, believe me, is rare in this country and I don't expect, despite the fact that I have had some of your people write me and say that they read this resolution, they wanted me to know they didn't vote against it, but I never get one of those from Mr. Ellis or from any of your people down there that aren't unanimous in opposition to what I stand for.

Now the power features of these two projects, you understand, are to be used for peaking power?

Mr. MARRITZ. Yes.

Mr. SAYLOR. There is no firm power at all in either of these two dams. You understand that.

Mr. MARRITZ. Well, I believe you can operate hydroelectric projects in a variety of ways. You can release a lesser amount of water more constantly around the clock, or you can put in more power—install more power—in a project and release it for a shorter period of time but produce more power. So that I imagine that the Bureau of Reclamation engineers decided that it would be more advantageous, would be more remunerative, to put in more penstocks.

Mr. SAYLOR. And the reason they did it is they found out there wasn't enough water in this river to operate any more firm power. The fact of the matter is, as stated when the Bureau was here the other day, that they were going to have to take 4 million acre-feet from the upper basin States. We had all of those people here from Colorado who were trying to get their projects authorized and, of course, they are short 4 million acre-feet because that is what it is going to take to fill up just Marble Canyon which the Bureau supports.

Now, your organization even goes beyond that. They say that they want Bridge built right away, is that right?

Mr. MARRITZ. Yes. We would like to see it built when the Bureau recommended that it be built. I am not sure what date it was scheduled for completion.

Mr. SAYLOR. Well, I am sorry to see that you part company with the Bureau because I guess I have to defend them all alone. I find nobody else to join me.

Mr. MARRITZ. I didn't intend to.

Mr. SAYLOR. This is a strange setup. The longer I am in Washington, the stranger things get. Here I am supposed to be a member of the loyal opposition and in this hearing I am carrying the cross for the White House. There is something wrong in this whole thing. [Laughter.]

Mr. UDALL. Will the Johnson administration's floor leader yield? [Laughter.]

Mr. SAYLOR. I will be happy to yield——

Mr. UDALL. I just wanted to——

Mr. SAYLOR (continuing). To the rebellious member of the other party.

Mr. UDALL. I just wanted to commend him for the way he is representing the administration.

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Mr. SAYLOR. I will reserve the balance of my time.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The gentleman from Kansas?

Mr. SKUBITZ. I have no questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. I would like to ask the gentleman if he has any ideas about the relative costs of hydro power and atomic power?

Mr. MARRITZ. Well, it is an extremely complicated area, as the committee gathers. It is a little difficult to compare one with the other because the only area of the country in which hydro projects operate around the clock is the Pacific Northwest, and they have enough water so that they can—the Bonneville Power Administration can—sell energy at roughly 3.3 mills per kilowatt hour. There is no nuclear plant built or planned to be built which can approach that figure.

Mr. BURTON of Utah. The REA is supposed to furnish its customers with the most economical power that it can obtain, and I would think that if there was a substantial body of evidence to support nuclear power as cheaper than hydropower, you would be in here testifying for nuclear plants, wouldn't you?

Mr. MARRITZ. That is so, sir; except that the nuclear construction is contemplated by investor-owned companies which, when they sell to distribution co-ops, do not always sell, in fact, never sell at the price which it costs them to produce it but there are always several increments on it which reflect a certain rate of return, a certain need to pay taxes on the income they are making, and so on. So that the Federal energy purchased by rural electric systems in the Southwest, not the Pacific Southwest, from the Bureau roughly averages 5.5 mills per kilowatt hour, whereas from the investor-owned companies, it averages somewhat higher.

There is another feature here and that is that the new low-cost nuclear capacity which is contemplated for installation will only somewhat affect the overall system performance and the overall ability of the companies to sell to the co-ops at a lower rate. In other words——

Mr. BURTON of Utah. My point in asking the question was if there was a new source of cheaper power, cheaper than hydropower, or if there was one that——

Mr. MARRITZ. I am sure they would be interested.

Mr. BURTON of Utah. Or if there was one just over the horizon, I would expect you people to take an interest in it. As far as I know, you never have. You have always been interested in hydropower.

Mr. Chairman, how much more time do I have? I would guess about 3 minutes.

Mr. ROGERS of Texas. Yes; about 3 minutes.

Mr. BURTON of Utah. May I yield to the ranking member.

Mr. ROGERS of Texas. Yes.

Mr. SAYLOR. Mr. Marritz, in approving this project unanimously, did anybody in the REA take into consideration the amount of subsidy necessary to underwrite a provision in this bill, the cost of importing 2.5 million acre-feet of water from outside sources?

Mr. MARRITZ. No, sir. We did not discuss the question of importation of water. I am happy we did not, because we had members of the Pacific Northwest on these committees. [Laughter.]

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Mr. UDALL. Unanimous——

Mr. SAYLOR. You mean it wouldn't have been unanimous had you discussed the importation of water.

Mr. MARRITZ. That is correct.

Mr. SAYLOR. Because the boys from Bonneville would have been on your backs.

Mr. MARRITZ. That is correct.

Mr. SAYLOR. The reason I ask that, Mr. Marritz, is that I am trying to determine how much weight should be given to this resolution because one of the factors presented to this committee indicates it is going to cost a tremendous amount of money for each acre-foot of water that is brought in.

We had a figure here yesterday that it costs $168 to transport water 300 miles into an area.

Now, I just figured that we are going to have to bring it from up in the Columbia, and that is about 1,200 to 1,500 miles away. But I have even been very generous with the Department downtown, so I have just taken the round figure of $200 an acre-foot, and if you take $200 an acre-foot as the cost of bringing that water in, because it is going to take 2.5 million acre-feet, that comes to $500 million.

Now, that is the yearly charge. And over a period of 50 years, it gets up to be somewhere in the neighborhood of $25 billion. The Department of the Interior bandies these figures around and they tell us that they come up here with no idea whatsoever. This resolution which approves the bill says you support the bill completely and I just want the people that represent your organization to know you are putting a tab on it because this is basically a tax of a dollar a person from now until eternity upon every citizen of the United States to pay for that 2.5 million acre-feet.

Mr. MARRITZ. Congressman Saylor, I confess to not being an expert in the area of water and I can't ascertain whether or not the cost figures the Congressman cited are accurate or not. And again, we do not deal with where the water would come from. I don't believe the legislation itself is specific in this respect.

Mr. SAYLOR. No; you have asked us to buy a pig in a poke, sign a blank check here, tell the Department downtown to go ahead because——

Mr. MARRITZ. No.

Mr. SAYLOR. (continuing). This doesn't say they are to study and report. This bill you have approved directs them to come up with a feasibility report. They are supposed to find out how to do it. That is one of the little gimmicks that nobody has noticed here so far or commented on.

Mr. ROGERS of Texas. The time of the gentleman has expired.

The gentleman from California, Mr. Reinecke?

Mr. REINECKE. I enjoyed your statement, Mr. Marritz. You referred to some of your hardheaded businessmen and business associates I believe in REA that have made pretty good investments over a period of years.

Mr. MARRITZ. No, sir. I was referring to the investor-owned utility plans for construction of hydroelectric projects, I believe.

Mr. REINECKE. Under REA, was this?

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Mr. MARRITZ. No. The invester owned.

Mr. REINECKE. I see.

Mr. MARRITZ. Pacific Gas & Electric.

Mr. REINECKE. Right. I was just thinking that I can find a lot of investors for you, too, if I can get 2 percent money such as the REA operates at.

But beyond that I wonder if you are aware of the fact that there are several applications pending before the Federal Power Commission, to construct the same dams for substantially less money than the department wants to build them.

Mr. MARRITZ. I have not studied the applications but I doubt in view of the fixed costs involved, that the same projects could be constructed by the applicants, whoever they may be, at a lower cost. And with respect to the other, the 2 percent money problem——

Mr. REINECKE. It is an interesting statement. A statement was made to me by one gentleman from Los Angeles Water & Power and their estimate was, I think 4 years old or 5 years old, which would have to be updated now, but they had estimated a cost to construct Bridge Canyon at $212 million, whereas the Bureau of Reclamation wants to spend $511 million on the same project. I can see where the dam might become very feasible at that lower capital cost.

Mr. MARRITZ. But it seems to me you are talking about a different dam. I can't see how they could be——

Mr. REINECKE. It has a capacity of 1.6 million kilowatts as opposed to 1.5 in the Bureau of Reclamation. One of the differences may have been that they weren't going to spend $85 million for fish and wildlife and recreation and a few other costs of that nature.

One place you might contribute something very material to this committee is in the REA projects, in the flatlands of this country, what do they use for peaking power when they have no hydro?

Mr. MARRITZ. Generally, rural electric systems purchase their energy requirements from supplies in the area. Only 18 percent of their energy is self-generated, so that most cooperatives do not have——

Mr. REINECKE. I didn't mean whether they generate it or not, but how is the power generated, not who owns it, but how is it generated in areas where you do not have water drops that can be converted into hydroelectric power?

Mr. MARRITZ. Well, provided there is sufficient water for a steamplant—much less than you need for a hydroplant, of course—they buy energy from steamplants.

Mr. REINECKE. I noticed in your statement that your overall national average for wholesale purchased power, and this is wholesale power which means that the generator had to have something in there for himself, by rural electric systems for fiscal 1965 was 6.5 mills per kilowatt-hour. I think that is a very reasonable figure. We have been told here that steam power could not generate peaking power for those prices. Apparently they can.

Mr. MARRITZ. That figure, Congressman, reflects a variety of costs all over the country and it is substantially helped by the Bonneville rate, for example, the TVA rate, the Bureau rate, and I think you will find that where rural electric systems purchase power from investor-owned steamplants, they pay considerably more for the energy.

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Mr. REINECKE. Well, you go on to include several areas in southern California where we pay as high as 12.6. That is interesting, too, because this is in an area where we have a great deal of hydropower. So apparently hydropower isn't the sole answer to low electric power rates, is it?

Mr. MARRITZ. Well, sir, this is—there are three cooperatives in southern California. I think only two now. One was forced to sell out to Southern California Edison Co.

Mr. REINECKE. Chose to.

Mr. MARRITZ. Chose to. There is some difference on that in southern California, I suppose. I am not familiar with that situation.

But if I understand the question, you are syaing that there is considerable hydro capacity in southern California, so why are the rates so high?

Mr. REINECKE. No. All I was saying, because your interests are pretty much nationwide ——

Mr. MARRITZ. Yes.

Mr. REINECKE (continuing). Your national average is a figure which is less than some of the averages in southern California where we do have a high percentage of hydropower that theoretically is the way to handle the peaking problems.

Mr. MARRITZ. I wonder where ——

Mr. REINECKE. The same peaking problem I am sure exists throughout the country but is handled by steam with the overall average rate being substantially equal or perhaps less.

Mr. MARRITZ. One of the problems with these systems in California is that they are unable to purchase power from the Federal projects. The companies around them are unwilling to deliver the power from Hoover Dam or Park-Davis or a like amount of firmer, more firm, more load factor energy. So that they do not benefit by this Federal power nor from any other hydroelectric installations that I am aware of.

Mr. REINECKE. Well, they may not benefit by it, but they seem to have a lower average rate than they have where we do have hydropeaking units.

Mr. MARRITZ. Not in southern California.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. Marritz, thank you very much for your testimony.

Mr. MARRITZ. Thank you very much, Mr. Chairman.

(The prepared statement of Mr. Marritz, above referred to, follows:)

STATEMENT OF NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. Chairman, my name is Robert O. Marritz. I am Assistant Staff Counsel-Engineer for the National Rural Electric Cooperative Association. The NRECA is the national trade and service organization of nearly 1000 rural electric systems in 46 of the United States. Approximately 95 percent of all REA borrowers comprise the membership of NRECA, which is primarily dues supported. Such membership is entirely voluntary.

At this year's Annual Meeting, the largest in our history, delegates unanimously expressed their support for the then Lower Colorado River project, as embraced by H.R. 4671, in the following resolution, from which we quote in pertinent part:

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"Whereas an integral part of [the Lower Colorado River Project] involves the construction of multi-purpose dams at Bridge Canyon and Marble Canyon on the Colorado River in Arizona; and

"Whereas Bridge and Marble Canyon projects, with 2-million installed kilowatts, would provide abundant low-cost electricity for this fastest growing section of the country, and the revenues from power, in turn, would help to pay for the project's enormous water supply system: Now, therefore, be it

"*Resolved*, That we support the Colorado River Basin Project, including construction of Bridge and Marble Canyon dams with hydro-electric facilities and extra high voltage transmission lines as a vital element in the orderly and prosperous development of the southwestern United States: and be it further

"*Resolved*, That we believe public bodies and cooperatives should have a preference in the marketing of electricity from these projects."

Rural electric systems need "yardstick" power

Rural electric systems have traditionally supported multi-purpose reservoir projects such as Bridge and Marble Canyon because of their benefits to the more remote areas of the United States in terms of flood control, irrigation, water supply, navigation and recreation; they have advocated them specifically, as they advocate Bridge and Marble Canyon now, because of their right to purchase power excess to the needs of the Federal Government. Congress in passing such legislation as the Flood Control Act of 1944 (16 USC 825(s)), the Bonneville Project Act (16 USC 832(c)), the Reclamation Project Act (43 USC 832(c)), and the Fort Peck Project Act (16 USC 833(c)) granted a preference on the purchase of such electricity to public bodies and cooperatives to ensure that the benefits from such projects were transmitted directly to the people served by these consumer-owned systems.

For their part, rural electric cooperatives still do a difficult job in relatively thin and unremunerative service areas. They have brought electricity to the countryside—98 per cent of it, at least—and are keeping it there; in so doing, they have created a $1.25 billion a year market in rural areas for electrical appliances and equipment. In Arizona 14 REA barrowers averaged only 4.36 consumers per mile in fiscal year 1965; in New Mexico 18 borrowers had only 2.82 consumers per mile; in Nevada, six borrowers averaged 1.93 consumers; and in Utah, six borrowers averaged 2.61 consumers per mile of line. These densities do not compare very attractively with the average for the investor-owned industry of nearly 35 consumers per mile. In large part it is non-profit operation and purchase of low cost wholesale energy, when available, which enables our members to stay in business.

Fortunately for consumers of our systems in these states, most of them have been able to obtain wholesale electric energy at reasonable rates. In Arizona the average cost of wholesale energy in fiscal year 1965 was 6.4 mills per kwh. In New Mexico energy purchased by cooperatives averaged 8.0 mills per kwh; in Nevada, cooperatives paid an average of 6.7 mills; and in Utah they paid an average of 6.0 mills per kwh. The national average for wholesale power purchased by rural electric systems in fiscal year 1965 was 6.5 mills per kwh, so the average paid by cooperatives in the southwestern United States compared favorably with this figure. This is due in great part, we believe, to the direct and indirect effect of power purchased from Federal multi-purpose projects in the Southwest. In fiscal 1965, for example, cooperatives in these four states cited purchased nearly 300 million kwh from the U.S. Bureau of Reclamation at an average cost of 5.5 mills per kwh, for which they paid about $1.5 million into the U.S. Treasury. This rather substantial amount of low cost "yardstick" energy, as well as directly lowering the average cost to these systems, acts as an affirmative competitive force on the wholesale rates offered by investor-owned utilities in the area.

In contrast to this rather fortunate situation, we point out that in southern California, where no Federal power is available for purchase by rural electric systems, one cooperative paid an average 12.6 mills per kwh for energy in fiscal 1965 to the San Diego Gas and Electric Company; two others paid an average of 10.2 mills per kwh to the Southern California Edison Company.

Colorado River project is needed, feasible

The presently proposed Colorado River Basin Project would cost a total of $1.323 million, a portion of which would be allocated to mainstem dams at Bridge Canyon ($511 million) and Marble Canyon ($239 million) and their

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associated works. The Central Arizona irrigation unit would cost an additional $526 million. There would be 1400 mw of generation installed at Bridge Canyon and 600 mw installed at Marble Canyon; both sites would benefit from the headwater regulation by Glen Canyon Dam and would, in turn, benefit downstream projects at Hoover, Parker and Davis.

Of the total cost of the project, $1,165 million—99 per cent of its total cost—would be repaid, more than half of the repayment revenue coming from sale of electricity. Only 12 per cent non-reimbursable, the project is further enhanced by an extremely high benefit-to-cost ratio of 1.9 to 1 over a fifty year payout period.

The peculiar nature of the power generated by Bridge and Marble Canyon would be a tremendous asset to all Pacific Southwest power supply systems. The present plans of an organization known as the Western Energy Supply and Transmision Associates (WEST), composed of ten investor-owned utilities, and a group of publicly owned bodies and rural electric generation and transmission coperatives, include installation of approximately 36 million kilowatts between now and 1985, most of it in fosil or nuclear fueled steam generating plants, which operate baseloaded on an around-the-clock basis. Bridge and Marble Canyon Dams would be oeprated as peaking projects, on a 35 per cent plant factor. Thus they could be advantageously scheduled to complement the baseloaded capacity of WEST members and other power suppliers by generating electricity during the daily peak load periods, which usually occur during the morning an dearly evening hours. Hydroelectric projects, whether conventional storage, run-of-the-river, or pumped storage projects, all have the advantage of being able to start quickly, since they are permanently kept in "spinning" readiness, and brought to load capacity in a very short period of time. It is our understanding that the output from the projects would be marketed over the payout period at $10 per kilowatt year for capacity and 3 mills per kilowatt hour for energy (or 6.3 mills per kwh for energy alone). This is low cost electricity by almost any standard, and compares very favorably with present production costs for capacity and energy from new steam plants in the region of $15 per kw plus the energy charge (or 8.0 mills per kwh for energy alone, at 35 per cent plant factor).

To any suggestion that conventional hydroelectric projects are being outmoded by large coal or nuclear-fueled plants, we would point out that FPC received in 1965 some 170 applications for major and minor hydroelectric licenses, and amendments to licenses. In the same year FPC acted on 149 such applications, granting 141 of them. Applications pending at the end of fiscal 1965 were for projects totalling 5.3 million kw.

There can be no questioning the tremendous growth which has taken place in the Pacific Southwest, and of the concomitant need for water and electricity which this growth has created. In the area described as Region VIII by the Federal Power Commission, encompassing most of Arizona, Nevada and California, it is estimated that the total peak demand for power will increase, from about 20 million kilowatts today, to 52 million kilowatts in 1980. This growth does not even consider markets for wholesale power within economic transmission distance in Utah, Colorado and New Mexico. However, the new capacity required in Region VIII alone of 32 million kw suggests that the 2 million kw of Bridge and Marble Canyon power will be readily marketable.

Grand Canyon would not be affected

We have been aware of the complaint of preservationists that Bridge and Marble Canyon Dams, and particularly the former, would destroy, or inundate, or in various ways materially alter the character of the Grand Canyon. We would like to say most emphatically that this complaint is not borne out by fact. Marble Canyon Dam would be built upstream of the eastern border of Grand Canyon National Park and its reservoir would extend behind it to Glen Canyon Dam; in no way would it interfere with the appearance of the Grand Canyon National Park, except to the extent that it would somewhat alter the flow of the Colorado River through the Park. The primary erosion of the river would continue to take place. More importantly, the secondary erosion within the Canyon—by far the dominant type of erosion taking place in it today—*would continue unabated* by the construction of either Bridge or Marble Canyon Dams. The forces of nature would continue to work upon the Grand Canyon almost exactly as they do today.

As for Bridge Canyon Dam it would not, as claimed by the preservationists, back up water *within* Grand Canyon National Park but only along the extremely

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remote and inaccessible western border of the Park. Bridge Canyon would raise the level of the Colorado along this western border beginning at 90 feet above its present level and decreasing to its present level 13 miles upstream; that is, the level of the river along 13 miles of the western border of the Park would be raised an average of 45 feet.

A stretch of 104 miles of natural river would still remain from the headwaters of Bridge Canyon Reservoir to the upstream Marble Canyon Dam. The 104 miles would include 91 miles within the boundaries of Grand Canyon National Park, assuring that the Grand Canyon which most of us have seen from the north and south rims, or hiked into, or explored by pack trip, will be in no way affected by the construction of either dam.

Recreation vs. preservation

We believe that there are legitimate and very serious policy questions involved in the decision to build or not to build a project such as Bridge Canyon, in view of the character of the natural wonder it is alleged to threaten. Concededly, it would somewhat change the appearance of Grand Canyon National Monument, although its construction would not at all change the character of Grand Canyon National Park. In this respect, we believe that the recreation benefits which are foreclosed *or contributed* by construction of Bridge Canyon should be assessed and weighed against the crucial need of the Southwest for water and power. The following table is helpful in this respect.

Visitor days [1]

	Lake Mead National Recreation Area	Grand Canyon National Park	Havasupai area of Grand Canyon National Park	Grand Canyon National Monument
1965	3,954,100	1,689,200	4,100	1,300
1964	3,462,600	1,575,700	3,100	900
1963	3,349,600	1,538,700	4,400	800
1962	2,688,700	1,446,500	4,100	900

[1] Data obtained from National Park Service.

Plainly the most "valuable" recreation resource in terms of visitor days was the Lake Mead National Recreation Area, created by a dam such as is proposed here, since it benefitted the most people. The second greatest attraction, in terms of recreation visitor-days, was the Grand Canyon National Park, the accessible portions of which would be unaffected by construction of either Bridge or Marble Canyon. The remote western border of the Park known as the Havasupai area would be somewhat affected by the raising of the river level. However, virtually all of the visits to this area are made through tours arranged by the Havasupai Tourist Enterprise at Supai, Arizona.

In an effort to determine the anticipated effect of Bridge Canyon upon visits to the Havasupai area, I contacted Mr. Reed Watahomigie, a native of the area, and Manager of the Havasupai Tourist Enterprise. Mr. Watahomigie expressed the opinion that the construction of Bridge Canyon would in no way interfere with the tours presently conducted and that its probable effect, if any, would be to increase the accss of people to that portion of the Canyon and thereby stimulate tourism and recreation in the area.

Consequently, it seems clear to us the construction of the two dams would increase the accessibility to their respective portions of the Colorado River. A boat trip from the foot of Marble Canyon to the headwaters of Bridge Canyon Dam would still permit the experience of 104 miles of wild river; but the reservoirs of both Bridge and Marble Canyon would also create lakes comparable to that of Lake Powell above Glen Canyon. It is our strong conviction that such a still water lake, surrounded by steep, varied, beautifully-colored Canyon walls, is entirely consistent with the objectives of the National Park Program.

We do not feel that Bridge Canyon Dam or the reservoir created behind it would in any way adversely affect the singular beauty of the Grand Canyon. Consequently, we believe that the Budget Bureau's suggestion that construction of Bridge Canyon be deferred and further studied is not advisable and should not delay its authorization and construction. For the above reasons we respectfully urge the Committee to consider approval of Bridge Canyon Dam as part of the total construction proposed by the Colorado River Basin Project.

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Desalination plants could complement plan

Although we are not expert in areas of water and reclamation law, Section 304 of H.R. 4671 appears to be carefully drawn with an attempt to protect both the water users of Arizona, California and Nevada and of any contiguous basin which might export its excess water to the Colorado. We also respectfully suggest, as an alternative to water importation from another river basin, the construction by the Secretary of the Interior of a large scale desalination plant, perhaps at the mouth of the Gulf of California, which would have the effect of both increasing the availability of water for users in Arizona and California, without exporting it from the Pacific Northwest or the Missouri Basin, as well as producing a large quantity of baseload electric generating capacity to complement Bridge and Marble Canyon peaking generation. The combination would provide a flexible power supply for cooperatives and publicly owned systems, as well as investor-owned companies. To the former customers the Bureau of Reclamation could market load factor energy and peaking power, while, to the companies, the Bureau would sell peaking capacity only.

SUMMARY

In conclusion, we respectfully call attention to the critical need for fresh water in the Pacific Southwest and for abundant power capacity, both baseload and peaking; to the fact that Bridge and Marble Canyon Dams would act as "cash registers" for the entire Colorado River Basin Project, marketing electricity at rates sufficient not only to repay their own cost, but helping to pay for all reimbursable features of the project; and to the fact that neither Bridge Canyon nor Marble Canyon Dam would in any way change the main gorge of the Grand Canyon National Park, but only a small portion of the Monument. In this case, the balancing of interests points overwhelmingly to construction of the facilities proposed by the present legislation.

We respectfully recommend authorization of the Colorado River Basin Project, as described by H.R. 4671, including Bridge Canyon and Marble Canyon Dams.

Mr. ROGERS of Texas. The next witness now is Dr. Henry Dobyns.

Now, we have about three or four other witnesses who come from outside of the general area and we are going to have to hurry along because we have very little time left.

Now, if those remaining witnesses who cannot be reached desire to insert their remarks in the record, it will certainly be permitted and they will be permitted to identify themselves and make a short statement in support of their position.

Now, it will be Wednesday of next week before this subcommittee can reconvene.

Are there any of the witnesses that would like to do this—like to indicate, or would prefer to come back next week? Did you care to——

Mr. ETTER. I was originally scheduled much earlier in the program and for some reason was put down, so I am not going to voluntarily——

Mr. ROGERS of Texas. What is your name?

Mr. ETTER. Etter. E-t-t-e-r.

Mr. ROGERS of Texas. You may proceed, Dr. Dobyns.

STATEMENT OF DR. HENRY F. DOBYNS, ANTHROPOLOGIST, CORNELL UNIVERSITY

Dr. DOBYNS. Thank you, Mr. Chairman. I would like to ask unanimous consent of the committee to receive my written statement and I will summarize it very briefly and place myself——

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Mr ROGERS of Texas. Without objection, it is so ordered and the statement will be included the same as if you had read it.

Dr. DOBYNS. Thank you. I would just like to reiterate that as an anthropologist who has spent a good deal of time tramping the Hualapai Indian Reservation and some of the other areas in question here in the western part of that complex that we term the Grand Canyon, I strongly favor the construction of Bridge Canyon or, as I understand you relabeled it, the Hualapai Dam, on a number of grounds.

I would, as an anthropologist, like to quiet the concern of many conservations concerning the flood of archeological sites and point out that the Federal Antiquities Act provides for this contingency. Actually the scientific record will be fuller and sooner explored under conditions of construction than nonconstruction with amateurs actually destroying the evidence before it can be salvaged, frequently. And the construction of a dam in this area really provides the main and major hope for an equitable social, economic, or cultural integration of the Hualapai and the Havasupai groups into the United States in contrast with the rather harsh historic treatment which they have received, and I would hope that my fellow liberals in this Sierra Clubs and other such organizations would see the wisdom of the conservation of Indians as well as rocks and ducks.

I would like to inject, if I may, one thought. I am disappointed that the gentleman from Pennsylvania could not remain because I detect in his objection to the request to the committee a kind of holistic point of view that I think well behooves the statesmen on this committee. I have been listening to a good bit of discussion about costs in dollars. It seems to me there is another dimension of cost and that is in biological cost.

The National Academy of Sciences, the National Research Council, in their publication No. 1400, entitled "Waste Management and Control," which is a scientific summary report in response to a request of the Government, has pointed out that there are acute problems of pollution of the human environment, and I would cite figure 6 in that report at page 124, a map which shows that air pollution in much of the basin and range part of the Western States, including the park that we are discussing here along the lower Colorado River, is subject to either occasionally or frequently reduced air circulation which produces conditions favorable to air pollution. So that the alternatives sometimes suggested of fossil fuel plants in this area or, as we very well know, on the Pacific coast in the Los Angeles area where the problem is most acute of anywhere in the county, because of the topography, it seems to me is placing a high biological cost on the entire population which is a kind of cost that statesmen on this committee should consider.

We have also been hearing dicussion of nuclear power, and I would just like to refer as a person who likes to see realistic views taken that a dam cannot have a nuclear accident. If an accident, if Bridge Canyon construction had an accident, it would simply flow down into Lake Mead behind Hoover Dam. It would not blow up any people in the Los Angeles metropolitan area. Even without an accident, in a nuclear reactor, it would not be putting radioactive carbon 14 and other short-life strontium 90 and so on, into the atmosphere with serious consequences to the future of the human race, and I would like to quote

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one very brief passage from page 84 of the National Academy of Sciences report in reference to this problem of exposure to radiation, that—

> In the case of nuclear radiation, while the exposed individual may not be harmed by the exposure, the human race may suffer in the long term from such exposure. This produces a need for a totally different set of considerations criteria. In establishing tolerance limits for acceptable exposure levels, standards must take into account these potentially very damaging effects on future populations.

And it seems to me that the statesmen on this committee need to take that kind of biological cost very seriously into consideration in weighing the relative merits of fossil fuel, nuclear, and hydroelectric power generation.

Thank you.

Mr. ROGERS of Texas. Thank you. Mr. Udall?

Mr. UDALL. Just a couple of quick ones.

We have had a lot of study of the Navajo, Hopi, and other Indian Reservations. Dr. Dobyns is a field authority on this large wild and largely unknown Hualapai area. He has spent as much time in there as anyone, and I think he has made a real contribution to these hearings because we don't have the benefit of people who lived there, who have tramped through it, who have analyzed it and studied it, and know of the relationship between the people and resources of that area.

I congratulate you on that.

Dr. DOBYNS. Thank you.

Mr. UDALL. Secondly, I think you indicated that you are one who is ordinarily alined with the Sierra Club and their groups in many if not most issues.

Dr. DOBYNS. Yes, that is true.

Mr. UDALL. And you feel that here the overriding considerations as you presented them and as you balanced the different factors, come out in favor of the construction of the dam.

Dr. DOBYNS. Yes. I find myself in the peculiar position of being against the Storm King development by General Electric but for the Hualapai Dam.

Mr. UDALL. Finally, we have had a lot of comment about pollution. Is there any problem with pollution from the discharge, the cooling water that is used in connection with nulcear plants?

Dr. DOBYNS. As the report of the National Academy of Sciences indicates, the scientists themselves simply do not have sufficient data to be sure on this point. But their very lack of assurance derives from the lack of knowledge of the subterranean flow of waters so that we, in fact, do not know whether we are prejudicing our subterranean water supplies by some of our waste disposal methods.

Mr. UDALL. Thank you.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. How many of Hualapai Indians are there? I think somebody said so earlier in the hearing.

Mr. UDALL. 900, the chief said.

Mr. ROGERS of Texas. Mr. Reinecke.

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Mr. REINECKE. Thank you. Dr. Dobyns, have you made some of these research studies in the canyon on Indians?

Dr. DOBYNS. My research has included trips into a good number of the south rim tributaries which feed into the Havasu in this area under discussion in terms of the Hualapai or Bridge site, not with regard to Marble.

Mr. REINECKE. Are these in the pursuit of the work at the university?

Dr. DOBYNS. This is in pursuit of research leading to testimony as an expert witness before the Indian Claims Commission and litigation between the tribe and the United States for damages for loss of aboriginal territory.

Mr. REINECKE. Are you hired, then, by the tribe in this case?

Dr. DOBYNS. In carrying out this research, I was retained by the tribal council acting for the Indians in the Sioux.

Mr. REINECKE. I see. And would there be—you mentioned that archeological and anthropological information would be more readily explored with the construction than letting the amateurs, as you put it, tear it down as they went through. Do you envisage any contracts—excuse me, that is not the right term—any arrangements whereby you would be retained to make any of the studies for the Hualapai Tribe?

Dr. DOBYNS. My colleague, Prof. Walter C. Eller, now at Prescott College, is designated by the Hualapai as consulting archeologist to the tribe, and I assume I might be testifying in his favor. I would not anticipate that I am testifying in my own favor, though I would not necessarily rule out the possibility or, if I go as I am going, to the University of Kentucky as a department chairman next year, one of the members of that department is also concerned in this area, so he might be involved in salvage contract operations.

I would not anticipate that I, personally, would.

Mr. REINECKE. You are interested in the Indians. Have you looked into this project to see how much, to use the word "dollars" is being transferred in the direction of the Hualapai Tribe?

Dr. DOBYNS. Yes. I am at least in general terms aware of some of the kinds of benefits which can be expected to accrue to the Indians. That is, there is a large cash payment involved, presumably, if all this legislation should be approved. It derives from prior agreements between the tribe and the Arizona Power Authority, and in testifying I hope that I am testifying in favor of safeguarding the economic interests of the Hualapais, which would lead to their equitable integration into the general population in terms of reserving to the tribe its rights to carry out the recreation developments on the outside of the reservoir, the artificial reservoir that will be created, so that a tribe which is today dependent on a rather small income from cattle and from timber cutting could hope to really join the affluence of the Great Society by its own efforts in carrying out the recreational area developments in terms of an access road which can be built which would be the only road which would enable one to go to the bottom of the Grand Canyon.

Mr. ROGERS of Texas. The time of the gentleman has expired.

Mr. REINECKE. $20,000 per Indian just for the initial payment.

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Mr. ROGERS of Texas. I will go on a little bit longer, but I want to advise that we are going to have to quit here because I am already a week behind in my office. I will go along, but I think these people from out of town——

Thank you very much, Doctor, for your presentation.

(The prepared statement of Dr. Dobyns follows:)

STATEMENT BY DR. HENRY F. DOBYNS CONCERNING H.R. 4671 TO AUTHORIZE THE COLORADO RIVER BASIN PROJECT

Mr. Chairman and members of the Committee, my name is Dr. Henry F. Dobyns. I am an anthropologist by profession, associated with the Department of Anthropology at Cornell University.

In association with Prof. Robert C. Euler of Prescott College in Arizona, I have spent a good deal of time in scientific exploration and evaluation of findings in the Grand Canyon of the Colorado River in Arizona. Professor Euler and I have also conducted the ethnohistorical and ethnographic research among the Hualapai Indians whose reservation occupies a long stretch of the south rim of western Grand Canyon including the south rim portion of Bridge Canyon dam site. I have also conducted some archeological research in southern tributaries of the Grand Canyon.

On the basis of my archeological and ethnographic research among the Hualapai Indians, and my familiarity with the western Grand Canyon area, as well as long years of residence in scientific research in the state of Arizona, I favor the construction of Bridge Canyon dam. I hold absolutely no brief for maintaining the western Grand Canyon system unchanged. I know many reasons for the construction of Bridge Canyon dam for the economic and social progress of Arizona and for the Hualapai and Havasupi Indians. The construction of Bridge Canyon dam, the installation of power generation facilities there, the creation of a large recreational lake would constitute the major single foreseeable economic foundation for a fair social, cultural, and economic integration of much discriminated against Indians into the United States body politic. I cannot help but feel that those who are opposing the Bridge Canyon dam project are carrying on the traditional white discrimination against the Hualapai Indians, and in effect are attempting to hold them in economic, social and political subordination.

As far as "very valuable anthropological sites" being flooded by the artificial lake that would be created behind Bridge Canyon dam is concerned, this prospect does not worry me in the least. In the first place, while there are sites bearing evidence of prehistoric Indian occupation of the south rim canyon areas, these sites on the whole are not large and will provide limited evidence as to the prehistoric patterns of life. In the second place, the areas involved fall into the jurisdiction of the United States Government and the Federal Antiquities Act. This means that should dam construction and lake filling occur, funds will be provided to contract with universities and other institutions to carry out salvage survey and excavation in these sites before they are flooded or otherwise destroyed. So that it is much more likely that the scientific record would be recovered in the near future under circumstances of dam construction than otherwise. For the same reasons I would not fear that the scientific record would be lost which may otherwise be the case.

Furthermore, since Professor Euler and I have worked with the members of the tribal council of the Hualapai tribe for a number of years, I am confident that the Hualapai tribal government itself would insist upon efficient salvage archeology program which would be integrated into the recreational facility development centered around the economic possibilities of Indian development of the recreational lake shores.

If scenic beauty really is the decisive consideration, then it seems to me that both Bridge and Marble Canyon dams should be built, not opposed, by those interested in scenic beauty.

Bridge Canyon has 3,000 foot deep sheer walls. How tall would Bridge Canyon dam rise? Would it not be some 700 feet? In this case a relatively small portion of the depth of the canyon will be under water. Upstream, the impounded artificial lake would become progressively shallower. Since the lake would occupy a small proportion of the canyon bottom, how much of the scenery visible from the rim would it actually affect? Given the steepness of the canyon walls,

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there are few observation points on the rim from which the river can now be seen. The great bulk of the visitors to Grand Canyon National Park now look at the canyon from the rim. Only a relatively small number takes the trip into the canyon proper. There is no reason to expect the pattern to be different in the Bridge Canyon area.

Bridge Canyon dam would open up to a large segment of the public an area of the canyon which is now most difficult to reach and is visited by very few people. The last time I explored into the South Rim country that would be affected by Bridge Canyon dam, there was not much in-canyon scenery accessible to very many people. It was possible to drive through the sand in a four-wheel drive vehicle to Peach Springs Canyon, to the river at the mouth of Diamond Creek, and to make some progress towards Bridge Canyon. Any real enjoyment of the canyon bottom views required riding horseback, or hiking.

While there are people determined enough to enjoy canyon scenery to ride or hike in, the same scenery would be enjoyed by many more U.S. taxpayers were there a paved road down Peach Springs Canyon to a lake behind Bridge Canyon dam, where boats would then provide access to all the wonders of canyon-bottom scenery, plus fishing and water sports. Bridge Canyon dam would add to the *available* scenery, rather than damaging inaccessible scenery.

It is true that there are thousands of lakes in this country, but it is also true that the artificial lake behind Bridge Canyon dam would be nearly unique in its deep-canyon setting, to be matched only by the lake behind Marble Gorge dam.

May I remind you that Bridge Canyon dam would be built downstream from Grand Canyon National Park. It would not affect the flow of the Colorado River through the Park, so would not affect the erosional power of the stream in the Park. That argument may apply to dams upstream from the Park, but not to those downstream.

When people first began going to look at what came to be called the Grand Canyon, they actually stopped at the Peach Springs station of the Atlantic and Pacific Railway. Carriages then carried them down Peach Springs canyon to the Diamond Creek Canyon junction and the main canyon. Later, the present developments within Grand Canyon National Park were built, and tourist traffic diverted from Peach Springs. Construction Bridge Canyon dam would bring people back to the original entry-way into the canyon wonderland. Today, the developments would not be in the hands of outside railway companies. The Hualapai Indian Reservation occupies the South Rim of the canyon above and below the Bridge Canyon dam site. The access roads to the construction site, to artificial lake recreation sites, and to scenery viewing points will all lie within this Indian territory. The Hualapai Tribe would benefit tremendously both socially and economically from construction of Bridge Canyon dam. May I urge that it be accorded this opportunity, and not treated as part of the picturesque canyon scenery?

Mr. ROGERS of Texas. Dr. Stephen Jett, assistant professor of geography, University of California.

STATEMENT OF DR. STEPHEN C. JETT, ASSISTANT PROFESSOR OF GEOGRAPHY, UNIVERSITY OF CALIFORNIA

Dr. JETT. I have here a statement which I have submitted in part prior to the hearings and which I would like to have entered into the record as if read in a slightly revised version if I may have the permission to do so.

Mr. ROGERS of Texas. Without objection, it will be included in the record the same as if read in full.

Dr. JETT. I would like to summarize the statement briefly and, if I may, also append to this statement to be entered into the record following the testimony of Dr. Dobyns, a few words with regard to this problem of tourism and recreational development in the Hualapai region, in which I take the position opposite to his.

Mr. ROGERS of Texas. Do you have that prepared?

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Dr. JETT. Yes. I will give it to the reporter.

Mr. ROGERS of Texas. If you will submit that, and if it is appropriate, it will be included.

Dr. JETT. Thank you, sir.

Mr. ROGERS of Texas. Otherwise, it will be included in the file with reference being made to it.

Dr. JETT. I would like to first make a statement as to my qualifications. I spent a good deal of time in the Navajo Indian Reservation area engaged in studies of tourist and recreational and scenic resources of this region. I have in press at the present time a book called "Tourism in the Navajo Country, Resources and Planning," which discusses my views on the subject. This is being printed by the Navajo Tribal Museum.

At the time of the original submission of my statement, I had no official authorization to make any statements on the part of the Navajo Tribe and I should emphasize that the majority of my testimony is still as an individual witness with no connection with the tribe. Since that time, however, I have talked to the chairman and have been authorized to state in his behalf that he feels that the Navajo Tribal Council and himself in particular have not been sufficiently informed regarding the facts of this bill, particularly in reference to the proposed construction of Marble Canyon Reservoir.

The Navajoes' interests are very much involved here since the reservoir would inundate a 46-mile-long portion of their reservation. They own approximately one-half of the proposed site. And it is in this regard, particularly in reference to the tourist and recreational developments that I am testifying today.

I should also state that my position is as assistant professor of geography at the University of California at Davis, where I am concerned particularly in the resources of the southwestern region, among other things.

The Marble Gorge area, as has been brought out in testimony previously is a portion of the Grand Canyon. This is one of the Nation's most visited scenic areas, having at latest reports something approaching 1.7 million visitors per year, as was brought out in the testimony before last. This means that the section of the Grand Canyon on the Navajo Reservation, including Lower Marble Gorge, has a tremendous potential for development as a tourist resource.

It turns out that the distance from Route 89, the nearest through route, to the Navajo Rim, as I call it, of the Grand Canyon is only one-third of that from Route 66 to the visitors' center at the south rim of Grand Canyon, the most visited portion at the present time. It is less than one-half the distance from a through highway to the north rim of the canyon. The roadbuilding that could be accomplished to this overlook or series of overlooks would be very inexpensive due to the rather smooth topography involved.

I, therefore, conclude that there is a very great possibility here of tourist development if the canyon is maintained as an unimpaired scenic resource.

In contrast to this situation, if the reservoir were constructed it would inundate several of the most important and distinctive scenic portions of the canyon and would substantially impair three out of

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five major potential viewpoints of the Lower Marble Gorge area of the Grand Canyon.

Some of these are particularly spectacular. I won't enumerate them. They are mentioned in my testimony.

The development of the scenic area at fairly low expense would have the effect of drawing visitors, tourists, to the region and their expenditures on the reservation would tend to increase the economy of the Navajoes who have a per capita income of only about a third of that of the average of the United States.

On the other hand, the construction of a reservoir at this site, in addition to impairing the scenic values here, would have relatively little effect as drawing recreationists who would expend money on the reservation since two factors are involved here.

No. 1, the major points of access to the reservoir would be off the reservation. In fact, this is the only really feasible access at Lee's Ferry and this is not on the Navajo Reservation. It is across the river and some miles away.

Secondly, we must keep in mind the relative possibilities of the development of tourism for scenic purposes as opposed to those for development of water-based recreation visitation.

Figures and predictions by Marion Clawson of "Resources of the Future," who is perhaps the country's outstanding expert on the statistical matters revolving around recreation, he has predicted that the development of demands for scenic resources will increase from 1950 levels to the year 2000 by 40 times, whereas recreational development of the type that would be afforded by these reservoirs would increase only 16 times. So we can expect a much more rapid rise in terms of use as a scenic resource in the long run.

The Federal Government's Outdoor Recreation Resources Review Commission has concluded similarly, although their figures are somewhat more conservative, they also agree that these water-based activities in general will increase at a lesser rate than tourist, scenic use.

In addition to this, from the point of view of the development of resources on the Navajo Reservation, we find that if alternative sources of power production were other than the hydropower that would be afforded by the Marble Canyon Dam, this would have the effect, unlike the dam, in providing a demand for fossil fuels and uranium ores, which are in great abundance on the reservation, and this would provide permanent employment for the Navajo Indians of the region.

These resources are on the reservation and are very near the proposed damsite. Coal, natural gas, petroleum, uranium, any of these potential sources for fuel are available in great abundance on the Navajo and Hopi Reservations.

So I would like to summarize briefly by saying that from the point of the view of the Navajo Tribe—as I see it, and as this has not been confirmed by the tribe itself, although I would hope it will be when they have sufficient information—from the point of view of economic development and recreation and tourism, it is more desirable to have the unimpaired Marble Canyon than it is to have the reservoir.

It is also more desirable to develop the fossil fuel resources for power production than it is to develop hydropower.

Thank you very much.

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Mr. ROGERS of Texas. Thank you very much. Mr. Udall?

Mr. UDALL. One quick one. Were you authorized or requested by the Navajos to come here and make this statement?

Dr. JETT. I was not. This was rather a last-minute sort of thing. The tribe did not know about it. I did not know about it until the last minute. I felt their interests should be represented. I contacted the tribe but they were unable to get anybody here.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. No questions.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. Just one question. You referred to a gentleman who was an expert on recreational usage.

Dr. JETT. Yes, sir.

Mr. REINECKE. Have you had much experience in that area yourself?

Dr. JETT. Yes. As I mentioned, I have written a book which is in press.

Mr. REINECKE. I am interested in one fact that has been given to us by the Department; namely, that the anticipated visits to Lake Mead for 1965, I think, are a little over 3½ million, and they were just cited up by Mr. Mercer in a recent paper. This is almost 10,000 people per day on that lake.

I have been on this lake many times in all seasons, and I can't ever remember seeing any more than a few hundred. Granted, it is a big lake. I don't mean to say I have been all over the lake the same day.

Isn't 10,000 people per day an exaggeration, or does that figure include those who cross the dam into Nevada?

Dr. JETT. I am not completely sure on this fact, but since the Hoover Dam is within the Lake Mead Recreation Area, this would have to include those people.

Mr. ROGERS of Texas. Thank you very much for your presentation.

(The prepared statements of Mr. Jett's, above referred to, follow:)

STATEMENT OF STEPHEN C. JETT, PH.D., ASSISTANT PROFESSOR OF GEOGRAPHY, UNIVERSITY OF CALIFORNIA, DAVIS, AND AUTHOR OF TOURISM IN THE NAVAJO COUNTRY: RESOURCES AND PLANNING

My name is Stephen C. Jett. I am an Assistant Professor of Geography at the United States, and I have written the book *Tourism in the Navajo Country:* tion of Natural Resources." My region of specialization is the Southwestern United States, and I have written the book *Tourism in the Navajo Country: Resources and Planning*, now in press at the Navajo Tribal Museum. My studies of the resources of the area put me in a position to be able to comment on some of the economic aspects of this controversy, particularly in relation to the interests of the Navajo Tribe, which owns roughly one half of the proposed Marble Canyon reservoir site.

I am here as an independent witness and am not authorized to speak on behalf of the Navajo Tribe. Tribal Chairman Raymond Nakai has informed me that the Tribal Council has not been consulted by the Federal Government regarding the proposed legislation and has had neither sufficient time nor information to reach a definitive decision in time for these hearings, of which the Tribe became aware, apparently, only when I informed them of these proceedings last week. I have been authorized, however, by the Chairman of the Navajo Tribe to make known to the subcommittee his opinion that the Tribe has not been adequately informed and his wish that the Navajos, whose welfare this proposed

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project so directly affects, be informed and consulted in this regard since Navajo Tribal land is involved and since, therefore, no dam can be authorized for Marble Gorge without an agreement with the Navajo Tribe. And I do not believe that the Congressmen from the Southwestern States will want to ignore the desires of the 100,000 Navajo Indians residing in Arizona, Utah, and New Mexico. In this regard, it might be noted that the editor of the Tribe's newspaper has referred to Bridge Canyon and Marble Canyon Dams as "menaces." [1]

If built, Marble Canyon Dam would cause the Inundation of a 46-mile-long portion of the Navajo Reservation. The portion of the Reservation that would be flooded is currently of little value to the Tribe. However, with the great surge in demand for scenic resources, the Marble Gorge area has great potential for development as a major scenic attraction, particularly in view of the fact that it is a part of the Grand Canyon, one of the world's most visited scenic wonders. Visitation at the Grand Canyon has been rising rapidly, reaching nearly 1,700,000 visitors in 1965.[2]

Development of the scenic resources of the lower Marble Gorge area could be accomplished by building a low-cost road from U.S. Route 89 to the canyon rim, with spurs along that rim. The distance from Route 89 to the rim (20 miles) is only one third that from U.S. Route 66 to the presently most visited portion of the Grand Canyon (59 miles), and is, in fact, shorter than the distance to any other portion of the main Canyon (see Table 1) other than to the Hualapai rim.

TABLE 1.—*Distances of various points on the rim of Grand Canyon from nearest through highways*

Locality	Nearest through highways	Distance
South Rim (Grand Canyon Village)	U.S. 66	59 miles.
South Rim (Grand Canyon Village)	U.S. 89	57 miles.
South Rim (Desert View)	U.S. 89	31 miles.
North Rim, Grand Canyon National Park	U.S. 89	44 miles.
"East Rim" (lower Marble Gorge section)	U.S. 89	20 miles.

Among the outstanding and distinctive viewpoints which would be made accessible by a road to the "East Rim," or what I will call the "Navajo Rim," of the Grand Canyon are the junction of the exceptionally deep and narrow canyon of the Little Colorado River (already designated a Tribal Park) with the Grand Canyon; the Desert Facade, where the Colorado approaches the rim more closely than at any other point in the Grand Canyon, creating a nearly vertical drop of 3,300 feet (more than twice the height of the Empire State Building); the extremely beautiful and impressive area surrounding Marble Canyon damsite; Vaseys Paradise overlook, which affords a view of a great mass of spring-fed greenery hanging on the canyon wall; and the Shinumo Canyon overlook, which presents an impressive vista of a long stretch of Marble Gorge.

The development of access to the Navajo Rim of Grand Canyon would have the effect of attracting visitors to the area, and their expenditures while on the Navajo Reservation would contribute to the earned income of the Navajo Indians, one of the most poverty-stricken groups in the nation, whose per capita total income ($645 a year in 1960) is only a third of the national average, with one-third of *that* one third being welfare in cash and kind.[3]

The ways in which the Navajos could profit from the development of the Grand Canyon's Navajo Rim include the sale of tourist services such as are provided by motels, restaurants, service stations, shops specializing in native arts and crafts as well as souvenirs and camera supplies, and, perhaps, guide services. Navajos have already gained some experience in managing enterprises of this sort and are actively engaged in creating and managing their own park system. An entrance fee, comparable to those at National Parks, could be charged to partly offset the costs of maintaining a Navajo Tribal Park (unless the Tribe

[1] Chet MacRorie, "From the Horse's Mouth," *Navajo Times*, Vol. 7, No. 11, p. 4, 1966.
[2] National Park Service, Branch of Statistics Analysis, U.S. Dept. of the Interior, *Public Use of the National Parks; a Statistical Report*, 1966.
[3] Robert W. Young, *The Navajo Yearbook*, Bureau of Indian Affairs, Navajo Agency, 1961, pp. 227–9.

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elects to pass these expenses on to the National Park Service in the event that the bill to enlarge the National Park succeeds in Congress).

Thus, being a distinctive portion of the world famous Grand Canyon and being the closest part of the main canyon to any through highway, the lower Marble Gorge area has great potential for development as a scenic attraction and could greatly benefit the Navajo Indians. If, on the other hand, Marble Canyon Dam were built, major damage would be done to some of the most scenic sections of Marble Gorge, thus reducing its potential for development as a scenic attraction. Three of the five major overlooks mentioned above would be seriously impaired as natural and scenic resources. The damage would be particularly great in this lower part of Marble Gorge, which is its most scenic section, due to the fact that being at or only a short distance upstream from the dam, the inundation would cover a much greater percentage of the height of the canyon walls than further upstream. The access road to the damsite from the canyon rim would cause additional damage.

Although the reservoir created by Marble Canyon Dam would draw numbers of water-oriented recreationists, the only practical point of access to the proposed reservoir is at Lees Ferry, which is some miles off of the Navajo Reservation and thus not located in such a way as to benefit Navajo entrepreneurs. Cliffs would effectively preclude access from the Navajo side of the reservoir.

In assessing the relative economic impact of tourism *vs.* water-based recreation on the region as a *whole*, the probable future trends of these two activities must be kept in mind. Marion Clawson, of Resources for the Future, Inc., who is probably the country's greatest expert on recreation statistics, predicts that the demand for use of recreation areas, such as the proposed reservoir, will increase perhaps 16 times over 1950 levels by the year 2000, but that the demand for use of scenic areas by sightseers will increase by as much as *40* times.[4] The Federal Government's Outdoor Recreation Resources Review Commission, although presenting more conservative predictions, also predicts that, given opportunity, sightseeing will grow more rapidly than boating, fishing, or swimming.[5] This is particularly relevant when one considers the extremely limited access to the proposed reservoir and the large number of alternative water recreation areas in the region, facts which have been pointed out by the Bureau of Outdoor Recreation in the Pacific Southwest Water Plan.[6]

The construction of Marble Canyon Dam would have relatively little, if any, and only short-term impact on the Navajo economy. On the other hand, if alternative power sources were sought in the region, which other testimony indicates is likely to be more economical, then he Navajo Tribe would stand to gain, since continuous employment would be likely to be available in mines on the Reservation supplying the fuel to thermoelectric plants, and in these plants themselves. Fossil fuels are extremely abundant on the Navajo and Hopi Reservations, in the form of vast coal reserves in the Black Mesa area (about 55 miles from Marble Canyon damsite), for which there are already development plans underway,[7] and great natural gas and petroleum reservoirs in the Four Corners area and probably also in the Black Mesa area. The latter could conceivably be utilized to run diesel and gas electric generators, which can provide peaking power easily. In addition to coal, gas, and petroleum reserves, the Navajo Reservation and immediately adjacent areas are rich in uranium ore. Uranium, mined by Navajos and others, could also provide an efficient and economic alternative to hydropower for peak load periods.[8]

In summary, from the point of view of the Navajo Tribe, it appears that the development of Marble Gorge as an undamaged scenic resource could greatly benefit the Navajo people, whereas the construction of Marble Canyon Dam

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[4] Marion Clawson, "The Crisis in Outdoor Recreation," *American Forests*, Vol. 65, No. 3, pp. 40–41, 1959.

[5] *Outdoor Recreation for America: A Report to the President and to the Congress by the Outdoor Recreation Resources Review Commission*, p. 220, 1962.

[6] "Revised Report of the Bureau of Outdoor Recreation on Pacific Southwest Water Plan," *Pacific Southwest Water Plan, Appendix of August 1963 as Modified January 1964*. U.S. Dept. of the Interior, pp. 2–3.

[7] Helen G. Monberg, "News About Navajo Country," *Navajo Times*, Vol. 6, No. 3, p. 12, 1965.

[8] Hugh Nash, "Dams in Grand Canyon—A Necessary Evil?" *Hearing before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, First Session, on H.R. 4671 and Similar Bills, to Authorize the Construction, Operation, and Maintenance of the Lower Colorado River Basin Project, and for Other Purposes*, Serial No. 17, 1965.

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would destroy a portion of this resource, would benefit the Navajos very little if at all, and would create a reservoir with relatively low potential for generating income through recreationists' expenditures, especially in reference to benefiting the Navajos. Moreover, if alternative power sources were sought, the Navajo people would stand to benefit from employment in activities related to the providing of fuel for thermoelectric generators as well as from minerals royalties gained thereby.

REMARKS ON THE SCIENTIFIC AND RECREATIONAL ASPECTS OF PROJECTS AFFECTING THE HUALAPAI INDIAN RESERVATION BY STEPHEN C. JETT, PH. D.

I would like to comment on Dr. Dobyns' remarks regarding the recreational aspects of the proposed Bridge Canyon reservoir and its economic impact on the Hualapai Indians. Like Dr. Dobyns, I have published a number of articles dealing with the region in anthropological journals. I have *also* done considerable research regarding the scenic and recreational resources of the region. and I must disagree with him on this issue.

We would both like to see recreational development that would benefit the Hualapais, but I feel that the creation of Bridge Canyon reservoir would not be the way to achieve this end.

Dobyns and others contend that construction of the dam and reservoir would benefit the Hualapais by the construction of access roads, the attracting of money-spending recreationists, and payment for the inundated lands. However, all these benfits could be obtained by developing this section of the Grand Canyon as an undamaged scenic resource rather than as a reservoir. A *single* road, considerably shorter and less expensive than those proposed, would provide access, tourists would provide income, and if this area were added to the National Park, as proposed in the Saylor, Reuss, and Dingell bill, the Hualapais would receive compensation for the land, perhaps in greater amount than for the reservoir site.

Dobyns implies that archaeological and geological materials are better preserved when reservoirs are created, owing to the accompanying salvage operations. These operations, however, can save no more than a small sample of the geological and archaeological specimens whereas a reservoir inundates the entire geological and environmental context and all the archaeological sites in the reservoir area. Dobyns' argument is also fallacious in that such surveys can be accomplished without reservoir construction. In fact, such a survey has already been carried out in Marble Gorge.

To confirm my impressions regarding salvage research, I consulted some experts. Dr. Christy Turner, Archaeologist for the Glen Canyon salvage project, has authorized me to express his view that salvage archaeology in connection with these projects gives a poorer return for the investment than would long-range studies in the area because of limitation of time and funds, lack of trained personnel, and the fact that one cannot recheck data or test hypotheses by returning to dig sites. Dr. Henry W. Setzer, Associate Curator, Division of Mammals, Smithsonian Institution, has authorized me to state his observation that the Grand Canyon is unique in the United States in its importance to studies of evolution and ecology, that the bottom of the canyon is an integral part of these studies, and that present reservoirs have already seriously upset the ecology. He notes that "salvage" ecological studies at reservoir sites have been most inadequate. Finally, as one who has a degree in geology based on research in the region, I can attest to the unique geological importance of the Grand Canyon and the impossibility of doing an adequate job of "salvage" geology.

It seems apparent to me that the Hualapai were advised to take the stand they have at these hearings because, as they have stated, they are afraid that they cannot prevent construction of the dam and that if they are to avoid the troubles that the Senecas and other Indians have experienced, they must make their bid now to retrieve something from the project. They want to avoid, as Tribal Chairman Rocha has put it, begging for gratuities "after the Damage is done."

Mr. ROGERS of Texas. Dr. Alfred Etter, Aspin, Colo., representing Defenders of Wildlife.

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STATEMENT OF DR. ALFRED ETTER, REPRESENTING DEFENDERS OF WILDLIFE

Mr. ASPINALL. Mr. Chairman, before Dr. Etter begins his statement, he was requested by the present attorney for the Defenders of Wildlife to furnish this committee as of September 10, 1965, the size of his organization.

Dr. Etter hasn't yet given us this information as to the numbers of his members and this was a request, Doctor, which was asked in good conscience and we would kind of like to have you tell us why you haven't answered it.

Dr. ETTER. Mr. Aspinall, I am very sorry about that. It is something, I suppose, slipped my mind. I really didn't know at the time of the hearings how many people we actually had. This is something I don't bother with too much. But if you want the figure now, I can give it to you, approximately.

Mr. ASPINALL. Well, I would rather have you give it to me exactly within 10 days, and then have it placed in the record at this place because you are the only one, Doctor, that hasn't seen fit to comply with our request.

Dr. ETTER. We have a very limited staff of two people who are full time on the staff level and a couple of secretaries, so I suppose we have not taken care of that for that reason. It is not a large organization.

Mr. ROGERS of Texas. Would you furnish that for the record.

Dr. ETTER. I will do that; yes.

Mr. ROGERS of Texas. Without objection, it will be inserted in the record at the appropriate place.

Dr. ETTER. I can also provide the amount of money we have spent on these hearings, too, if that is desirable.

Mr. ROGERS of Texas. If you desire to do that, it will be all right to include it.

(When received the information will be placed in the committee file.)

Mr. ROGERS of Texas. Now, your statement, Doctor, will be included in the record in full the same as if it had been read.

Dr. ETTER. Thank you.

In view of the fact that I was put low on the program, I tried to scribble down the remarks that I want to make to save time and——

Mr. ROGERS of Texas. Yes.

Let the Chair say this. Of course, time is always an element in this. If the Doctor can wait over until next week, I think we could assure you that you would have time to read the entire statement, if you would like to do it.

Dr. ETTER. I would appreciate that. I had made arrangements to attend that water meeting in Denver this coming week, so I would like to read this. I don't think it will take too long. So I had better get started, if that is all right.

Mr. ROGERS of Texas. All right. If it is going to take more than about 5 minutes, to summarize it, of course——

Dr. ETTER. It will take about 7. Will that be too much? Can we spare 2 minutes?

Mr. ROGERS of Texas. You mean to read the entire statement?

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Dr. ETTER. No. I don't intend to.

Mr. ROGERS of Texas. All right. You go ahead.

Dr. ETTER. This statement is in an abbreviated form that I have written down.

Mr. ROGERS of Texas. Go ahead.

Dr. ETTER. Before I begin, I don't know whether it is appropriate at this point or not to ask to have this article which is called, "The West Divide Project: A $100 Million Boon Dog," which appeared in the Aspin Illustrated News, inserted in the record or at some other point.

Mr. ROGERS of Texas. What is it?

Dr. ETTER. This is a copy, a newspaper article which appeared yesterday in the Aspin Illustrated News. I have copies of it here. It is a well studied presentation of the West Divide project. I know this man who wrote it and he spent as long as could be spent in view of the fact that the feasibility reports were out so late.

Mr. ROGERS of Texas. Under the rules, Doctor, I think, it being a newspaper article, it can be received for the files, but not for the record.

Dr. ETTER. Fine. I will provide copies for each of you and for the file.

Mr. ROGERS of Texas. Thank you.

(The document referred to will be found in the files of the subcommitte.)

Dr. ETTER. I may stumble on occasional words here because I have this all written down in handwriting.

I will leave out my qualifications and just say I am one of those hysterical people that Mr. Aspinall—I should say my Congressman calls them, and other conservationists. I must confess as a youth I was hysterical. I wrote a poem once. I fell in love, got married, and I had a son. I would like to tell you about him. And I do in my prepared statement, but that gets too hysterical.

It is about how he plans to go down the Grand Canyon in a kayak. Of course, that is ridiculous. It has only been done once before. It is like wanting to go up in a spaceship or climb Mount Everest or live in the White House.

These young people today are difficult to understand. They have stars in their eyes. But us old people, we are what God was waiting for, I suppose, and he had the answer, too.

There are a lot of emotional people up in Aspin. That is why you hear so much about it. They get all wrought up over the mountains and the snow and the trout and philosophic discussions, as if you could live on those things.

I might say, though, in Aspin they found out years ago that when you mine things, you just run out of them finally. It is hard to understand, but it happens. I suppose if the wheels had been turning back there before 1900 up in Aspin, they might just have gotten this first reclamation project instead of the Salt River project, and we would all be under water up there and we wouldn't have anything to say.

Well, after 60 years the Bureau of Reclamation has finally come to realize that we shouldn't be neglected, so they have the West Divide project designed for that country, not for the Roaring Fork Valley

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where Aspin is but on the Crystal which is a tributary of Roaring Fork. It is about 50 miles from where I live. So I am immediately concerned. It won't be flooded out.

But now let's see if there is anything in this statement that I have prepared for you which is hysterical. I would like to say further—I would like to say first something about flood control.

The Corps of Engineers claim $22,000 a year for flood control benefits. Of course, they don't mean all kinds of floods. They just mean the kinds that are caused by the snow melting. The darn stuff melts ever year. It just can't help it. It does it every year. You can't do much about a thunderstorm when your reservoir is full, however, so they don't claim any benefits for thunderstorms.

Well, actually if you can't protect against one kind of flood, what good does it do to protect against the other kind? You know, floods, for one thing, are always being damned—and I mean both ways. They are kind of like Communists and fires and disease and coyotes. They are always bad. The truth is, though, that there are things that floods do that they have always done and which are beneficial.

On the Crystal, for example, they scour out the channels, create holes for trout, undermine a bank here and there. They carry for one thing fresh water down the stream to places like far down in Yuma, Ariz., where they used to get fresh water once and now they only have pretty much salt.

Well, one of the problems certainly with the flood problem on the Crystal is that the sheep, those cuddly little creatures we call maggots out in the Rocky Mountains, have stripped off all the vegetation from the hills. Now, that is serious. For one thing—but one thing people would call an advantage is that it makes the water run down the hill faster.

Of course, that has something to do with causing floods, too. I think we could spend a good deal of time and money on the watershed of the Crystal and it would serve the same benefits longer and at much lower price than trying to build the West Divide project.

There is one thing about the West Divide project that I admire. That is how they can change an elk into a man-day of hunting so quickly. It is amazing. If they drown out a lot of deer, they solve that by putting a new road up into the brush way up in the hill so the hunter can go up, instead of in the flooding area, and just like magic, it is just as though there had not been any loss at all, no deer loss. Progress is amazing.

These hunters are getting like big jolly old elves that they will believe anything you tell them. It is really amazing how they solve these problems these days. Man-day is one of the best ways.

Well, when I climbed up the hills to find the herd of some hundred elk, and looked down over the hill and I see them walking around down there, that wasn't counted as a man-day because I didn't have a gun and a bottle of whisky with me, and it wasn't hunting season. either, and it is not added up in the recreational benefits. It is just making everything so handy that I like about living in America. I think our Saviour is going to be making birth control handy. They are working on that. But this business of making everything available, it is ridiculous to charge so many benefits to it.

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In the mountains I have had some crazy ideas. One time I talked to Mr. Aspinall and he said, you can't make any decision on the basis of beauty. That is sure true when you are jumping on stepping-stones going across the Crystal River. You can't stop and pick out all the emphasis.

A lot of times I had thought that maybe a lot of our troubles wouldn't have come up at all if we had taken the scenic way out—forests, playgrounds, clean rivers, trout streams, good rich grass, houses with yards, contoured land, clean air. These are decisions that were made or should have been made on the basis of beauty instead of the mess that we have gotten into. We would be a little better off.

I was going to talk about the West Divide project and I had better get to it. You might not know it, but that has something to do with damming this river I have been talking about, the Crystal, where my boy learned how to—now he is leaving the Crystal and wants to go down the Grand Canyon. So the two are really tied together in my mind at least.

The West Divide is a name that the Government gave this project. I think it was Mr. Burton today who talked about giving Echo Park Dam another name because Echo Park sounds like what it really was. That is what they did with the West Divide. It is damming the Crystal but they don't say anything about that in the name "West Divide" so a lot of people who would be excited about the damming of the Crystal don't get excited because it is called the West Divide and it is a little piece of land way up on the other side of an entirely different watershed.

So I think these projects should be given descriptive names which call to the attention of the people who are interested where they are.

Now, this plan, the basis of it is to dam the Crystal River and then drill 20 miles of tunnel through the mountain at a cost of $40 million, take the Crystal water over to the oil shale people in the Colorado River. Of course, it doesn't say take it over to the oil shale people. It is an irrigation project because there is a little bit of hill pasture that gets wet on the way down. There is plenty of good water. You can buy all you want for $2.50 an acre-foot. That is, if you are farming. That is dirt cheap.

Of course, the farmers in those hills can't afford much anyway, so that is why they have got the price so low.

The shale people can get it for $10. I hear municipal and industrial water down in Phoenix sells for $50 but over here on the West Divide they can get it for $10. As a matter of fact, I figure there is about eight times as much subsidy going into the West Divide project as would go into the central Arizona project. I mean comparatively, not in actual total money, but proportionately. Farmers aren't so dumb when they see that you can buy some of the $2.50 water and then sell it to the oil-shale people for $10. You can really make a killing. It beats cutting hay which is about all they can raise on the hills.

The shale people, the oil shale people want it badly. They are willing to do anything to get it. A lot of people got together down at De Beque on the Colorado River not long ago with the Govern-

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ment men, and I mean Federal and State and local, the Colorado Water Board, too, and they tried to figure how they can get around the law that says a farmer can only buy enough water to irrigate 160 acres. That wouldn't be enough for the president of an oil company. So they came up with some answers.

They decided first that the oil company could go ahead and contract with the Government to pay the high rate for the water, and the high rate is $10, and then let the farmers use the water until they get the shale business started.

Now, this was printed in the Grand Junction paper.

The second solution was that subsidiaries of the oil companies could divide up all the ranches into 160-acre pieces and each take one. That is what happens to your irrigation projects. It is planned in advance.

Another system they have worked for them already is the Government to say that some of the land they originally planned to irrigate isn't worth irrigating. And then to sell that water to an oil company. That is what they did for the Humble Oil Co. just recently, and I think it bears investigation.

I figure that is what will happen to the West Divide country. A lot of people will move in and get their roads and fences up and then they will just sell out. It will help the economy quite a bit, I am sure.

The funny part about drilling these tunnels at $40 million is that all the water in the Crystal runs down into the Roaring Fork and Colorado right by the door of the oil companies, so I can't see what all the fuss is about. If it gets real dirty at Glenwood Springs from the mud from the Home State Diversion project coming in, which is a Bureau of Reclamation project, they can clean it up. Somebody can.

One thing I can't see is why if the Government is putting in $50 million into the project, why the oil companies don't just buy up the water that goes over the dam at the powerplants down below De Beque. I guess the trouble is trying to justify it on paper.

With this new development money, as they call it, coming in now, there just isn't any limit to what the water people can do. They could even keep the dams out of the Crystal country if they wanted to, if they wanted to subsidize beauty instead of bury it. If they thought about it, they could do that.

The Public Health people are smart. They do not say any more. We are skipping to another section there. They do not say any more than they have to.

They said that the West Divide project will improve the economy and permit the establishment of a more healthful environment. I never could see anything wrong with this Crystal country in the first place. Of course, the air does not move much in the Colorado Valley where the shale plants will be, and I suppose that the shale retorts and the oil refineries and the traffic will sort of stir it up some. That should help.

Mr. ROGERS of Texas. Doctor, we are running out of time. If you could sum up, it will be helpful.

Mr. ETTER. Well, the essence of it is that it is quite apparent, I think, attention has been called to it in these hearings today, that there is some question about whether we should hire somebody else to take the Bureau of Reclamation's place.

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Now this project, the West Divide project, is about as phoney a project as anybody can dream up. The Bridge Canyon Dam and Marble Canyon Dam have already been shown to be questionable by reputable people, and I think that we need to investigate the Bureau of Reclamation, its whole project and how it designs these benefits and costs and so forth, the costs they leave out, the benefits they claim.

I think it is completely phony.

Thank you.

Mr. ROGERS of Texas. Thank you, Doctor.

Mr. Aspinall may have some questions, Doctor.

Mr. ASPINALL. I have no questions.

I think the doctor's presentation has been kind of an anti-Aspinall operation because we have not been able to get on the river and fish together as much as we should.

I would say, Doctor, that if your feeling is represented by the same kind of feeling that apparently Mr. Iskow has, and I have no idea who Mr. Iskow is, that perhaps it would be better for all of us to get acquainted, because I think the members of this committee and of the Congress will testify that I do not use a whip.

I think I can tell you, my friend, that I have been in Pitkin County just as much as I have been in any other county of western Colorado with the exception of my own home where my own family lives. I think you should understand that, because I was in Pitkin County I think before you even got through the first grade, and I loved it and I still love it, and I love all of the magical beauties and the natural resources. So you and I had better go out—not mountain climbing, I have given that up—but I think we could go fishing on the Crystal and have a good time.

Mr. ETTER. Mr. Aspinall, so far as I know I said nothing at all about your having been in Pitkin County except there were no hearings at all in Pitkin County.

Mr. ASPINALL. You asked, Doctor, to have this put in the record and if you have not read it, you had better read it.

Mr. ETTER. I know he said that.

Mr. ASPINALL. It is your statement. You asked to put it in the record. You give recognition to it.

Mr. ETTER. Excuse me, but have you been there in the last 2 years?

Mr. ASPINALL. Why of course I have. Every year. I was even there when some of your misguided friends said "Go home, Aspinall," back in 1954 and 1956, and I have been there every year since then. There are not very many people up there that would want to keep me out, but there are a few perhaps who just do not want to see two sides of any question. So I am not here to sell the West Divide project as such.

I am here to represent the people. The people who are asking for the West Divide, Doctor, and you know it just as well as I do, are the people of Gunnison County and Pitkin County. So do not blame me.

Mr. ETTER. I do not pretend to speak for all of Pitkin County, only for the Aspen chapter of the Colorado Mountain Club, plus the Defenders of Wildlife, which hires me.

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Mr. ASPINALL. Let's get the personalities out of it. We always do better.

That is all. I have taken too much time.

Mr. ROGERS of Texas. Mr. Udall?

Mr. UDALL. Dr. Etter left me speechless.

Mr. ROGERS of Texas. Doctor, I am indebted to you. I have been wondering who has been using this whip. If you will tell me it is Iskow, I was blaming it on the witnesses. I did not know Mr. Aspinall was the one who had the whip. But I see Mr. Iskow—is that his name?

Mr. ETTER. Iskow, yes.

Mr. ROGERS of Texas. He says that Mr. Aspinall has been using a whip. I am glad to know who it is.

Mr. ETTER. Well, he used it on me.

Mr. ROGERS of Texas. He did?

Well, I have not got any scars on my back yet. I might get some, but I have been able to dodge so far.

Thank you very much.

Mr. ETTER. Thank you very much for allowing me to talk even though it is overtime. I appreciate it.

Mr. ROGERS of Texas. I wish we could allow you longer, but you are very kind to sum up your testimony.

STATEMENT OF DR. ALFRED G. ETTER, ASPEN, COLORADO, REPRESENTING DEFENDERS OF WILDLIFE, WASHINGTON, D.C., AND THE ASPEN CHAPTER, COLORADO MOUNTAIN CLUB

Mr. Chairman and members of the subcommittee, let me make clear at the beginning why I am here. I am here to speak for the beauty of the Crystal River Valley and for the wild place that is called Grand Canyon. However, my training in both biology and geology, my experience as a consultant for President Truman's Water Resources Policy Commission, and my residence in Pitkin County, Colorado, where the major feature of the West Divide Project would be located, qualify me to speak about various important aspects of this Bill.

The Crystal River and the Grand Canyon are tied together by more than a flow of water. In this Bill they are tied together by a common threat—damming. They are also tied together by my son's experience and ambition. It is his hope to kayak down Grand Canyon this summer. It has been done only once before. That is why he wants to do it—it is a challenge and youth needs challenge. If twenty million people had done it, I and he would say 'forget the canyon. Dam it! It is not worth fighting about.'

My son's ambition was developed after many lessons and thrills on the Crystal River. A far-sighted man, John Holden, some years ago established the Colorado Rocky Mountain School at Carbondale. The Crystal is the students' laboratory. The mountains are their challenge and inspiration. If you want to know about the values of the Crystal, then you must talk to some of the students at this school. You would find that there is a big difference between the 'man-day' of recreation which is so callously used as a recreation measure, and the 'youth day' that measures the experiences of those who meet the challenges of this river.

If you would know about the fishing on the Crystal, talk to John Holden. That is why he built the schol in a bend of the river. He can tell you more than the Bureau of Sports Fisheries and Wildlife, which says, in typical 'Bureauese', that the West Divide Project will improve fishing on the stream. Fishing is not catching fish, nor is it putting in a man-day. It is thinking about the river. It is knowing and studying the river. A free river makes sense. A dammed river does not. Recreation rewards are in proportion to the sense a river makes. Rivers require thought. Reservoirs pacify.

The Corps of Engineers says that Placita Dam on the Crystal will benefit the valley because it will provide flood-protection from the spring snow melt; but

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the dam will provide no insurance against floods caused by rains. Benefits of $22,000 a year are attributed to snowmelt flood-prevention but flood-control that protects from one kind of flood and not from another would seem to be largely fictitious. Use of the flood-plain is still restricted, which is as it should be.

Floods are always being damned, but the benefits of floods are never mentioned, and I have no doubt that on the Crystal these outweigh the losses. With a dam, kayaking on the spring floods will be a thing of the past—but high water is valuable for other things than kayak races. Floods scour the channel, sweep away the scum of summer, start a new crop of insect life, widen the plunge pools and undercut a bank or tree root to provide trout with a hiding place. They recharge the gravels with moisture and deposit sand and silt in the right places to make a river reasonable and productive.

If flood prevention is needed here, it should begin in the headwaters where sheep have damaged the vegetation, encouraging soil loss and mud flows. The soils and rocks of the mountains can serve as reservoirs if they are given the chance, releasing slowly the melt in spring or the rains of summer. The destruction of headwater vegetation and soil has contributed greatly to the fluctuations of our western rivers. Dams seem always to be man's only answer, but the system of holding water underground between interstices of rock prevents evaporation and equalizes flows more effectively. $60,000,000 spent on aiding nature on the Crystal watershed would produce greater, and longer term, benefits than a $20,000,000 dam and $40,000,000 worth of tunnels.

WILDLIFE AND MAN-DAYS

Do Bureaus need to be so cold? Listen to what the Bureau of Sports Fisheries and Wildlife has said about the animal life of the Crystal valley: "About 1000 acres of summer range used by deer would be inundated by Placita, Haystack, and Yank Creek Reservoirs. Additionally, the irrigation of about 19,000 acres of new land would result in some reduction of winter browse for deer. Nevertheless, since new roads along West Divide Canal would improve access to the deer hunting areas, deer hunting with the project would remain at 7,000 man-days annually. About 300 acres of wintering area for elk would be inundated by Placita Reservoir. This would result in a loss of 100 man-days of elk hunting annually."

Man-days of hunting, indeed! Have the animals themselves no value? Is the opportunity to kill all that is important to the American? The day I spent climbing the crags to look down into a green valley upon 150 elk was never counted as a man day of hunting, for it was not hunting season and I had brought no whiskey or gun. It was the economy of nature I was interested in, not the flow of pieces of green paper through an accounting system. With the whistling of a marmot the elk were gone. Were those few moments a man-day? To me they seem a lifetime!

Remote places like the Grand Canyon, we are told, cannot be preserved because not enough man-days are spent there. One might ask how many man-days are spent in space ships? How many more days of excitement are spent in the preparation for those few days aloft? Just so, man-days spent in the Canyons of the Colorado must include the day spent wishing, imagining, and preparing. Vicarious enjoyment of the canyon is a part of everyman's day. How many man-days have been spent on top of Mount Everest?

Making things available is no virtue. Grand Canyon and the valley of the Crystal are no better off for having man in them, and man will be no better off with more men. We have made civilization available to everyone, and now everyone seeks desperately for escape, for recreation, for re-creation—in short, to be born again, someplace else. The current trend is to make birth control more available. That is the exception that proves the rule.

The report of the Fish and Wildlife Service was based on operational data received in December, 1965. Perhaps that accounts for the inadequacy of its report, for the Crystal valley is a cold and crystal place when the snow lies deep. Charlie Orloski's axe rings loud and far when he chops wood, and the beaver are in their lodges and the muskrats are in their cabins, and the yellow warblers of the willows and the kinglets of the spruce are long gone south. But this is no reason to leave them out of the wildlife picture of the Crystal, as they have been.

Now water and lakes are no stranger to these mountain valleys. Glacial moraines and landslides have built dams more than once, but reservoirs that rise

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and fall 100 feet every year and box canyons of concrete are foreign to the landscape. It would be possible at the heads of even the most fluctuating body of water, at these elevations, to provide a system of stable pools. Crescents of boulders might be spread to provide a footing where beaver could build their dams near high water line. These would catch silt, sprout with alder and willows, birch and aspen, and make the transition between mountain stream and reservoir more attractive and productive—but creative engineering is foreign to these cold reports that never mention the beauty of the country. If we can attach millions of dollars worth of hydro-plant receipts for fifty years to subsidize an impractical scheme to irrigate a few thousand acres of mountain pasture, then we should be able to subsidize beauty too.

SOUND DECISIONS BASED ON BEAUTY

The Chairman of this Committee, Mr. Aspinall has said to me that you can't make every decision on the basis of beauty. I am heartened by the implication in this statement that some decisions can be made on this basis. If ever a decision should be made on this basis, it is the decision to keep Grand Canyon and the Crystal flowing free. If a study were made, I am sure that decisions based on beauty would prove to be the soundest ones made in this country. It is unfortunate that we cannot think of beauty first. Had we decided long ago to keep our streams and air clean, we would not be faced with present vast subsidies and expenditures to clean them up, and many hours of pleasant experience would never have been lost. Had we decided to divide our lands and cultivate them on the contour long ago, instead of in squares and up and down hill, our land would be much richer and hours building fence could have been spent enjoying the scene. If we had kept the litter of mankind out of the floodplains of rivers, we could have more meandering rivers and more open spaces in our cities. If we had not laid houses end to end, we would have more playgrounds and less ugly children. Our parks, each a decision based on beauty, are the incentive for the vast tourist business of today. The National Forest, with their many healthful benefits, are a reaction from repugnant landscapes of a clear-cut nation. Decisions to vary the monotony of cities with plantings of many different species of trees instead of solid rows of a single species would have avoided the tragedy of towns made treeless by the death of elms. Slums breed disease, crime, and dissatisfaction.

There can be no doubt that beauty is the soundest basis for decision. The challenge now is to consider beauty first, instead of last, in planning the use of our water resources.

OTHER THINGS THAN BEAUTY

Agriculture on the West Divide

Beauty requires temperance. Perhaps Phoenix thought it would make itself more beautiful by mining its ground water, but now it is losing its beauty at the rate of 50,000 acres per year. To keep a country beautiful and healthful requires some foresight and restraint. The Bureau of Reclamation often receives credit for Arizona's blossoming. It must also receive blame for the brown-out that is destroying its economy and occupying so many hours of so many people's time, here and elsewhere. Pumping of underground waters quickly became a part of the Bureau's Salt River Project. Surface flows were dammed and used before they could recharge the ground water. Underground flows were tapped at the source. Proliferating developments were permitted to use irrigation return flows. Many mistakes were made and ground water tables were falling twenty five years ago. Now the Bureau is still flying blind. The Colorado River Basin Project will kill Arizona and injure Colorado.

The West Divide Project is a good example of some of the deficiencies of the Bureau's approach. Pruned down to its essentials, this scheme is based on damming the flow of the Crystal River at Placita and storing it for irrigation, city, and industrial use. Essential to the irrigation development are two tunnels at a cost of nearly 40 million dollars. This accounts in part for the fact that irrigation is charged with 70 per cent of the cost of the 100 million dollar project. But irrigation would pay back only 17%. How could it pay back more when annual benefits would take the average form of two tons of alfalfa per acre on 40,000 acres? The low charge of about $2½ dollars per acre foot of water is testimony enough as to the ability of the land to produce. The Grand Junction Sentinel recently commented, "It remains to be seen whether small farms can operate successfully in the area on a return of $5,000 a year per farm. . ."

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The Bureau's benefits appear to be based on a clear profit of $27 on a top of alfalfa. At the present time, that is a good selling price. The Bureau explains that these are futuristic benefits, projected 15 or twenty years. What will the farmer do in the meantime? Secretary Udall has called attention, recently, to the limitations of high mountain irrigation. Why can't he get his views across to the Bureau of Reclamation?

Obviously, irrigation is being used as a front for other objectives, the chief of which is oil shale. There is no secret whatever that oil shale interests are pushing for a reservoir in every gulch. They are buying water rights wherever they can. They controlled, as of 1964 nearly 700 cubic feet per second on the Colorado River where the average flow is only two or three thousand cfs. They are buying up lands with with water rights and then requesting a change in point of diversion, thus dewatering agricultural lands which are already developed with canals, roads, fence, and buildings. In the meantime, the Bureau is developing expensive plans such as this West Divide project to put water on what will be marginal farms to begin with. In short order money, time and hope invested in improving these lands will be liquidated by more demands for water rights . This is not theoretical. Discussions are going on now as to how Shale Oil can get rights to irrigation water. A meeting in De Beque, Colorado, in October 1965 to discuss the Bluestone Project was said by the Grand Junction Sentinel, to have come up with the following solutions:

"1. Shale interests pay the higher rate for municipal and industrial water and allow it to be used for irrigation until needed for shale.

"2. Subsidiaries of oil companies divide ownership of ranches among themselves to qualify under acreage limitations."

"A third and somewhat criticized method was used by Humble Oil when they obtained rights directly from the river district (Colorado River Water Conservation District) when some lands which had been provided for in the Bluestone Project, a Bureau-of-Reclamation-designed undertaking, were subsequently decided not to be up to irrigation standards, and were dropped from the project. The paper said that, "Critics contend that Humble thus obtained rights ahead of other shale interests who acted independently." This situation bears investigation. It also shows what will happen to the so-called, West Divide Irrigation Project.

It is a most singular circumstance that in November, 1965, Secretary Udall announced the sale of 7200 acre feet of water annually to the Colony Development Company for a term of 40 years. The price was $72,000, or $10 an acre foot, approximately. The water would be pumped from the Colorado River. It just happens that the Bluestone project, located just upstream from the Colony Plant on Parachute Creek, would deplete the Colorado River by 7200 Acre feet. The Bluestone water would be better and would not have to be pumped. Does Colony intend to take over the Bluestone Project when it is built, using the methods suggested in Solution No. 1?

There is no apparent reason why a deal based on Solution No. 1 could not be worked to purchase West Divide water as soon as the $40,000,000 tunnels have been drilled with the help of the $52,000,000 "irrigation" subsidy from the Upper Basin Fund. This kind of deception should not be allowed to cause the damming of the Crystal.

Municipal and Industrial uses are legitimate uses, of course. The fact is, however, that the Crystal River runs into the Roaring Fork which runs into the Colorado and then directly past the communities and industrial areas where shale oil will be developed. It would be very nice to have available two costly tunnels to deliver pure mountain water to these areas, but it is far from necessary. Water can be pumped from the Colorado for any proposed use. Treatment would be needed in some cases, as well as some storage. Water flow through the tunnels would be subject to interruption during periods of low temperature, so that some alternative facilities would have to be available to these industries in any case. Present drain on the Colorado River for irrigation use comes largely at periods of high water. There would thus be a fairly steady supply in the Colorado for industrial and muncipal use.

The West Divide project would presumably be paid off by payments of $17 million from irrigation, $28 million from Municipal and Industrial users, and a contribution from the Upper Colorado River Development Fund of $51 million. This subsidy from the fund is actually charged to irrigation, but it is obviously a subsidy for private industry. Perhaps the $51,000,000 might be used instead, to

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purchase the water rights of the Palisades Power Plant on the Colorado River below the Shale Oil development area. Then the Crystal could remain free, and available for the tired Oil Shale executives and employees to discover what it means to live among beatuiful mountains. Is there any reason why beauty should not be subsidized? These new "Basin Development Funds" are a distinct threat to the economy and the nation. They permit the subsidized condemnation of the landscape, and they encourage poor planning and subterfuge such as that demonstrated by the West Divide Project. The proper use of these funds is to make possible projects which would perhaps be more costly than other alternatives, but which would not be so damaging to unique features of the earth.

Public Health, Salinity, and the Future of the Colorado

In an amazingly naive supplement to the West Divide feasibility report, The U.S. Public Health Service has made the following earth-shaking discoveries:

"1. Recreational development contiguous to the reservoir will be partially regulated by topographical features of the shore line." What they mean is, it won't be any good.

"2. Temporary construction camps may be necessary to serve the contractor's employees." But they are not sure.

"3. As overall watershed management involves many interests, it is essential that the effect on public health be fully coordinated with state and/or local health departments.

"4. Mosquitoes are the principal vestors which might be affected by the proposed project, although other insects and rodents may be involved.

"5. Project development will improve the economy and permit the establishment of a more healthful environment."

Discovery number 5 is whitewash. There is presently nothing wrong with the economy that competition with an urban development will help. It will be said that a boom would mean that the young people wouldn't have to leave home to find jobs—but they will, just the same just as they do in every other part of the country. Real estate may boom, the law business will certainly boom, and the oil shale business may or may not boom.

With regard to the establishment of a more healthful environment, evidence that urban proliferation and industrial development produce these effects is lacking. In the other hand, air pollution will certainly become a critical problem in a very short time after oil shale retorts, oil refineries, and industrial and municipal activities start to add their loads to what occasionally, even now, is a burdened atmosphere. Closed in between 2000 foot bluffs, there is little air movement in the valley many days of the year. Grand Junction, a city of only 50,000 much less than 300,000 envisioned for the oil shale area and West Divide basin, frequently suffers from air pollution as a recent plea by the County Health Officer to stop burning trash testifies.

While no one has a "Crystal" ball, the Public Health Service and the Bureau of Reclamation are under obligation to examine much more carefully and report much more honestly the probable social repercussions of what they plan for project areas.

Incidentally, longer term visions of the economy should perhaps mention that the Bureau of Mines has indicated that some 3 to five million tons of clean coal would be made unavailable by the building of the Placita dam and reservoir. Coal is a much more concentrated form of energy than oil shale, and this loss deserves consideration. No special brief will be prepared for coal, however, until the Thompson Creek Coal Company in the project area prevents coal washings from reaching the Crystal.

A separate report of the Public Health Service on Water Quality Control in relation to the West Divide Project is a big improvement. Most significant fact revealed is that the West Divide Project, once it began to operate, would increase the total dissolved solids in the Colorado River approximately 6% over the average flow-weighted concentration of the past 20 years, and would deplete the flow of the Colorado by 76,000 acre feet. Without knowing the flow data upon which this 6% figure is based, and without comparable data for other proposed projects in the Upper Basin, we can still estimate from the following combined depletion data of the other four projects included in H.R. 4671 that the combined effect of the five projects would be to increase the TDS of the Colorado River approximately 30%, if all five projects discharged into the Colorado above Cameo, (which they do not) where the flow is around 3000 cfs:

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Depletion of the flow of the Colorado River	*Acre-feet*
Animas La Plata	126,550
Florida	2,050
Dolores	87,300
Dallas Creek	37,000
San Miguel	87,000
Total	339,900
Average	84,975
West Divide	76,400

Twenty other projects planned for Colorado would deplete the Colorado by 441,600 A.F. This would raise the TDS approximately 35%, for a total of 65%. Thus the TDS at Cameo, downstream from the West Divide Project area, which is, or was several years ago, around 400 p.p.m., would be increased to 660 p.p.m. This is theoretical, of course, and in order to have any significance at lower stations on the river would have to be translated into absolute quantities. It certainly would not be translated into absolute quantities. It certainly would not be an exaggeration however, to estimate that with the building of a majority of the Colorado projects, the TDS at Lee's Ferry might be increased 20% above the figure of 450 p.p.m. reported by Wilcox in "Salinity Caused by Irrigation" in the Journal of the American Water Works Association for February, 1962. An increase of only around 100 p.p.m. seems a trivial price to pay for all the wonderful storage projects envisioned by the Bureau of Reclamation. If the salinity increase would stop there, it might not be serious, but there will be many factors working for greater increases. Ground waters are being eyed at various locations as water sources, but the Public Health Service reports TDS values of around 1400 mg/l. in the valley deposits and an artesian flow from a well drilled by the Equity oil company showed over 3000 ppm TDS, high in sodium and bicarbonates. If these sources are used and the waste dumped in the river, large increases of salinity could develop. Deposits of a sodium ore "dawsonite," in connection with shale deposits indicates that water storage products in the region may pick up large quantities of this toxic element. Mine wastes would have to be so handled that leachings could not reach drainages.

There is great emphasis on re-use systems for irrigation and industry. These will send more highly concentrated waste waters into the rivers. The damming of rivers to permit slow release throughout the year means that flows are much delayed in their progress downstream. The low salinity spring meltwater no longer reaches down into the lower basin to dilute the saltier water of those regions. Once these flows reached Yuma and the Salton Sea, and helped to push the salty water of the valley sediments on into the Gulf of California. That natural system of cleaning is dead now, and the gravels and sands of the Yuma valley contain from 1000 to 6000 ppm. of dissolved solids. Sam Dick, President of the Yuma County Water Users Association has made the following interesting remarks about the water shortage in Yuma: " . . . the large storage dams on the Colorado had not been constructed at that time (1929) and the silt-laden water did not require the quantity of application now required by clear water." The lower salinity of this silt-laden water of flood periods was probably partly responsible for the need for less irrigation. With the new Upper Basin dams, this effect will be greatly intensified.

In the volume "Ten Rivers in America's Future", a report of President Truman's Water Resources Policy Commission, the statement is made that: "One other unanswered question concerning the diversions (out of the Upper Colorado Basin) relates to their effect on the quality of water in the lower river. Most of the diversions are of relatively clear water from the headwaters areas. The diluting effect that this water has had on the water of the lower basin may be significant. Removal of sizeable amounts of mountain water from the Colorado System, together with increasing return flows from irrigation, may possibly leave the remaining water with toxic amounts of alkali at some locations. This may well influence the life of the irrigated areas in the lower basin, and their economy." Present authorized and committed diversions from the Colorado River Basin chargeable to Colorado total nearly 900,000 acre feet. This amount of low salinity water added to the 1,000,000 acre feet to be delivered by the proposed Central Arizona Plan would reduce the salinity perhaps as much as 40%. Instead of having water from the Colorado with over 1000 parts per million of dissolved solids, good for only a single irrigation before evaporation and tran-

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spiration increased the salinity to over 4000 parts per million making it virtually unusable, 900,000 acre feet of mountain water added to the CAP outlet would make it possible to have two irrigation uses.

Another factor increasing the salinity of the Colorado in coming years will be the increased use of fertilizers. It is usually figured that plants take up only about half the fertilizer applied. The rest goes into the soil and ground water. Nitrates have built up in some areas to over 100 parts per million in drainage water. This could have medical repercussions.

Mr. Wayne Aspinall, Chairman of this Committee, in hearings held at an earlier time on the Central Arizona Project, said in a discussion with Mr. McMullin of Arizona that, ". . . there appeared in the Milwaukee paper a statement that the water started out pure up at the head tributaries of the Colorado River, but because of the use of it by the time it got down someplace to the lower basin, it was full of salts. Now anybody that knows anything at all about it knows that that is not true." Because I feel that this is a most critical matter, and because I disagree with Mr. Aspinall, I would like to express my opinion that were this bill examined carefully from all angles of the salt problem, in full view of all the data available from the Public Health Service, the Bureau of Reclamation, The Geological Survey, and all other research bodies or publications, it could not possibly be justified. Bridge and Marble Canyon dams will increase the salinity a very significant amount. Water provided to Arizona, as previously stated, will certainly run close to 1000 ppm, and will increase as time goes on. To spend this kind of money to send that kind of water into a basin already loaded with salt just can not be justified. It is my own conviction that this project will kill Arizona, not save it. With every acre foot of water from the Colorado will come over a ton of salts. A single irrigation and these salts will descend into the ground water basin to further contaminate it. Instead of helping the ground water situation, it will make it worse, for there is no means of escape for these salts. If the time ever comes when a good quality water is available for recharging this aquifer, additions of salt from the Colorado will only delay its rehabilitation.

I feel that it is high time that the Bureau of Reclamation be forced to make all of its calculations relating the benefits and costs on the basis of quality of water supplied, and not just acre feet as is done at present. Unless this kind of change is made, the Bureau of Reclamation can destroy every irrigation area in the United States.

Changes produced by dams.

The Bureau of Reclamation has consistently maintained that the proposed dams in Grand Canyon will have no adverse effects on the National Park or National Monument. Brief mention must be made of some of the effects that dams have. Some of the effects have already been mentioned such as the cessation of flooding, the capture of low saline waters, increases of total dissolved solids where reservoirs are located in rocks contained soluble substances, such as those of the Grand Canyon where, in spite of the vast quantity of water involved, a natural salinization of over 200 parts per million increase occurs in the river between Lee's Ferry and Hoover Dam. The ebb and flow of water through the interstices of rock induced by daily and seasonal fluctuations of reservoir water level create a perfect design for leaching.

In the canyon below Marble dam the natural cycles of warming and cooling, of fertility fluctuations, of food organisms and breeding patterns will be altogether changed by the cold waters discharge from Marble reservoir. Organisms adapted to life in the Colorado River as it exists will be virtually eliminated. If trout are introduced these constitute an intrusion by species not natural to the park, which has always been considered undesirable. As with the Crystal, the river will not make sense, being completely subject to man. The clear water below the dam will be hungry for sediment and will scour out the channel for many miles below the dam removing the fine material, sand bars, etc., in the channel. J. W. Stanley of the Bureau of Reclamation in an article called, "Effect of Dams on Channel Regimen" has stated, "Probably the greatest source of surprise to those who study for the first time the actions of the Colorado River after construction of Hoover and other dams is the fact that the rate of scour downstream has been rapid, and that there is a progressive lowering of the stream bed as the years pass." He traced the changes for over forty miles. Marble Dam would be only about 13 miles outside the National Park.

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The material that was picked up from the channel, plus other sediments would be heaped up at the other end of the Park, creating deltal conditions at the point of slack water, which is in the park, and for a number of miles both above and below that point. These are predictable changes which cannot be denied or avoided.

The reduction of high flows will mean that where side streams dump detritus into the main canyon, large accumulations will build up creating obstacles for boaters. The fact that the water temperatures will be so reduced makes it much more dangerous for boaters.

Access to the river will be a problem. No one wants to begin a wilderness boat trip at the foot of a dam.

The biological effects of building water barriers in these canyons cannot be assessed because so little is known about the biology. One of the first things to be done in designing a large project of this kind should be to make a thorough inventory of both plants and animals. Much valuable data will be destroyed when the canyon is flooded. Unique natural communities and rare species, millions of years in the making, will be destroyed both within and without the park. Ironically, these cannot be listed because we do not know what or where they are. They were to be the challenge of a future naturalist.

The role of conservation groups in the planning of water use

In December 1965, Mr. Harold Aldrich, regional Director for the Bureau of Reclamation in Montana, spoke to the Upper Missouri Water Users Association and said, "We can no longer enjoy the luxury of controversy. Vital water resources development requires a united conservation front." This is the Bureau of Reclamation attitude exactly. *It* has seen the light, and all must follow. This is dictatorship, pure and simple. Future water resource development requires *more* controversy, not less. The interfingering of many interests and many natural factors is becoming more complex and more important by the minute. Mr. Felix Sparks of the Colorado Water Conservancy Board recently made the remark that if Grand Canyon had been called Rattlesnake Gulch, all the problems would be over.

These remarks taken together indicate a dangerous misunderstanding of the role of the Conservation organization. Conservation organizations are engaged in providing a service to the general public and the nation. They are recognized as educational in function. If they do not serve that purpose then they can justifiably be criticized. In the case of the present hearings I think the charge can be made that the role of the conservation organization has been made as difficult as possible. A minimum of hearings has been held at which the general public could attend; in the case of the West Divide Project, no hearings of any kind were held in Pitkin County where Placida Dam would be built; early hearings in Garfield County were poorly publicized and dealt with a much different project than the one that exists today. The names of projects are not representative of the area involved, and do not serve the purpose of communicating the nature or location to those who should or would be interested. West Divide is a good example of this. It gives no inkling that the Crystal River would be affected.

Most important of all, information on the projects was almost impossible to obtain until too late to study in detail. The West Divide Feasibility Report, for example, was first printed March, 1966. It was not transmitted to the Secretary of the Interior until March 10. Requests made to the Office of the Secretary of Interior's office for copies of the feasibility reports on the five Colorado projects about April 25 were ignored. The first copy received by a conservationist in Colorado, so far as can be determined was April 29, even though the request had been mailed in February. Of the five Colorado Projects, three, San Miguel, Animas-La-Plata, and West Divide were not printed until February of 1966 or later.

This is absurd in view of the long history of the Central Arizona Project. An educational organization cannot pretend to educate when the texts are not available. When facts are not available, then only emotions can be used. Conservation organizations are the conscience for society; in the quest for right and wrong both fact and feelings are important.

Summary

An article in the Arizona Republic, January 15, 1965, reported on some remarks of Secretary of the Interior Udall. "Udall declared that Arizona had made only

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one serious mistake in the management of its resources so far—the decision made in the early 1950's to mine its ground water rather than manage it on a renewable basis. 'That decision was not wise, and ultimately we will pay the penalty for it,' he declared."

There is no reason why one bad decision should preceipitate a chain reaction. There are fundamental flaws and objections to H.R. 4671, and neither the Central Arizona Project portion nor the West Divide Project is sound. Basic changes are needed in order to make water resource planning a democratic process.

Mr. ROGERS. Without objection, the statement of Mrs. Harold Harvey will be placed in the record at this point.

STATEMENT BY MRS. HAROLD HARVEY

With over 1900 water storage dams and reservoirs in Colorado and numerous others authorized or already under construction, the number of unspoiled mountain streams in the state is rapidly diminishing. If the Bureau of Reclamation continues to have its way, the rushing waters that delight the eye and challenge the fisherman will soon be things of the past, commemorated, if at all, only by billboards advertising beer. In their place we will have dams, reservoirs, pipelines, canals, irrigation ditches, hydroelectric tranmission lines, industrial plants producing industrial pollution, and here and there a trickle where there used to be a bright cascading torrent.

So, with the West Divide Water Project, we are to lose the lovely Crystal River. The Crystal happens to be in Pitkin County, where I live, but no hearings on this plan were held in Pitkin County. By means of the Placita Reservoir and a tunnel under McClure Pass, water is to be taken from one valley in order to irrigate land elsewhere at a cost of $1500 per acre. Is that land actually needed for crops? Simulaneously our government pays other farmers to keep land out of production. And in the Midwest, better cropland than this could ever be may be purchased outright for $500 an acre.

Irrigation is not the whole story. The nascent oil shale industry needs water too. The Colorado River is at hand, but its water is so polluted that it would have to be cleaned up considerably before it would be fit for this industrial use. With the Bureau of Reclamation so eager to subsidize the delivery of clean water to the oil shale site, why bother? On the contrary, we may be sure that the oil shale industry will itself contribute its share of pollutants to the Colorado. The revenues anticipated from irrigation and the oil shale industry combined add up to only a little more than a third of the cost of the West Divide water Project. In addition to all the usual subsidies, such as the right to borrow money at only 3% interest for the project, it will be financed by taking $50,000,000 from the Colorado River Storage Project. It cannot be said that this project will pay for itself.

Uneconomical and unnecessary as this and many similar projects of the Bureau of Reclamation are, no realist can suppose that this mutibillion dollar arm of government will voluntarily curtail its activities merely because the law of diminishing returns has set in. On the contrary, its work proceeds at an ever accelerating pace, heedless of the consequences to irreplaceable natural assets. The shocking proposal to tamper with Grand Canyon through the construction of Bridge and Marble Canyon Dams illustrates how far this kind of thing can go. The West Divide Water Project mirrors this folly in miniature.

Yet interestingly enough, one of the functions of the Bureau of Reclamation is "abatement of sedimentation, salination, and pollution of streams and other water courses", according to the description given in the *U.S. Government Organization Manual*. May we not then realistically inquire why the agency cannot channel some of its excess money, energy, and talent into more worthwhile endeavors? Surely abatement of stream pollution is a crying public need. If the money destined for the West Divide Water Project were put to work cleaning up the Colorado River, wouldn't all of us be richer for it? It would be particularly fitting for the Bureau of Reclamation to undertake this work in view of the fact that the irrigation made possible by its endeavors has contributed so much to the salination of our waters. While we bring new lands into production here, the irrigation water we deliver to Mexico is so saline that it is killing thousands of acres of cropland there.

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Lastly, let me remind you that tourism plays a vital role in the economy of Colorado, and that potentially it has a greater future here than any industry. As we destroy one trout stream after another, the recreation value of the ones remaining must increase proportionately. Some day, too late, we may awaken to find that for a few more acres of surplus cropland, a few more smoking factories, we have destroyed the goose that laid the golden eggs. As one of many people who moved to Colorado because I was captured by its natural beauty, its clear air and majestic mountains, its forests and meadows and sparkling streams, I am more aware than may natives how much we have to lose. Let us not mindlessly pillage, plunder and pollute merely because it is in our power to do so.

(It has been determined that the following statement and letter are appropriate for inclusion in the record at this point:)

STATEMENT OF MICHAEL MECHAU, RESIDENT OF REDSTONE, COLO., REGARDING THE WEST DIVIDE PROJECT FOR THE CONSIDERATION OF THE SUBCOMMITTEE ON IRRIGATION AND RECLAMATION

I am and have been for many years a resident of the Crystal River Valley in Colorado. My house is just below the site for the Placita Reservoir which would be by far the biggest part of the West Divide Project proposed for authorization in H.R. 4671. Although this project has long been talked about, exactly what it entailed, what purposes it would serve and how, and how much it would cost to have been unclear. I have read the report of The Bureau of Reclamation on the West Divide Project and the statement and attachments which Commissioner Dominy presented to the Subcommittee on Irrigation and Reclamation on May 10 and the Statement of Assistant Secretary Holum and other materials. What emerges is not basis enough for the authorization of anything like a project of this magnitude. The costs would be tremendous while the benefits, in contrast, would be uncertain or scanty. The two main objects are to provide water for irrigation and to provide water for municipal and industrial needs required for possible oil shale development. But irrigation by itself would not justify such tremendous expenditures; neither would use for oil shale development even if it were imminent. Furthermore, these two objects combined do not justify this project since they are not wholly compatible. In substance, the Bureau of the Budget in its review of the Bureau of Reclamation report came to the same conclusion with regard to the West Divide Project and therefore recommended against authorization.

COSTS

Plans call for 17.1 miles of tunnels and 73.5 miles of canals in addition to three dams. Total project cost is estimated at $100,369,000, of which $569,000 are for recreation purposes. Estimated annual operation and maintenance costs are $110,200 which includes $16,700 for upkeep of recreation facilities.

IRRIGATION

The one certain benefit would be the irrigation of 18,890 acres not now irrigated and 21,030 acres insufficiently supplied. Increased production on these high pastures and hayfields, however desirable in itself, does not warrant massive expense of Federal funds. Moreover, this benefit, if ever enjoyed, would not be lasting once large municipal and industrial needs were served, since there would not be enough water for both purposes. Curtailing irrigation would not help stabilize the rural agricultural economy—one of the stated aims of the project.

OIL SHALE DEVELOPMENT

The Colorado River, which flows by the oil shale country and which naturally carries the waters of the Crystal River would appear to be a more convenient source of water than the headwaters of the Crystal. Municipal use of Colorado River water would require control of pollution. But this is a matter requiring action in any case. In order to assure sufficient water a dam could be built in DeBeque Canyon, a recognized potential dam site nearby whose cost should be compared to that of the West Divide Project.

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RECREATION

The Forest Service Report on the Project indicates that due to the steep sides of the valley, very little space near the Placita Reservoir would be usable for public camp sites. In fact the largest public camp ground in that area would be under water. Accordingly, it is highly doubtful that there would be increased public recreational benefit. This is especially doubtful when the consequences of the loss of a free running stream are considered. It should also be noted that the site for boat launching facilities could be used only when the reservoir would be at or very near full capacity. That is, most of the time it would be unusable.

PRESERVATION AND UTILIZATION OF COLORADO'S WATER

The main selling point in Western Colorado for a project whose features are so little known and so little understood is that, unless this opportunity is taken, Colorado will lose the water it is entitled to. This opportunity, however, does not justify authorization of a project as ill-conceived as West Divide.

THE ASPEN GROUP OF THE COLORADO MOUNTAIN CLUB,
Aspen, Colo., May 6, 1966.

Representative WAYNE N. ASPINALL,
House of Representatives,
Washington, D.C.

HON. WAYNE N. ASPINALL: The members of the Aspen Group of the Colorado Mountain Club wish to register their protest against the proposed West Divide Project. Please make this letter a part of the current hearings.

Damming the Crystal River and the North Thompson Creek would be a desecration of these areas. Rather than mitigate fish and wildlife losses it would increase losses by destroying their natural habitats.

Your feasibility reports indicate that the soil in the area of the Placita Reservoir is extremely porous. You propose to finance a large part of this project through hydropower over a period of fifty years, yet this type of power will be obsolete within a very few years. All in all, this whole project is highly impractical. There are many areas in which our tax money is sorely needed, but this obviously is not one of them.

Sincerely,

ALFRED BRAUN, *President.*

Mr. ROGERS of Texas. Now the next witness scheduled is Miss Joy Coombs, of the Grand Canyon Workshop.

Miss Coombs.

STATEMENT OF MISS JOY COOMBS, OF THE GRAND CANYON WORKSHOP

Miss COOMBS. My statement is short. I would like to read it in full.

Mr. ROGERS of Texas. Did you want to read all of it, Miss Coombs?

Miss COOMBS. I would like to, yes, please.

Mr. ROGERS of Texas. Well, can you read pretty fast?

Miss COOMBS. I can read it in 5 minutes.

Mr. ROGERS of Texas. Good, go ahead.

Miss COOMBS. Mr. Chairman, my name is Joy Coombs. I represent the Grand Canyon Workshop (affiliated with Colorado Open Space Coordinating Council, Inc.), a group of about 50 Colorado citizens who are concerned about the long-range effects of many aspects of the revised version of H.R. 4671.

I speak also for the Boulder Hostelers (affiliated with American Youth Hostels, Inc.)—membership about 40, and for the Colorado Mountain Club—membership about 2,000. We have the following comments on titles II and V of the proposed revision of the bill.

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TITLE V

As citizens of Colorado, we request that the projects of title V be deferred because, after considerable effort, we have been unable to obtain adequate descriptions of them.

For three of these five projects, the Acting Secretary of the Interior, Assistant Secretary Holum, did not approve final feasibility studies of the Bureau of Reclamation until March 10, 1966. These were not released until March 16. The hearing date, May 9, was set on April 22, although the announcement of its was received in Colorado on April 25. This was only 12 days before our statements were due in the office of the House Committee on Interior and Insular Affairs.

We had just 12 days to obtain information, study it, make a judgment, and prepare a statement. Let me tell you what difficulty we had obtaining information.

We have been unable to learn how the Bureau of the Budget reported on the Colorado projects. As of this date, May 6, we have been unable to obtain a copy of feasibility studies on any of the Colorado projects.

I have here a copy of a letter which I personally wrote to the Bureau of Reclamation on April 25, asking for copies of the feasibility studies. A friend in Boulder, where I live, told me on the phone Wednesday of this week that some reply had come to my home from the Bureau on Tuesday. The hearings, as you all know, were already in progress by that time.

A telephone call was made by the Grand Canyon Workshop to the Department of the Interior on April 25. We were told that copies of feasibility studies would be sent if they were available. They never came.

Clearly, it has been impossible for the citizens of Colorado to obtain the information on which to make a sound judgment of the projects which have been offered to them, offered quite frankly, at this time in this bill, to win their support for H.R. 4671.

Congressman Saylor congratulated our Governor on the price tag of $360 million, which he put on his support for this bill. But we feel we do not really know what this investment, $360 million, will amount to.

Our newspapers in Colorado do make every effort to report news about water, but they have carried only sketchy reports about the Colorado projects, and to my knowledge have published no maps at all. Evidently the newspapers have had difficulty obtaining information.

A 25-page summary of the five Colorado projects published by the Bureau of Reclamation in January 1966, made available to the Grand Canyon Workshop 2 weeks ago, leaves many questions unanswered. These are basic questions for which any Coloradan should be able to obtain answers before these public hearings, and before the House vote. Until more information is made available to the general public, we oppose the title V projects for the following reasons:

1. We question whether $360 million should be spent to irrigate land on the western slope, which would be marginal even after irrigation, when the State might derive more benefit from (1) the same money spent to irrigate eastern slope land, and (2) when direly needed flood

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control dams in the Denver area (Chatfield Dam) are authorized but not funded.

2. The areas affected have a known recreational value in their present state. Since outdoor recreation is one of Colorado's fastest growing industries, we question whether irrigation of marginal lands is the best use of these lands and this money.

3. We have no evidence that these projects will increase Colorado's ability to use its allotment of Colorado River water appreciably, and that after they are built, there will be enough water passing through Glen Canyon Dam to pay it out.

I now have fragmentary information which would help answer these questions. It was not obtainable in Denver, not even a week before this hearing. I had to travel 2,000 miles, entirely on my own time, entirely at my own expense, and attend this week of public hearings to obtain what information I have.

On the matter of public information, I must say I was somewhat frightened this morning to hear a member of the subcommittee suggest that the Interior Department could operate on the same basis as the Defense Department.

I think that surely all civilian departments have quite different requirements on public information than the Defense Department.

TITLE II, IMPORTATION

The firm of Tipton & Kalmbach, hired by the State of Colorado, has shown conclusively that there is not enough water in the Colorado River for the central Arizona project unless there is importation from another basin. Their conclusion has been publicly acknowledged by the Bureau of Reclamation and the Colorado Water Conservation Board.

And yet a bill before this committee would authorize the central Arizona project, but not importation.

It is disastrous for the upper basin States, including our own State of Colorado, to promise their legacy of Colorado River water to the lower basin States unless importation can be assured. No such assurance is offered in the present legislation.

Of course, if we assume that by enactment of this bill the Federal Government would be committed to importation, this commitment would be made before the appropriate feasibility studies are even started. In this case, what is the meaning or value of feasibility studies?

Our position on this is in accordance with that of the Bureau of the Budget and the administration, for on May 10, 1965, they said:

> Committing the federal government to future obligations of unknown amount is a decision which should be taken only after the most careful consideration. * * * The Bureau of the Budget believes that it would be unwise for the federal government to commit itself to the importation of water pending the completion of the study.

SUMMARY

For the reasons stated, we must object to the Colorado projects under title V until adequate information is made available to the public. We recommend deferment of these projects.

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We recommend that a project be designed which is independent of water presentation or that this bill be deferred until a study of feasibility is completed. We hope that satisfactory ways of supplying additional water to the Colorado Basin will be found.

We want Arizona to have and be able to use its allotment of water. Arizona should have our cooperation in making the river whole. At the same time and with no conflict, we hope this subcommittee will consider it is on the side of wisdom and to the long-range benefit of our country to make the Grand Canyon whole.

Bills have already been introduced to extend park protection to the Grand Canyon from Lee's Ferry to Grand Wash.

We urge you to support these bills and to preserve Marble Gorge, the most beautiful part of Grand Canyon as a wild canyon with running water and beaches for camping and side canyons to explore, for all those Americans now and in the future who elect to spend $175 and a few days to have that extraordinary experience.

There has been concern expressed at this hearing for protecting the water rights of States of origin in perpetuity. With reference to Bridge Canyon Dam as proposed, and to Grand Canyon National Monument, we are quite sure that most Americans think that the protection given by Congress to their national parks and national monuments should be honored in perpetuity.

Thank you.

Mr. ROGERS of Texas. Thank you.

Mr. Aspinall?

Mr. ASPINALL. I wish to thank Miss Coombs for her fine short statements and for her patience throughout the week waiting for her presentation.

You have been here most of the week, have you not?

Miss COOMBS. Yes, sir.

Mr. ASPINALL. Did anybody try to put you out?

Miss COOMBS. No, sir.

Mr. ASPINALL. Without too much embarrassment, you found the room that was available for everybody else, did you not?

Miss COOMBS. I stood a few mornings.

Mr. ASPINALL. That is right, but some other people stood also. We are sorry that we did not have any better accommodations for you.

Did you hear the explanation that I had to give as to why we did not have a larger room?

Miss COOMBS. No, sir; I did not.

Mr. ASPINALL. Well, other committees were given the rooms that we were supposed to have in the new building.

Thank you very much.

Mr. ROGERS of Texas. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Burton?

Mr. BURTON of Utah. I admire Miss Coombs for coming this distance to give us the benefit of her thinking.

Where is your home, Miss Coombs?

Miss COOMBS. I live in Boulder, Colo.

Mr. BURTON of Utah. Is Boulder on the eastern slope?

Miss COOMBS. Yes.

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Mr. BURTON of Utah. It has been my observation this week on this bill, and I am sure my friend from Arizona and my friend from Washington agree, that where you live has a lot to do with the position you take.

Thank you, Mr. Chairman.

Mr. ROGERS of Texas. Mr. Foley?

Mr. FOLEY. All I can say is I have enjoyed your statement, Miss Coombs. I think it contains some real contributions to this record.

On the question of water importation, I would of course imagine we would be sympathetic with your viewpoint that we should not prejudge feasibility studies.

Would it be fair to say that the course of wisdom would be not to prejudge various means of augmenting water into the Colorado River until we have some more basic hydrological and technological information on which to base it.

In other words,I think you may have heard the Bureau of Reclamation testify yesterday that they had no information to indicate that desalinization was less feasible than diversions or importations of water.

Miss COOMBS. Yes.

Mr. FOLEY. Would that correspond with your judgment that we ought to wait on more information before we decide that the we ought to wait on more information before we decide that the answer to the Colorado Basin is importation of water?

Miss COOMBS. I certainly would, and this is why I used the words "supply additional water to."

Mr. FOLEY. Right.

Miss COOMBS. By what is the best means as determined by a thorough study, or any combination of means.

Mr. FOLEY. Thank you.

Mr. ROGERS of Texas. Mr. Reinecke?

Mr. REINECKE. No questions.

Mr. ROGERS of Texas. Thank you very much.

Miss COOMBS. Thank you.

Mr. ROGERS of Texas. We have one other witness to hear this afternoon, if I can find my witness list, Mr. E. H. Hilliard, Jr., of the Colorado Open Space Coordinating Council.

STATEMENT OF E. H. HILLIARD, JR., COLORADO OPEN SPACE COORDINATING COUNCIL, INC., DENVER, COLO.

Mr. HILLIARD. Gentlemen, I appreciate it is the end of a long, hard week and I would like to just hit some high spots, but submit the full statement for the record, if I may.

Mr. ROGERS of Texas. Yes. Without objection your entire statement will be included in the record as though you had read it in full, Mr. Hilliard, and you may proceed.

Mr. HILLIARD. I will do my best. My name is Edward H. Hilliard, Jr. I represent the Colorado Open Space Coordinating Council, Inc. (COSCC), 2422 South Downing Street, Denver, Colo. COSCC is a coordinating structure for currently 18 Colorado recreational conservation organizations, most of which are statewide and which have cumulative memberships of approximately 10,000 Colorado citizens.

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Our organization is dedicated to "the conservation—preservation and wise use—and appreciation of scenic, historic, open space, wilderness, and outdoor recreational resources in Colorado." It should be emphasized, however, that we are also advocates of Colorado's economic development—consistent with creation and maintenance of a quality environment.

We are not opposed to all dams as such. We certainly recognize Arizona's need for water. I would like to talk for a minute, however, on title V, the five Colorado west slope projects, particularly the West Divide project and bring up one or two figures which I don't believe have been brought up before.

I am not an expert on water or water economics, but using the very brief summaries made available by the Bureau of Reclamation, and based on some estimates from people in the real estate business as to land values in the area of the West Divide project, it appears to me that the approximately $100 million being proposed for that project is spending something like 17 times the value per acre of land benefited.

If you will glance at the top of page 3 in my statement, the current fair market value on dry farmland in that area is around $100, and for presently irrigated, with the small local projects, around $300. Yet the $68 million of the $100 million for the entire West Divide project, the $68 million that is allocated to irrigation divided by the 40,000 acres averages $1,700 per acre. I can't conceivably believe that this is an economic use of funds regardless of their source.

Further on the West Divide project, it has a cost-benefit ratio according to the Bureau of Reclamation, but when you read the summary, it turns out that $51 million of the self-liquidation so-called, if I read the figures right, $51 million out of the $68 million is coming from future surplus revenues of mainstream projects, the Colorado Basin Development Fund, I believe primarily Glen Canyon; is that correct, sir? Again, this is a commitment of natural resources in a way that I can't conceive that it is economic.

We want to maximize the national income of the country within a reasonable framework of quality and a reasonable framework of regional development. But here we are proposing a project that requires a very substantial part of it to come from future payouts of downstream projects.

I think it is a great step forward that in the bill under consideration, 4671, in I believe section 403, it provides finally for the return of the Treasury of surplus revenues somewhere down the road. I believe that principle is sound, that Congress should have the prerogative of deciding how these funds are used, and they should not be commited to extremely marginal irrigation projects, the West Divide being an outstanding example of a marginal project.

The other four projects in Colorado are better, but similarly, they are very questionable, due to soil conditions, cold climate, high elevation, and the large amount of subsidy in relation to the value of the land.

It would seem to me logical that Congress, in a national perspective, should see if we need more food and fiber, which is the stated purpose of these projects, that it should be investigated what research and fertilizer will do in putting, in applying this money to land with natural rainfall. Now, this may be disloyal to Colorado, and I am

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frankly an East Slope citizen, but I also feel that I am a national citizen. The tax dollar that comes from me or a New Yorker or anywhere else should be very carefully screened by such as this committee. And, if it will yield more food and fiber in some other part of the country, be it Mr. Udall's Arizona or Georgia or Iowa, I feel we should do it that way, and that it is a shame to put $260 million into highly marginal irrigation projects in the arid and high altitude West Slope of Colorado.

From the projects themselves 18 percent of that money is not recoverable. And I am talking about the batch of five now, but are subsidized by downstream future revenues. That is my point on the economics of the five projects as the figures available in these brief summaries from the Reclamation Department.

On one other point, the quality of the recreational impact and the quality of recreation. I think history is running in our favor that the maintenance of a quality recreational asset in the long run will be a more economic asset than hurting that quality with a short-range view in mind.

I believe that the damage and channelizing and diverting of a natural flowing stream like the Crystal, which is one of the most beautiful ones in the country, will someday be a greater attraction for Colorado than all of the economic benefit from this dam, not only the dam itself, but the diversion of the water on marginal irrigation or even the subsequent use of it for M. & I.

I think when I said that history is running in our favor, I would feel that if most commercial users of public land in the 1870's were considering the feasibility of Yellowstone Park, they would have said it was a great mistake to lock up all that land for a few wealthy people who might be able to go out there and take a pack trip. And yet here we are, not so many years later, less than a century, with 2 or 3 million average people with a 3-week steelworker paid vacations attracted by that asset.

I feel what it has done for the economy of that region in hard dollars is far greater than the logging and grazing, and possible mining the region would have yielded. By the same token an asset like the Crystal River or the other rivers that are affected by these very marginal irrigation projects will be greater benefit in the long run to Colorado because of the uniqueness of a clear natural flowing river, and that, therefore, reducing that esthetic value to long-range dollars, Colorado will be better off.

Those are my main two points.

Mr. ROGERS of Texas. Thank you.

Mr. HILLIARD. Quality for Colorado and the, I think, really atrocious economics evidenced in these five projects.

(The prepared statement of Mr. Hilliard follows:)

STATEMENT OF E. H. HILLIARD, JR., COLORADO OPEN SPACE COORDINATING COUNCIL, INC., DENVER, COLO.

My name is Edward H. Hilliard, Jr. I represent the Colorado Open Space Coordinating Council, Inc. (COSCC), 2422 South Downing Street, Denver, Colorado. COSCC is a coordinating structure for currently 18 Colorado recreational conservation organizations, most of which are statewide and which have cumulative memberships of approximately 10,000 Colorado citizens. Our or-

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ganization is dedicated to "the conservation (preservation and wise use) and appreciation of scenic, historic, open space, wilderness and outdoor recreational resources in Colorado." It should be emphasized, however, that we are also advocates of Colorado's *economic* development—consistent with creation and maintenance of a QUALITY environment.

We are opposed to H.R. 4671 as now written. We have grave misgivings about the economic wisdom of Title V of the revised bill authorizing the Animas-La-Plata, Dolores, Dallas Creek, West Divide and San Miguel projects on Colorado's Western Slope. We are *not* opposed to all Colorado River Basin projects generally or to most aspects of the Lower Colorado Basin Project in particular. We recognize Arizona's desperate need for additional supplies of water. But we do not believe that desperation justifies the employment of every imaginable political device just to see the project authorized—including a "packaging" with the entire bill of Colorado's special interest in Western Slope reclamation projects.

We are *not* flatly opposed to all five Western Slope projects. And contrary to possible impression, we are not opposed to all dams and reservoirs on general principle merely because they invade natural areas and scenic resources. We are concerned about these five Colorado projects in Title V because: (1) We doubt the wisdom of expending $356 million dollars to irrigate marginal lands that are of low market value and questionable productivity both before and after irrigation. (2) We believe that further investigation would indicate that the preservation of existing *quality* recreation opportunities in some of the areas to be effected by the projects might produce greater *long range economic* return than would irrigation.

Before discussing further the economic feasibility of the Colorado Western Slope projects, I will stipulate—*before* cross examination—that I am not personally an expert on the economics of irrigation projects. I am an example of why it is so difficult for the average American to petition his government, particularly when hearing notices are so short and *public* documents so hard to obtain. While proponents of this bill prepare their testimony with the assistance of batteries of lawyers, economists, engineers and public relations experts—many supplied by *federal* agencies supported by the taxpayer—those who oppose or question must depend on volunteers working nights and weekends. Therefore, I rely entirely on Bureau of Reclamation figures available to *me* as I can only interpret, not challenge.

Congress, in its wisdom, has appropriated funds over the years for various water developments in the West, principally to be carried out by the Bureau of Reclamation. The touchstone of all such projects is the cost-benefit philosophy—that is, the cost of each project must be offset by a source of revenue from irrigation charges, power sales, etc. They must be "self-liquidating." Politically, this is most acceptable since it dispels some of the stigma of direct subsudy. How a cost-benefit ratio is arrived at seems unimportant to the Bureau of Reclamation. It is the *concept* of cost-benefit that is paramount.

Many reclamation projects seem but another extension of Parkinson's Law, paraphrased: work expands to meet the money available. In this instance—the five Colorado projects in Title V—the Bureau of Reclamation is asking Congress to authorize projects that can be paid for only by committing future surplus revenues, which may or may not be adequate, from the Upper Colorado River Basin Development Fund. Is it possible that such "surpluses" could be more productively utilized elsewhere, or should they not be returned to the Treasury?

Let me summarize our interpreation of one of these five projects—West Divide—affecting Garfield, Pitkin, Mesa, Eagle and Gunnison counties. Basically, this project would impound and distribute water from the Crystal river, a tributary of the Colorado southwest of Glenwood Springs, at a cost ('62–'64 prices) of $100 million. About $68 million of the cost is allocated to irrigation, of which $62 million is for canals (including tunnels) to put 115,600 acre-feet of water on 40,000 acres of land, 19,000 of which would be newly irrigated. Crop yields would be predominantly alfalfa, small grains, pasture and a little fruit. Due to the 5,000 to 7,900 foot elevations, the short growing season (only 118 frost-free days per year), the uneven topography and the poor condition of the soil—more than half of this acreage is Class 3, or marginally irrigable. According to reputable real estate brokers in this area, the current fair market value averages $100 an acre for dry farm land and $300 for irrigated land. Yet, an investment of $68 million for irrigation on 40,000 acres means that an average

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of $1,700 an acre of public money is being spent—almost *six times* the present value of the irrigated land and *seventeen times* the value of the dry farm land; and half of this 40,000 acres may not be economically irrigated anyway.

The Bureau of Reclamation claims that $97 million of this $100-million project will be self-liquidating, but $51 million of that is supposed to be from Upper Colorado River Basin Development Fund money—if and when such funds are accumulated. We gravely question the Bureau's revenues on a project like West Divide. While we are sympathetic with efforts to improve the economic status of farmers and ranchers in that area, we fail to see that the Bureau of Reclamation has proved that this will be the result. As I will discuss in a moment, it may well be that development of the recreation and tourist potential in the natural environment of that area will produce vastly more *long range* benefits. Think what could be accomplished to upgrade the area's economy if a fraction of that $100 million was spent on recreation development—on both *private* and public land. Will irrigating marginal hay and grassland produce as much for the people in that area? The Bureau has made no attempt whatever to answer that question.

An economic profile of the five Colorado projects proposed in Title V can best be described by the following table:

Project	Total construction cost (in millions)	Allocated to irrigation (in millions)	Number of acres irrigated	Number of acres, class 3 or 4	Average cost of irrigation per acre	Average value of land per acre		Degree of subsidy per acre, or irrigation cost, land value per acre	
						Dry	Irrigated	Dry	Irrigated
Las Animas-Plata	$102	$97	106,000	(1)	$910	$100	$300	9	3
Dolores	47	39	61,000	32,000	630	100	300	6	2
Dallas Creek	38	27	29,000	20,000	950	100	300	9	3
San Miguel	70	55	39,000	?	1,400	100	300	14	5
West Divide	100	68	40,000	19,000	1,700	100	400	17	4
Total	357	286	275,000	(2)					
Average					1,118	400	400	11	3.5

[1] 14,000 plus.
[2] 85,000 plus.

Let us examine this table project by project:

Animas-La Plata.—Total cost: $102 million; allocation to irrigation: $97 million; total acres to be irrigated: 106,000 (56% full service, 44% supplemental service); number of acres Class 3 or 4: 14,000; average cost of irrigation per acre: $910; present average market value of land in the area: $100/acre dry, $300/acre irrigated. Thus the cost of irrigating the land is three times the value of the land after it is irrigated.

Dallas Creek.—Total cost: $38 million; allocation to irrigation: $27 million; total acres to be irrigated: 29,000 (52% full service, 48% supplemental service); number of acres Class 3 or 4: 20,000; average cost of irrigation per acre; $950; present average market value of land in the area: $100/acre dry, $300/acre irrigated. Here, the cost of irrigation is more than three times the irrigated land value.

Dolores.—Total cost: $47 million; allocation to irrigation: $39 million; total acres to be irrigated: 61,000 (53% full service, 47% supplemental service); number of acres Class 3 or 4: 32,000; average cost of irrigation per acre: $630; average market value of land in the area: $100/acre dry, $300/acre irrigated. For this project, cost of irrigation is only twice the value of the irrigated land.

San Miguel.—Total cost: $70 million; allocation to irrigation: $55 million; total acres to be irrigated: 39,000 (68% full service, 32% supplemental service); no classification of land in data available; average cost of irrigation per acre: $1,400, average market value of land in the area; $100/acre dry, $300/acre irrigated. Cost of irrigation is almost five times the value of the land.

West Divide.—Total cost: $100 million; allocation to irrigation: $68 million; total acres to be irrigated: 40,000 (47% full service, 53% supplemental service) number of acres Class 3 or 4: 19,000; average cost of irrigation per acre: $1,700;

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average market value of the land in the area: $100/acre dry, $400/acre irrigated. Irrigation cost exceeds irrigated land value by over four times.

Let's summarize the economics of the five Colorado projects as a group. The total cost is a staggering $357 million dollars. The total amount allocated to irrigation is $286 million, of which $232 million or 81%—Gentlemen, I repeat, 81% is not recoverable by the projects themselves but is to be subsidized from anticipated "surplus" revenues accumulating to the Upper Colorado River Basin fund. Of the total 275,000 acres to be irrigated—both full service and supplemental service—85,000 acres of nearly *one third* of the total is Class 3 or Class 4 land, which is only marginally suited for irrigation. The overall average cost of irrigation for these five projects is $1,118 per acre, an average of 11 times the present value of dry farm land in the area and 3.5 times the value of irrigated land. A newspaper editor in this region reports that he has yet to find one land owner who would pay *half* of this $1,118 to have his land irrigated.

The application of the same water to low-elevation, warm-weather, longer-growing season areas, such as Colorado's eastern slope or in an area like Grand Junction would seem far more logical and fiscally prudent. The Defense Department makes much to do about its fiscal responsibility, such as determining the most economical and productive alternate weapons systems. Would it not be wise for the same philosophy to prevail in the Bureau of Reclamation which places such great emphasis on the "pay out" ability of its projects?

Political considerations and "basin compromises" aside, isn't the supposed purpose of these projects simply to produce more food and fibre for the nation? Wouldn't it then seem logical for Congress to determine under what alternative projects, or in what other areas, the same $357 mililon would yield the greatest return? Has this Committee considered, for example, what the same agricultural expenditure would yield in areas of abudant rainfall? I respectfully suggest that it is within the duty of Congress to find answers to such questions, rather than narrowly viewing each proposal on a project by project basis. While some may criticise my seeming "disloyalty" to my own region, I am urging that Congress look at the big picture on a national basis, putting aside purely regional or local concerns, either political or economic.

Cost-benefit ratios, for both total and direct benefits, are listed for the five Colorado projects, are listed in the following tables:

	Total	Direct
Animas-La Plata (1963 version)	1.56 to 1	0.8 to 1.
Dallas Creek:		
100-year payout	1.89 to 1	1.16 to 1.
50-year payout	?	?.
Dolores:		
100-year payout	2.03 to 1	1.11 to 1.
50-year payout	1.67 to 1	0.92 to 1.
San Miguel: 100-year payout	1.52 to 1	0.89 to 1.
West Divide:		
100-year payout	1.98 to 1	1.16 to 1.
50-year payout	1.63 to 1	0.96 to 1.

Historically, the Bureau of the Budget has been against including indirect benefits in considering whether a project should be built. It must be observed that the 50-year direct cost-benefit is less than 1 : 1 for two of the projects; the 100-year direct benefit, usually much greater, is less than 1:1 for a third project, and possibly less than 1:1 on a fourth, although data is not available. In light of the Budget Bureau's philosophy of feasibility, it seems that these projects are borderline at best—if they are feasible at all!

CONSIDERATION OF RECREATIONAL IMPACT

The Bureau of Reclamation claims that the lakes behind the dams in these five projects will provide new recreation opportunities; it includes these as secondary benefits which are "non-reimbursable costs" of the projects. Of course, the Bureau has not considered what recreational benefits are lost by altering the natural state of these areas.

The Bureau of Reclamation consistently evaluates a recreational resource on a quantitative basis only—how many people engaging in how many activities.

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And this is invariably determined by the intensity, or quantity, of participation in similar use areas. But the kind of recreational experience to be enjoyed is also a factor, and with economic implications.

Increasing outdoor recreation demand can be satisfied only by the availability of a variety of recreational supply. Needs must be met by providing a wide spectrum of recreational experiences. The mass recreation facility constructed around a TV-rating type of philosophy, can only partially satisfy this demand. Answering needs for a variety of recreational facilities is a basic criterion of recreation planning set forth by the Bureau of Outdoor Recreation. To believe that even most recreation appetites can be satisfied by larger reservoirs, noisier boat marinas, and an abundance of water ski rental concessions is a questionable, oversimplification.

The obvious difficulty with this tendency to become obsessed with a god of number: how *many* boating, how *many* water skiing, how *many* driving over the top of the dam, is that *quality* recreation is literally and figuratively trampled to death in the rush. This is gross error because the value of the recreational experience is also determined by the kind of recreation people are experiencing.

Traditionally, the Bureau of Reclamation is not charged with a qualitative evaluation of natural recreational resources. The Bureau usually confers with other government agencies. Of these we would expect a comprehensive statement from the United States Forest Service; however they have merely recited a loss of existing campsites. But their statement on this is of interest:

"Impacts of the Placita Reservoir added to present-day use will create tremendous recreation-use pressure, and use at the existing public recreation sites already exceeds capacities. There is little expansion area available, and what there is, remains far removed from the immediate and proposed developments. Another discouraging aspect is the fact that the largest existing site, Bogan Flats with 35 units, will be inundated by the reservoir with resulting annual loss of 14,850 man-days use. . . . It is the uppermost site in the valley and the *only site under public ownership in the area.*" (Multiple Use Survey. "Evaluation and Effects of the West Divide Project on Administration, Management, and Use of the Gunnison and White River National Forests", USDA, Rocky Mountain Region, USFS, Denver, Colorado, 1965.) [Emphasis added.]

Of the three reservoirs planed for the West Divide project—Placita, Haystack, and Yank Creek—Placita, with a capacity of 106,000 acre-feet is *supposed* to have great recreation potential of supposed economic benefit to the area. Not only will this dam destroy *natural* vacation areas, but it will also inundate natural and man-made facilities already there—facilities not replaceable without purchasing private lands around the shoreline. Damage to fish and wildlife resources is inestimable, Yet the Bureau of Reclamation has allocated $3 million of the cost of the project to recreation and fish and wildlife!

While the Forest Service report makes projections of *increased* recreation use due to the reservoirs, no projections are made of increased recreation use *without* the reservoirs. Thus it is impossible to really determine the effects of the reservoirs on long-term recreation use. There could well be an increase of trout fishermen using the popular Crystal River to equal the number of speed boaters on the surface of Placita Reservoir.

More importantly, a fluctuating reservoir creating minimal and intermittent flows downstream, constitutes the destruction of an irreplaceable natural asset. This is a public value which is in no way appraised in the consideration of the project. What would be left of the Crystal River below the dam would probably attract few of the present recreationists. Since all five of these projects threaten some of the best natural trout streams in Colorado, I think a discussion of these effects is pertinent.

Even though the Bureau of Reclamation relies on the opinion of the Bureau of Sports Fisheries and Wildlife that a Crystal River summer flow of 40 cfs is an adequate stream flow to mantain fish life, fish and wildlife specialists agree that nobody really *knows* the effect of reduced stream flow on fish maintenance and propagation. Adequate research has not yet been done. A controlled flow of 40 cfs *may* be adequate for Crystal River trout from May to September, or it may *not*. We rather suspect that this release from a reservoir outlet does not mean that this same flow will be maintained in the stream below. Seepage into the bottom sediment and sides of the stream channel—which depends on the water table levels and geologic conditions—will generally reduce the stream flow from the amount released from the reservoir.

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We suspect that in many reclamation projects the Bureau of Reclamation tells the Bureau of Sport Fisheries and Wildlife the *maximum* stream flow maintainable for project feasibility, and that Fisheries and Wildlife then lives with that figure. We feel this is particularly true in the Rocky Mountain region.

In other words, the effect of controlled stream flow on fish life really is pure conjecture at present. Some experts point out that controlled flow may enhance propagation, because fish will then tend to lay eggs below the low water line. On the other hand, there is plenty of evidence that radical drops in water temperature, brought on by discharge from depth in reservoirs, is harmful to fishlife. Such water not only is too cold; it also lacks adequate oxygen supply. But to flatly declare, as does the Forest Service in its West Divide study, that reservoirs and controlled streams actually *improve* fishing, is a reckless statement that cannot be substantiated.

Finally, the Bureau of Reclamation's constant emphasis on man-made recreation facilities and apparent disregard for contributions of natural beauty to the recreational experience is wholly inconsistent with established policy of the Bureau of Outdoor Recreation. Chapter 4, Part 630.4.3.H of the Grants-in-Aid Manual of this Bureau—prepared as a guide to statewide recreation efforts qualified for aid under the Land and Water Conservation Fund Act—states in part:

"It is important that the differing *qualities* of recreation and activity be considered in all phases of the Plan. *Many of the benefits of outdoor recreation cannot be considered in purely quantitative terms.* Preserving the natural beauty and quality of the outdoor environment contributes directly to many types of outdoor recreation. The Plan as a whole, specifically including the statement of objectives and the action program, should reflect consideration of natural beauty and other scenic and asthetic values of the state's outdoor environment and landscape generally * * *." [Emphasis added.]

It is easy to conclude that the federal agencies which have so far evaluated the recreational impact of these projects have confined their analysis to the altered environment, not the natural one in its original state. They have chosen to ignore the economic aspects of esthetic values merely because they are hard to measure. With the growth of tourism a certainty, Colorado's natural environment—including its free flowing trout streams, will be a future asset of inestimable value.

SUMMARY

We are opposed to H.R. 4671 as revised, and respectfully urge that the five Colorado Western Slope projects be striken from the bill and deferred for further study because:

1. Three hundred fifty seven million dollars is an exceedingly great sum to spend on irrigating lands that are low in market value and productivity, both before and after irrigation.
2. One-third of the total lands to be irrigated—85,000 acres—are Class 3 or Class 4 lands, only marginal for irrigation.
3. The cost of irrigating this land is as much as five times the value of the land *after* it is irrigated.
4. Alternative methods of raising more food and fibre for the same money should be investigated—from a national point of view.
5. Outdoor recreation values should be evaluated qualitatively as well as quantitatively; both types of recreation opportunity are required to satisfy surging recreation demand. Only a few places in the nation, as in Colorado, have quality recreational resources left.
6. It is likely that the maintenance of diverse recreation opportunity in natural areas in Colorado will produce greater long range economic return than irrigation of marginal lands at the expense of the former.

This statement is expressly endorsed by the following participating organizations:

Aiken Ornithological Society, Box 56, Cascade, Colo.
American Camping Association, Rocky Mountain Section, 1375 Delware, Denver, Colo.
Denver Beautiful, Inc., 1301 Welton Street, Denver, Colo.
Denver Botany Club, 2560 S. Washington, Denver, Colo.
Denver Field Ornithologists, 1949 Paris, Aurora, Colo.
Colorado Federation of Garden Clubs, 1618 Ogden, Denver, Colo.
Colorado Mountain Club, 1400 Josephine, Denver, Colo.
Colorado White Water Association, 5525 Bails Drive, Denver, Colo.

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Mile-hi Alpine Club, 865 Mohawk, Denver, Colo.
Plan Boulder, 1430 High, Boulder, Colo.
Regional Parks Association, 2475 West 26th Ave., Denver, Colo.
Sierra Club, Rocky Mountain Chapter, 10950 Pearl Way, Denver, Colo.
Thorne Ecological Research Station, 1229 University, Boulder, Colo.
Trout Unlimited, Cutthroat Chapter, 1285 S. Seneca Way, Denver, Colo.

Mr. ROGERS of Texas. Thank you, Mr. Hilliard. Mr. Aspinall, do you have any questions?

Mr. ASPINALL. No, I just want to commend Mr. Hilliard for his statement. He is known to be one of our fine recreation conservationists in Colorado. I don't always agree with him, but I think we understand each other and I don't find myself sparring with him on the positions that he takes.

Yellowstone National Park has a beautiful lake in it, part of it man made. It is perhaps as highly visited as any part of the Yellowstone National Park, isn't that true, Ed?

Mr. HILLIARD. I think so.

Mr. ASPINALL. We seem to get along pretty good with that. The Lake Fork Creek itself is about as pretty a stream as the Crystal, that is it was, and above where the water would be impounded it is still one of the most beautiful streams in Colorado, is that right?

Mr. HILLIARD. Yes.

Mr. ASPINALL. You don't appear here against the Curecanti.

Mr. HILLIARD. No, but it was only because of my inability as a private citizen to be informed and try to find the time to be here. I would like to have been. I would again feel the same is true, that Colorado's long-term benefit is hurt more by Curecanti.

Mr. ASPINALL. Have you been to Lake Powell since it has been developed?

Mr. HILLIARD. No, sir, I have not, but I have been to a number of fluctuating reservoirs, and the streams below them, to know that they are an entirely different quality of asset.

Mr. ASPINALL. Well, I think you and I, perhaps we had better go down to Lake Powell.

Mr. HILLIARD. I would like to, seriously.

Mr. ASPINALL. Thank you.

Mr. ROGERS of Texas. Mr. Skubitz.

Mr. SKUBITZ. No questions.

Mr. ROGERS of Texas. Mr. Udall.

Mr. UDALL. Thank you, Mr. Hilliard, for your constructive and sincere attitude. We are happy to have you here.

Mr. ROGERS of Texas. Mr. Burton.

Mr. BURTON of Utah. I appreciate your statement too, Mr. Hilliard. It is well written and I have read it all. Of course, Yellowstone Park really isn't locked up. I go through there three or four times every summer. I drive with my family, on roads built into that area. We stay at the lodges operated by human beings. We use boating facilities over there on the lake. It is the purists who would lock it up. I think the true conservationists believe in utilization of those kinds of resources.

Mr. HILLIARD. Sir, I used the words "locked up" in the context of 1872, that it was going to be removed from all benefical use in the eyes of many people at that time. Similarly, many of our other parks.

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Mr. BURTON of Utah. Of course I agree with what the chairman said, this trip down to Glen Canyon would really open up your eyes. That is the most beautiful place. Hundreds of thousands of people can now see it. I had an opportunity to go up to Rainbow Bridge last summer. It was a wonderful experience. There will be thousands of people now that will have an opportunity because of the lake, and I hope you will look at it from our point of view.

Mr. HILLIARD. I feel some lakes, yes, and we do have many; these, however, the economic justification alone is terribly thin.

Mr. BURTON of Utah. Thank you.

Mr. ROGERS of Texas. Mr. Foley.

Mr. FOLEY. Thank you, Mr. Chairman. Mr. Hilliard, have you been here most of the week?

Mr. HILLIARD. No, sir. I arrived this morning. I wish I could have been here.

Mr. FOLEY. I think we would feel a little better about that. I would hate to feel you were here all week and been the unlucky person to be the last one to testify. But I enjoyed your statement. You have made a fine contribution.

Mr. HILLIARD. Thank you.

Mr. ROGERS of Texas. Is that all?

Mr. FOLEY. That is all except I would like to be recognized before the hearings are concluded for one unanimous consent.

Mr. ROGERS of Texas. Will it be less than 5 minutes?

Mr. FOLEY. Yes, sir.

Mr. ROGERS of Texas. Mr. Reinecke.

Mr. REINECKE. I want to say I think Mr. Hilliard should visit Glen Canyon. Certainly Glen Canyon before the lake was there was a marvelous thing in itself. Now we have a beautiful lake and I think all nearby canyons should be kept as canyons, particularly those below.

Mr. HILLIARD. But you are not proposing in a river like the Crystal, sir, which does have a road along it, and a very fine trout stream, you are not proposing that it—well, what I am trying to get at, it is available to people now. It does not need this fluctuating reservoir to make it an increased recreational asset.

Mr. REINECKE. Nor, am I proposing a road down Grand Canyon.

Mr. ROGERS of Texas. Thank you very much, Mr. Hilliard.

Mr. HILLIARD. Thank you.

Mr. ROGERS of Texas. That concludes the testimony today. There are two other witnesses scheduled today, but they are local witnesses and I am sure they can be here next week. Mr. Foley.

Mr. FOLEY. Mr. Chairman, I would offer, if it is not already accepted for the record, I ask unanimous consent to include in the record two resolutions of the America Public Power Association, adopted May 12, 1966, Resolution 9, the National Water Study, and Resolution 10, endorsing the provisions of H.R. 4671, as applied to Marble and Bridge Canyon Dams with a provision that investigative studies in title II be deleted, and that the National Water Commission be established.

I ask that these be received at the appropriate place in the record.

Mr. ROGERS of Texas. Is there objection? The Chair hears none and they will be so received.

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(The resolutions referred to follow:)

RESOLUTION No. 9

AMERICAN PUBLIC POWER ASSOCIATION, RESOLUTION No. 9, ADOPTED MAY 12, 1966

NATIONAL WATER STUDY

Whereas the problem of water supply to many areas of this Nation are becoming increasingly serious; and

Whereas many proposals involving water supply, including the diversion of water from one river basin to another, also affect the construction, operation and maintenance of hydroelectric projects: Now, therefore, be it

Resolved, That the American Public Power Association endorses S. 3107 which establishes a National Water Commission comprised of citizens outside of Federal Government service for the purpose of conducting a national water study covering the availability, demand, proper use, and conservation of our entire Nation's water resources.

AMERICAN PUBLIC POWER ASSOCIATION RESOLUTION No. 10, ADOPTED MAY 12, 1966

COLORADO RIVER

Whereas the further development of the Colorado River is in accordance with the proper conservation of our Nations water and land resources: Now, therefore, be it

Resolved, That the American Public Power Association reaffirms its support of authorization and construction of Bridge Canyon and Marble Canyon Dams and appurtenant power facilities as proposed in H.R. 4671; provided that, the water resource studies proposed in Section 201 be conducted, as expeditiously as feasible, under the direction and control of a National Water Commission composed of citizens outside of Federal Government service as proposed in Senator Jackson's bill, S. 3107.

Mr. ROGERS of Texas. Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I ask unanimous consent that the gentleman from California, Mr. Tunney, and all other Members of Congress desiring to do so, be permitted to place their own statements in the record at the appropriate place.

Mr. ROGERS of Texas. Is there objection? The Chair hears none. It is so ordered.

Mr. ROGERS of Texas. The subcommittee will stand adjourned until Wednesday next at 9:45.

(Whereupon at 5 p.m., the subcommittee adjourned until 9:45 a.m., Wednesday, May 18, 1966.)

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LOWER COLORADO RIVER BASIN PROJECT

WEDNESDAY, MAY 18, 1966

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 9:55 a.m. in room 1324 Longworth House Office Building, the Honorable Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS of Texas (presiding). The Subcommittee on Irrigation and Reclamation will come to order for the further consideration of pending business.

We have a number of witnesses scheduled this morning, but one or two questions that I want to ask of Mr. McCarthy, to get them into the record, so that the record will be complete. If you will come up, Mr. McCarthy.

I think that the record ought to be completely clear in regard to these matters. I am sorry that I had to leave here the other day for other committee meetings, and was unable to ask them at that time. You are familiar with the overall proposition involved in the project.

STATEMENT OF DANIEL V. McCARTHY, CHIEF, DIVISION OF PROJECT DEVELOPMENT; ACCOMPANIED BY MAURICE N. LANGLEY, CHIEF, DIVISION OF IRRIGATION AND LAND USE, DEPARTMENT OF THE INTERIOR

Mr. MCCARTHY. Yes, sir.

Mr. ROGERS of Texas. This question is being asked with regard to the Mexican entitlement. Is my understanding correct that if this bill passes in its present form with no change that the amount of water which Mexico is presently entitled to, 1,500,000 acre-feet, under the treaty, is that amount—is that correct?

Mr. MCCARTHY. Yes; that is the minimum under the treaty.

Mr. ROGERS of Texas. The minimum, 1,500,000 acre-feet, and that amount of water would still go to Mexico, but if the product of the Colorado River was less than 16,500,000 acre-feet, whatever amount of water was necessary to fulfill the Mexican entitlement would be paid for out of the general treasury?

Mr. MCCARTHY. Under the bill, of the first 1,500,000 acre-feet of water supplied to augment the Colorado River, the cost of the works to bring in that amount of water plus the associated river losses would be charged as a nonreimbursable cost.

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Mr. ROGERS of Texas. And now in using those terms that it would be charged to the taxpayers all over the country, would it not—it would come out of the General Treasury?

Mr. MCCARTHY. It would come out of the General Treasury. The cost would not be returned. That is correct.

Mr. ROGERS of Texas. I understand that, but what I mean is this—let us put it in plain first-grade terms—if it costs $200 million a year to provide a sufficient amount of water to deliver to Mexico 1,500,000 acre-feet of water, that $200 million would come out of the General Treasury—out of the tax funds rather than from any power pool funds or any water funds out of the Colorado River?

Mr. MCCARTHY. That is correct.

Mr. ROGERS of Texas. At the present time this water is coming out of the Colorado River, is it not?

Mr. MCCARTHY. That is correct. It comes from the natural flows of the Colorado River.

Mr. ROGERS of Texas. What is the procedure—the plan of the Bureau as to obtaining these funds necessary to make this payment?

Mr. MCCARTHY. We have no specific plan now. This would be a product of the investigation which the bill authorizes. The bill would authorize the study of means of augmenting the flow of the Colorado River. When we come to Congress with a report and a recommendation of how we should augment it, then we should have the recommendations as to financing, and so forth.

Mr. ROGERS of Texas. Yes. But what I am talking about is this additional amount of money that would be required if it was required—and I think that you and I, being realistic, appreciate the fact that it almost has to be done this way, would it not? What are your plans to make this payment—are they to make this payment out of the General Treasury to Mexico through the State Department procedures, or through appropriations acquired by the Department of the Interior?

Mr. MCCARTHY. As I said, we have no specific proposal. I would presume that if we followed our past practice, and if the Bureau of Reclamation were to construct the augmentation works, we would propose to get appropriations from the Congress to construct them.

Mr. ROGERS of Texas. I am not talking about the augmentation works now, Mr. McCarthy. I am talking about this—this construction of the augmentation works, would, of course, be a part of the capital investment in order to import water.

Mr. MCCARTHY. That is correct, sir.

Mr. ROGERS of Texas. As I understand the plan, the water that is in the Colorado River, would be delivered to Mexico, but whatever amount of water became necessary to put back into the Colorado River the amount necessary to produce the 16 million acre-feet of water, would come out of it, is that not correct?

Mr. MCCARTHY. Yes, sir. It could be, depending upon the type of augmentation. But for instance, if it were found that a desalting plant on the Gulf of Southern California were to be the source of the imported water, that water would be brought into the Colorado, and probably released near the Mexican border and go directly to Mexico.

Mr. ROGERS of Texas. Yes. But my point is this, that if that desalted water costs $100 an acre-foot as opposed to, we will say, the

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present estimate of the Colorado River water at $5 an acre-foot, the difference between the $5 and the $100 would be picked by the taxpayers over the country out of the General Treasury, would it not?

Mr. McCarthy. That is correct.

Mr. Rogers of Texas. And this would be a subsidization of the Colorado River situation, would it not?

Mr. McCarthy. We feel that it would be a discharge by the United States of a national obligation which it assumed when it entered into the treaty with Mexico.

Mr. Rogers of Texas. That is the next question that I wanted to ask. When did this come up about this being a national obligation? The reason I am asking these questions is not from a standpoint of being unfriendly about any of this, but from a standpoint of getting all of the facts on the record which the American people are entitled to, and if it is good thing, it ought to be done, and if it is not, it should not be done. When did it first become a national obligation?

Mr. McCarthy. I am not sure that you can put your finger on any specific time. The concept of this as a national obligation is part of the rationale behind the proposal that this should be a nonreimbursible item in the program.

Mr. Rogers of Texas. Mr. McCarthy, let us get down to the basic proposition involved. This was not suggested or though of until you get into the Central Arizona project, was it?

Mr. McCarthy. Up until recently there has been no problem in providing Mexico with its entitlement under the treaty.

Mr. Rogers of Texas. Up to which time?

Mr. McCarthy. Up until recently there has been no particular difficulty. There has been plenty of water in the Colorado River. Looking into the future we can now see——

Mr. Rogers of Texas. But—Mr. McCarthy, why has there been plenty of water in the Colorado to meet Mexico's entitlement? Is it because Arizona was not using its water?

Mr. McCarthy. The upper basin and the lower basin have had more than enough water from the Colorado River to meet the existing requirements.

Mr. Rogers of Texas. Yes, sir. The existing requirements—the existing requirements are not equal to the 16½ million acre-feet of water which is divided up under the compact.

Mr. McCarthy. Not at the present; no, sir.

Mr. Rogers of Texas. This anticipates that the dividing up of the 16½ million acre-feet of water which is simply not there; is it not?

Mr. McCarthy. That is correct; yes, sir. At the time the Mexican treaty was negotiated, the negotiators were confident that there was more water in the river than subsequently has been proven to be the case.

Mr. Rogers of Texas. That was in 1944, was it not, Mr. McCarthy?

Mr. McCarthy. That was 1944; yes.

Mr. Rogers of Texas. Was there any discussion at that time with regard to this being a national obligation of the Federal Government and that it could be payable in either kind, in water, or in money?

Mr. McCarthy. I cannot say specifically whether it was or not. There is a long history precedent to the negotiations. Whether this was covered in that legislative history, I do not know.

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Mr. ROGERS of Texas. Well now, has the proposal ever been offered before to make it a national obligation, prior to the time that studies began on bringing the central Arizona project into actually?

Mr. MCCARTHY. Not that I am aware of. As I said before, the problem is just arising. So long as the Colorado River was developing enough water for uses in the United States and to meet the Mexican treaty obligations, there was no particular problem. This is the time when the problem has arisen.

Mr. ROGERS of Texas. I understand that, Mr. McCarthy. But the problem is this, that the taxpayers all over the country are being charged with this subsidization which can very easily run into the billions of dollars because the proposal, as you know, the Bureau of Reclamation has to do now with that—it does not have to do with anything that has a limitation on years, does it?

Mr. MCCARTHY. I would like to point out that there are precedents. At the same time that the Mexican treaty on the Colorado River was negotiated the treaty on the Rio Grande was negotiated.

Mr. ROGERS of Texas. I yield to the chairman, the gentleman from Colorado.

Mr. ASPINALL. They were related, were they not?

Mr. MCCARTHY. Yes, sir, they were.

Mr. ASPINALL. And the benefits given to the Rio Grande were part of the burdens that were placed upon the Colorado River?

Mr. MCCARTHY. You could interpret it that way. The point that I wanted to make is that the dams that are being built on the Rio Grande as a result of the treaty are being built at Federal expense, with no repayments, except as to power installations which are being repaid from power revenues. So far as the water control facilities are concerned the regulation and storage provided by the dams are being undertaken as a Federal obligation.

Mr. ROGERS of Texas. Those are boundary dams?

Mr. MCCARTHY. Yes, sir.

Mr. ROGERS of Texas. Are they not?

Mr. MCCARTHY. Yes, sir.

Mr. ROGERS of Texas. And the matter with regard to the Rio Grande is different in one respect, in that it is a boundary stream, and under international law Mexico has rights of entitlement, insofar as the Rio Grande is concerned that it does not have with regard to the Colorado River?

Mr. MCCARTHY. There is, also——

Mr. ROGERS of Texas. I yield to the gentleman from Colorado. I am trying to get the record written on this.

Mr. ASPINALL. Is it not true, Mr. McCarthy, that both under international law are considered to be international rivers—both of these rivers?

Mr. MCCARTHY. Yes, sir.

Mr. ASPINALL. And being international rivers the countries which are involved have certain original rights, and in the settlement of either one it makes no difference whether it flows along the boundary or over the boundary, it is considered that each country is represented having certain rights to those waters?

Mr. MCCARTHY. Yes, sir.

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Mr. UDALL. Will you yield?

Mr. ROGERS of Texas. Yes.

Mr. UDALL. Technically, there is about 20 miles below Yuma where the Colorado River is the boundary between the United States and Mexico.

Mr. ROGERS of Texas. That is correct, in that area. When you talk about rights of entitlement between the countries, the rights of entitlement as to Mexico, so far as the Rio Grande and the Colorado River are concerned, basically, present an international problem, but the rights are different in those cases, are they not—they are not identical?

Mr. MCCARTHY. They are not identical. However, they both involve international waters.

I would like to bring up one other point, also, as a precedent. There is a portion of the cost of the Parker-Davis project which is now allocated to servicing the Mexican Treaty; in other words, the dams regulate the flows out of the Hoover, and in view of the fact that they do regulate the flows of the Colorado for delivery to Mexico, a portion of project costs is allocated to servicing the Mexican Treaty.

Mr. ROGERS of Texas. Could you furnish the committee—could you have the Department or the Bureau furnish the committee with the differences between the legal situations involved insofar as the Colorado River is concerned as compared with the Rio Grande where you have boundary dams?

Mr. MCCARTHY. Yes; I will ask that a discussion of the two problems and the relationships be furnished.

(The information will be found on p. 1664.)

Mr. ROGERS of Texas. Is there any imported water in the Rio Grande, except as to the San Juan, at least, in the western slope?

Mr. MCCARTHY. There may be some minor importations, but essentially that is correct.

Mr. ROGERS of Texas. I mean in this country, insofar as this country is concerned?

Mr. MCCARTHY. Yes.

Mr. ROGERS of Texas. The situation as it involved insofar as the Colorado River is concerned is that there has been more water divided up than we had to divide, and the only way that they can make deliveries of all of these waters that were divided is to import some water from somewhere else, either desalting, or to the importation from the Columbia River Basin or the importation from someplace else. And what is being asked here is that the taxpayers of this country pick up the tabs whatever the cost is to import the water into the Colorado River, to make that 16½ million acre-feet?

Mr. MCCARTHY. The bill would provide that the cost of the first 1.5 million acre-feet of import, plus associated carriage losses, would be a Federal expense.

Mr. HALEY. Will you yield?

Mr. ROGERS of Texas. Yes.

Mr. HALEY. When was the obligation, insofar as the Mexican rights to this water from the Colorado River established?

Mr. MCCARTHY. In 1944.

Mr. HALEY. In 1944? At the same time that the rights of California and Arizona were established; is that right?

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Mr. McCARTHY. No, sir. The Colorado River compact was negotiated in 1922.

Mr. HALEY. That was when the apportionment of the river was made insofar as California and Arizona were concerned?

Mr. McCARTHY. That was a compact that divided the water between the upper and lower basins.

Mr. SAYLOR. For your information, it was November 24, 1922—that is the date of it.

Mr. HALEY. What I am trying to establish here in my own mind is this—the gentleman is certainly on the right track—apparently, the apportionment of waters in this river was made as to the future with no thought of importation of water in order to meet the various commitments; is that right?

Mr. McCARTHY. At the time that the Colorado River compact was negotiated and at the time that the Mexican Treaty was negotiated, the hydrology of the river indicated that there was substantially more water available in the Colorado River than has proven to be the case since.

Mr. HALEY. By what theory or by what reasoning then do you come to the conclusion that the people, for instance, of the State of Florida should now be taxed to import the water into the river basin when it was known that the water was not there.

Mr. McCARTHY. At the time that the Mexican Treaty was negotiated there was no indication that sufficient water to serve both the Compact and the Treaty would not be assured in the future.

Mr. HALEY. Thank you. That is all.

Mr. ROGERS of Texas. I yield to the gentleman from Pennsylvania.

Mr. SAYLOR. Mr. McCarthy, following the signing of the Colorado River compact on November 24, 1922, the Bureau of Reclamation began to make studies on the Colorado River as to how to put water to beneficial consumptive use, did it not?

Mr. McCARTHY. I would like to ask Mr. Langley to answer that. He is much more familiar with the studies which we have made on consumptive use on the Colorado River.

Mr. LANGLEY. I am Maurice Langley, Chief of the Division of Irrigation and Land Use.

Mr. SAYLOR. Do you spell that L-a-n-g-l-e-y?

Mr. LANGLEY. That is correct.

Mr. SAYLOR. When did you first make studies—rather, when did the Bureau of Reclamation first make studies of putting water to beneficial consumptive use in the Colorado River?

Mr. LANGLEY. There were reconnaissance studies dating back, as far back as 1930—the first major reconnaissance study was in the thirties.

Mr. SAYLOR. When did you first, or when did the Bureau first come to Congress and ask approval of a project to put water to beneficial consumptive use in the Colorado River Basin?

Mr. McCARTHY. Our earliest project in the Colorado River Basin was the Salt River project which was constructed shortly after the initiation of the reclamation program back in 1902. That was one of the first reclamation projects which resulted from the Reclamation Act of 1902.

Mr. SAYLOR. I realize that. You have cases where they put water to beneficial consumptive uses before this time. You have cases in

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Arizona, in the Yuma area, where Arizona put water to beneficial consumptive use before this time, and by this time I mean the date when the compact was entered into. And you have some cases in California where they put water to beneficial consumptive use before this time.

Mr. McCarthy. Yes, sir. I am sure that is correct.

Mr. Saylor. But following the Colorado River compact, the Bureau stepped in and began to make plans for the development of the Colorado River. And in case you are not familiar with it, you had better go back and dig it out, because you have two volumes which are about 2½ inches thick. If you do not have them down there, I will furnish them to you, because I have copies of them, showing that somebody in the Bureau of Reclamation made plans to put a series of dams on the river from the Mexican border right up to the headwaters of the Colorado River, from tailrace to tailrace, the whole way up the river. You people have those down there. You had better start digging them out, because you are going to have to answer some questions with regard to that.

Mr. Aspinall. Will you yield?

Mr. Saylor. Yes.

Mr. Aspinall. You mean that was in the 1946 reports?

Mr. Saylor. In 1946 and 1947 reports, that is right—the reports which were furnished at that time.

Mr. Aspinall. And the reconnaissance reports led to the introduction of legislation or recommendations for legislation for 10 major main-stream dams.

Mr. Saylor. That is correct.

When was the first central Arizona project proposed by the Bureau of Reclamation?

Mr. McCarthy. Back in the late thirties, about 1938, I believe.

Mr. Saylor. Is there any evidence at all that there was an obligation in your studies, to Mexico?

Mr. McCarthy. I am sorry, I did not follow that question.

Mr. Saylor. In the study that you made for the preparation of that recommendation can you find any evidence that the Bureau was cognizant of a responsibility of delivering a quantity of water to Mexico?

Mr. McCarthy. All of our studies on the Colorado River, since the treaty, have provided for delivering water to Mexico, sir.

Mr. Saylor. That is not the question I asked you. You said it was in May 1938, that you made your first report. I asked whether or not in that survey, or in that study or in that recommendation there was any evidence you intended to deliver a quantity of water to Mexico?

Mr. McCarthy. I was in error in saying the Central Arizona project was first proposed in 1938. We started our studies about that time and our first report was in 1948.

Mr. Saylor. I am not trying to trap you. Let me go off the record.

(Discussion off the record.)

Mr. Saylor. It was before that.

Mr. McCarthy. Let me check that. I did not anticipate this questioning. I did not bring my records with me, sir.

Mr. Saylor. I, probably, have an unfair advantage, because I have the record of the hearings that took place in 1951 before this committee.

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Mr. McCarthy. Our report was dated 1948, as I recall it, and that was the basis on which those hearings were held.

Mr. Saylor. The chairman of the committee was the Honorable Mr. Murdock and they had been holding hearings for 5 years. The reason I asked this series of questions, Mr. McCarthy, is that in the hearings that took place before this committee in the 82d Congress there is absolutely nothing in regard to the importation of water—there is absolutely no evidence at all of the obligation to Mexico being a national responsibility. I would like to find out at what time, between the date when these hearings were terminated in April 1951, the time you made the report on the central Arizona project for the Southwest water development, that the consensus was arrived at in the Department of the Interior that this 1,500,000 acre-feet of water is a national obligation.

Mr. McCarthy. I think that I had better make it clear, Mr. Saylor, as to what the administration's position is. The administration has agreed that the cost of imports to offset this delivery to Mexico could be considered a national obligation if the Congress so determines.

Mr. Udall. Will you yield?

Mr. Saylor. Yes.

Mr. Udall. I think that he has hit the heart of this thing. There have been several questions and answers this morning as to when it became a national obligation. The answer is that it did not become a national financial obligation and does not become such a national obligation until Congress says that it is. And in the bill before us at page 30 and page 31, the Congress finds that this should be treated as a national obligation, so that it becomes one only when the Congress so determines.

At the time that the gentleman is referring to we were still laboring under the delusion that there was, probably, enough water in the river to supply the upper basin and the lower basin and the Mexican treaty allotments as well. By the time that we got up into the late fifties and the sixties, it was becoming apparent that this was not the case. In 1962, Chairman Aspinall wrote the Secretary and said, "You had better make some plans and studies for the lower Colorado and find out what the problem is and what to do." The result of this was the Southwest water plan which studied and determined that there was not enough water and that we would have to import water and suggested that one way to get the imports was to resolve the total problem of the river, and adopt a plan to bring in some water. And at that time it was suggested we might take the first 1,500,000 of importation to satisfy the Mexican treaty and treat the expense as a national obligation. That is the history of it.

Mr. Saylor. We have had people up here, Mr. McCarthy—and you were in the room when they testified—who placed a monetary value on the Colorado River at zero. In other words, they did not have to pay for the water that was flowing by their front door, and the water that was imported from a distance would have to be bought at a tremendous price.

I have not heard any argument presented by the Department that should make this an obligation of the Nation, rather than the basin.

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Does the treaty in and of itself makes this a national obligation?

Mr. McCarthy. The treaty obligates the United States to deliver this water. To that extent it does make it a national obligation.

Mr. Saylor. Well, then if it is the national obligation, why put it in this bill?

Mr. McCarthy. Because this bill looks toward an augmentation program that would involve costs and there would have to be some way to handle those costs. If we were without such provision, presumably, any costs involved in bringing water in to meet this treaty obligation would have to be reimbursed through some other means.

Mr. Saylor. I asked the other day when Secretary Holum was here whether or not there had been any studies made, either by the Bureau or anyone else, which would tell this committee what the per-acre-foot costs would be for the first 2,500,000 acre-feet of water necessary to satisfy the obligation to Mexico. At that time you heard him state there had been some surveys made, but he was not in a position, nor was the Commissioner of Reclamation in a position to tell us what that cost would be. Do you agree with that conclusion?

Mr. McCarthy. Yes, sir; I agree. There are no definitive data which we could use to give a competent answer as to what these costs would be. That is why we feel the study is needed. There have been some paper studies made, but we do not have a firm basis of information necessary to come to any definitive conclusion.

Mr. Saylor. Were you in the room when the representative from Texas said that in order to import the water 300 miles and raise it 4,000 feet, it would cost $300 an acre-foot?

Mr. McCarthy. The testimony I heard indicated that transferring water from East Texas to West Texas would cost somewhere in the vicinity of $160 an acre-foot.

Mr. Saylor. $168 an acre-foot.

Mr. Udall. Raised to 3,000 feet.

Mr. Saylor. 300 miles and 3,000 feet?

Mr. Udall. Yes, sir.

Mr. Aspinall. Yes, sir.

Mr. Saylor. Thank you.

Mr. Aspinall (presiding). The next witness will be——

Mr. White of Texas. Could I ask a question?

Mr. Aspinall. Unless there is objection, you may go ahead. We have other witnesses to present this morning, however.

Mr. White of Texas. This may be simplified in this way: Has it ever been considered by your Department to renegotiate with Mexico the allotment to Mexico of water, say, from the runoff in the United States, so that it would be more realistic than pinning ourselves to heavy runoff commitments?

Mr. McCarthy. No, sir. There has been no thought of that, that I know of. There is a provision in the treaty that says in effect that in the event of extraordinary drought there will be a reapportionment of the deliveries to Mexico.

Mr. White of Texas. Could this be a realistic approach to consider, to renegotiate with Mexico, to see if something could be done in alleviating this situation?

Mr. McCarthy. I could not say. This would involve other agencies of the Government, such as the State Department and the International Boundary and Water Commission.

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Mr. WHITE of Texas. Could your Department make an inquiry as to this problem?

Mr. MCCARTHY. The State Department will have a witness here this morning and you may want to ask him about that.

Mr. ASPINALL. Thank you very much. If we have any more questions we will try to get them to you.

The next witness is Mr. T. R. Martin, Chief, Boundary and Water Matters, Office of Mexican Affairs, of the State Department accompanied by U.S. Commissioner Joseph F. Friedkin, the International Boundary and Water Commission, United States and Mexico.

DEPARTMENT OF STATE,
Washington, May 13, 1966.

Hon. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
House of Representatives.

DEAR MR. CHAIRMAN: The Department of State has noted the announcement of hearings on May 9 concerning a recommended revision of H.R. 4671, Committee Print No. 19, entitled "A Bill To authorize the construction, operation, and maintenance of the Lower Colorado River Basin project, and for other purposes."

I am sure that you are aware that the United States had a very serious problem with Mexico concerning the salinity of Colorado River water delivered to that country under the Water Treaty of 1944. The agreement reached with Mexico in 1965 on this problem is not itself a permanent solution—it provides recommendations for a five-year period. The Department remains hopeful, however, that the agreement will provide bases for a permanent solution.

In 1964 the Government of Mexico protested the Department of the Interior's proposed salvage program for pumping groundwater for delivery to Mexico as a part of the treaty waters and in substitution for better quality surface water. While we believe that the groundwater salvage program can be carried out without significant adverse effect upon the downstream users in Mexico, the program has given rise to misunderstanding and concern. In response to Mexico's protest, the Secretary of State assured Mexican officials that we would consult with them before adopting a plan for construction of salvage works. At a meeting in Mexico City in April 1966, President Johnson and President Diaz Ordaz agreed to "the need for mutual consultation before proceeding to carry out works which in the future might create problems * * *" of this nature.

With this background the Department wishes to refer to Section 305 of H.R. 4671 and Section 305 of the revision of H.R. 4671 contained in Committee Print No. 19. The Department strongly recommends that the language of Section 305 of H.R. 4671—which provides for a report by the Secretary of State on consultations with the Government of Mexico and the approval of a definite plan report by the President before a groundwater program is undertaken in the Yuma area—be retained in any legislation which may be enacted by the Congress, and that such language be substituted for the present language of Section 305 in the revision of H.R. 4671 contained in Committee Print No. 19.

Section 305 as revised would authorize the groundwater salvage program. Enactment of the authorization without qualification might be misunderstood in Mexico as an attempt on the part of the United States to avoid consultation and to insist on a unilateral interpretation of joint rights and obligations. The modification that the Department recommends would reassure the Government of Mexico that this Government intends to comply fully with its commitment to consult concerning the water salvage plans.

The Department appreciates the Committee's consideration of this recommendation. Officials of the Department would be glad to testify if the Committee should wish.

The Bureau of the Budget advises that from the standpoint of the Administration's program there is no objection to the submission of this report.

Sincerely yours,

DOUGLAS MACARTHUR II,
Assistant Secretary for Congressional Relations
(For the Secretary of State).

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STATEMENT OF T. R. MARTIN, CHIEF, BOUNDARY AND WATER MATTERS, OFFICE OF MEXICAN AFFAIRS; ACCOMPANIED BY U.S. COMMISSIONER JOSEPH F. FRIEDKIN, AND EDISON W. DICK, ATTORNEY ADVISER, STATE DEPARTMENT

Mr. MARTIN. Mr. Chairman and members of the committee, I appear in place of Mr. Terrance Leonhardy, Country Director for Mexico, who was unexpectedly unable to meet this schedule, and I will read his statement.

Accompanying me are Mr. Joseph F. Friedkin, U.S. Commissioner on the International Boundary and Water Commission, and Mr. Edison W. Dick, attorney adviser from the Department. [Reading.]

Mr. Chairman and members of the subcommittee, thank you for this opportunity to appear in support of an amendment to H.R. 4671, as revised in Committee Print No. 19. The language that the Department of State recommends appeared in H.R. 4671. It was deleted in revision, and the Department recommends its restoration. The Country Director for Mexico, Terrance G. Leonhardy, was to present this statement. When he had to leave the city on official business, he asked me to read it. He also asked United States Commissioner Joseph F. Friedkin on the International Boundary and Water Commission to be present. We hope that we can assist the Subcommittee in its consideration of any matters relevant to this amendment.

The members present know, I am sure, that this Government has had a very serious problem with Mexico concerning the salinity of Colorado River water delivered to that country under the Water Treaty of 1944. The agreement of 1965 provides recommendations only for a five-year period. The adequacy of the agreement as a solution to the problem will probably depend as much on related developments in the Colorado River Basin during that period as on its actual terms.

When the Department of the Interior announced in 1963 its proposed salvage program for pumping groundwater for delivery to Mexico, as a part of the treaty waters and in substitution for better quality surface water, the Government of Mexico protested that it regarded the proposal as contrary to the treaty and international law. It has repeated this protest several times, the most recent being dated the second of this month. The Department does not concur in the position of the Mexican Government, but recognizes that this Government must consult with the Government of Mexico about the groundwater salvage program, as a matter of treaty obligation as well as international comity. The Secretary of State has assured Mexican officials that we would consult with them before adopting a plan for groundwater salvage. At a meeting in Mexico City in April, 1966, President Johnson and President Diaz Ordaz of Mexico agreed to "the need for mutual consultation before proceeding to carry out works which in the future might create problems" of the nature of the salinity problem. Until the Department of the Interior completes its groundwater salvage plans, however, the Department will not be able to discuss with Mexican officials concrete proposals and the effects, if any, that the plans might have on Mexico.

Section 305 as revised would authorize the very groundwater salvage program to which Mexico has repeatedly expressed objection. Enactment of the authorization, without qualification, might be misunderstood in Mexico as an attempt on the part of the United States to avoid the consultation we have promised, and as insistence by the United States on a unilateral interpretation of joint rights and obligations. We are sure the Congress does not have this intention.

The Department accordingly recommends restoration of the language from Section 305 of the original of H.R. 4671, which provided that "no groundwater program hereby authorized shall be undertaken in the Yuma area until the Secretary of State has reported to the Persident on consultations which he may have had with the Government of Mexico pursuant to the Water Treaty of 1944 (Treaty Series 994) and the President has approved a definite plan report thereon." This language, the Department believes, would reassure the Government of Mexico that this Government intends to comply fully with its commitment to consult concerning groundwater salvage plans.

Thank you, Mr. Chairman.

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Mr. HALEY (presiding). Do you have any additional comments that you care to make, Mr. Friedkin?

Mr. MARTIN. These remarks were intended to represent the initial comments of all present.

Mr. UDALL. Mr. Martin, the thrust of your brief testimony is that you want back in the bill this simple statement on page 10 that says that before the Bureau undertakes a water salvage program in the Yuma area that we will have consultations with Mexico?

Mr. MARTIN. Yes, sir.

Mr. UDALL. I do not see that that raises any great serious matter. The President intends, as you have said, to consult with Mexico.

Mr. MARTIN. Yes, sir.

Mr. UDALL. He has the power and the authority now to consult with Mexico and is doing it and he has done it.

Mr. MARTIN. Yes, sir.

Mr. UDALL. And you have indicated that the President and the State Department have every intention of continuing those consultations with Mexico?

Mr. MARTIN. Yes, sir.

Mr. UDALL. The only question I have is this: Why do you need the Congress to tell the President to do something that he already has the power and the authority and the intention of doing?

Mr. MARTIN. Our point is—your point is well taken. The explanation is this: We, of course, do not need this provision in the bill in order to act administratively, as you suggested. We can, of course, and we have done so.

Mr. UDALL. The treaty requires you to do so, does it not?

Mr. MARTIN. Yes, sir. That can be handled administratively. But we need assurances for Mexico, actually assurances on the part of the Congress. Perhaps, if I refer very briefly to the history of section 305, as we know it, our reason will be more clear. The drafters of this original language, I am sure, had no awareness of this problem with Mexico. When it first appeared in print, the Government of Mexico took it up with us at once. We consulted with the Department of the Interior, and suggested that language requiring consultation be incorporated in any bill that might subsequently be presented for the consideration of the Congress. In drafting H.R. 4671, that language was included in your bill. We turned to Mexico and said, in effect, "You see, your concerns were needless. That language is in the bill." And while I do not know that this persuaded Mexico that it had no reason for concern, it did persuade Mexico that the Congress had no intention to ignore our commitment to consult. Now we are faced with the situation where not only is the language not in the bill, but it has actually been taken out, and we have every reason to believe that this will cause public and official concern in Mexico. We believe that it can be easily avoided by the restoration of this language.

Mr. UDALL. I have nothing further to say, except for the record I want to say to the people in Mexico that those responsible for the new draft, as you have indicated, knew that the President has the right to consult. We did not want to burden the bill with a lot of unnecessary provisions. If a statement in the committee report or in the bill itself will reassure the Mexicans I would be happy to see

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that be done. There was no motive on my part to avoid the consultations that we owe the Mexican Government under the treaty.

One of the other reasons, just for the record, this provision was taken out: When we drafted the bill originally, we were in the heat of a very serious controversy about salinity of the water and there had been many developments. The bypass channel was rather substantially involved in this question. While this is a slightly different problem we felt that the consultations referred to in the original bill had been completed. There was no devious purpose in leaving it out. I want to thank you for your testimony and for bringing this minor point up.

Mr. MARTIN. Thank you.

Mr. HALEY. The gentleman from Pennsylvania.

Mr. SAYLOR. I yield my time to the gentleman from California, Mr. Reinecke.

Mr. REINECKE. With regard to the problem, if this bill were passed, do you feel that the bypass canal that we have at the present time can fall within the jurisdiction of your responsibility?

Mr. MARTIN. I am sorry that I cannot answer your question. We are authorized to speak only on section 305.

Mr. UDALL. If you will yield to me.

Mr. REINECKE. Yes.

Mr. UDALL. Actually the language of the bill to which the testimony refers has nothing to do with this. These are two separate problems.

Mr. REINECKE. My point is that if the treaty becomes a national obligation in the context that we are speaking of it here, then this may well apply additional financial obligations on the General Treasury to offset whatever is necessary to keep the volume of water up to where we can meet the treaty.

Mr. UDALL. If you will yield further, we have already constructed the Wellton-Mohawk bypass channel which is the solution to nearly all of this. It is in operation.

Mr. REINECKE. I am aware of that. I am wondering what the future may hold in the same regard.

Mr. UDALL. I do not see the problem that you speak of. I cannot imagine that any ground water recovery program that you are talking about would have any effect on this.

Mr. REINECKE. I am trying to anticipate what might become a national problem 20 years from now when there is no water to take care of this. Plus more ground that may be irrigated in the Colorado River Basin.

Mr. UDALL. The water for irrigation in central Arizona does not get back into the Colorado.

Mr. REINECKE. I believe that is all I have, Mr. Chairman.

I yield back my time.

Mr. HALEY. The gentleman from Pennsylvania.

Mr. SAYLOR. I will reserve my time.

Mr. HALEY. The gentleman from Colorado.

Mr. ASPINALL. We have a report of the Department relative to this matter. I would ask that the report of the Department of State dated May 13, 1966, be made a part of the record immediately preceding the statement here this morning by these two witnesses.

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Mr. HALEY. Without objection, the report will be made a part of the record as suggested by the gentleman from Colorado, and will be found on p. 1628.

Mr. ASPINALL. That is all.

Mr. HALEY. The gentleman from California. Mr. Hosmer.

Mr. HOSMER. Do you have anything to do with this desalting plant project under discussion between the State Department and the Interior Department people and the Mexicans, et cetera?

Mr. MARTIN. No; that is handled by a special study group that has been established to do that work.

Mr. HOSMER. This nuclear desalting plant, with regard to water, does it have any bearing on this question?

Mr. MARTIN. I do not know, sir. We would be unauthorized to comment officially on it. I doubt that the study has progressed to the extent that one could even make an estimate.

Mr. HOSMER. Would not there be a relationship between this source of water, an added source, an alternative source of water for Mexico and the water in the Colorado River and the Columbia River area?

Mr. MARTIN. I am sure that the Department of the Interior would be very glad to supply witnesses to come and comment on that.

Mr. HOSMER. You are dealing with the U.S. reserves when you are talking on a water matter with the Mexicans over there in the State Department in the Office of Mexican Affairs. If you talk about just one water matter and not the other, I think there is something the matter with the organization that you are representing.

Mr. MARTIN. I did not mean to suggest that we are not familiar with these studies, but we are authorized to appear here before the committee only on this one matter on which the committee called us.

Mr. HOSMER. Well, this matter is water in the Colorado River, is it not? That is what you are up here on, section 305, is that right?

Mr. MARTIN. Yes, sir.

Mr. HOSMER. This nuclear desalting plant, do you say that you take it completely out of the range of the studies that is covered by section 305?

Mr. MARTIN. I should say so at this stage, yes, sir.

Mr. HOSMER. Well, sir, I think that the State Department is making a very serious and drastic mistake. The last time that the State Department got into the Colorado River question it gave away to Mexico a great asset that belonged to the people of the United States and, particularly, those in the Colorado River Basin system in the United States, and if you cannot pay attention to this other activity that is going on in connection with the nuclear desalting plant, I think that you are making preparations for another giveaway. I have contended here for the last 2 years that in these discussions with Mexico, in connection with the desalting plant, or in connection with this bill, that you should bring in these agencies, the water agencies of the seven States concerned with the Colorado River Basin, into consultations, so that they can advise you and caution you against moves and activities and commitments which might be detrimental to them in this entire area. I suggest that that be done and be done quickly, otherwise, the State Department, operating in a vacuum, without adequate knowledge of these water rights in effect, can again repeat the mistake of the previous Mexican treaty.

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I reserve the balance of my time.

Mr. HALEY. The gentleman from Idaho.

Mr. FRIEDKIN. May I comment? I am Joseph F. Friedkin, Commissioner for the United States on the International Boundary and water Commission. I should like to refer to section 305 that we are speaking of which relates to the salvage of waters of the lower Colorado River. It refers to two features of this salvage.

One is the saving of water by control.

The second is ground-water recovery. The recovery of ground water which we save.

These are the two features, particularly, of section 305, that we are talking about here.

Now in addition, we, of course, are aware, as an observer, of the recent meeting of this study group on desalination. I sat in on this at a final session. It is doing a study. It is in a very beginning stage. No conclusions can be drawn at this time. It may develop into something which does relate to this bill. It may be needed to be studied in connection with other sources of water, but it is in the early stages.

If I may make one more observation, please, sir, that is, at the time that the 1944 water treaty was developed, it was negotiated in consultation with the seven States of the Colorado River Basin. It was developed and formulated in consultation with them.

Mr. HOSMER. Now that you have opened up the desalting proposition, according to the reports which are published in the desalination report, a weekly periodical covering this subject, it quotes the Mexicans as stating that the project will be built. I do not know what the State Department has told those people, to give them that idea. They are stating that they are going to build this thing. I know that the irrigation and reclamation people from the Bureau, and the State Department, with the Mexicans, took a big airplane ride around Baja California and, apparently, gave those people that impression.

Mr. FRIEDKIN. There is no——

Mr. HOSMER. We know that this is not a good project. I am afraid that you people are going to get the Mexicans to the point where you will have to come up to Congress and tell us that you gave them a moral commitment or some other kind of commitment in relation to the salt in the river now, and we are going to get into a big mess about building the desalting plant.

Mr. FRIEDKIN. I was only there toward the end of the meeting as an observer. I assure you, however, that there was no commitment. It was very carefully avoided, that is, any commitment for any construction. This is only a study that they are making, and this is where the study stands.

Mr. HOSMER. There must have been something said that encouraged the Mexicans, which gave them this notion, that this is almost a fait accompli.

Mr. FRIEDKIN. There really would be no foundation for it.

Mr. HOSMER. Thank you.

Mr. HALEY. The gentleman from Idaho.

Mr. WHITE of Idaho. Thank you, Mr. Chairman. You refer to section 305 in your testimony, and I will ask you about that. You

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have alluded to the 1944 treaty. I think Mr. Friedkin, also, spoke to this with respect to the States that were involved at the time that the treaty was negotiated. Was it not the thinking of the people who put that treaty together that the Colorado River Basin was the only possible supply for water at that time when the treaty was executed?

Mr. FRIEDKIN. At the time of the negotiation of the treaty—and I was an employee of the Commission at that time——

Mr. WHITE of Idaho. You were with the Commission at that time?

Mr. FRIEDKIN. Yes. The thinking was that the water was within the Colorado River Basin.

Mr. WHITE of Idaho. That is exactly at that time.

Mr. FRIEDKIN. At that time the thinking was that there was sufficient water. The records indicated that there was sufficient water.

Mr. WHITE of Idaho. In the Colorado River?

Mr. FRIEDKIN. Yes.

Mr. WHITE of Idaho. And subsequently, in the agreement that was entered into, it indicates now that there will not be sufficient water to do all the things that are charged against the Colorado River?

Mr. FRIEDKIN. Primarily, a change in the runoff characteristics of the river. The runoff has been less in the last 20 years.

Mr. WHITE of Idaho. It has diminished. That it cannot supply all of the water demands on the Colorado River?

Mr. FRIEDKIN. Yes.

Mr. WHITE of Idaho. Then is it your thinking, to extend the present legislation, to give national responsibilities to the treaty, that this water is obligated out of areas other than the Colorado River Basin?

Mr. FRIEDKIN. I am getting beyond my responsibilities here. I do want to say, if I may, that a treaty with a foreign country is to be regarded as a national obligation.

Mr. WHITE of Idaho. But it was the stipulation at the time that the treaty was entered into and it was the understanding at that time as to where the possible sources of water were and what the availability of the water was at that time, and no one was thinking beyond that point, and there was no discretion and nothing alluded to other than the Colorado River being the supplier of this water?

Mr. FRIEDKIN. And the record of the Colorado River runoff at that time indicated that there was adequate water to take care of the treaty and the other needs.

Mr. WHITE of Idaho. The treaty was promulgated on those specific facts at that time, is that not true?

Mr. FRIEDKIN. Yes, sir. The records of the flow at that time.

Mr. WHITE of Idaho. And now to extend that to a national obligation what is necessary to say, that this water should be supplied from any source inside the United States? Do they have to have a specific sort of language in this legislation saying that the obligation must come out of the United States from any available source of water that we can put together?

Mr. FRIEDKIN. I am really not qualified to respond to that.

Mr. MARTIN. I think that "national obligation" can be interpreted in several ways. When the Commissioner spoke of it being a national obligation, he meant a treaty obligation on the part of the United

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States. Whether or not the Congress recognizes it as a national obligation and acts accordingly, I think is another question.

Mr. FRIEDKIN. May I cite some examples?

There was the question of precedent that came up earlier. Even as far back as 1906, we had a treaty with Mexico on the waters of the Rio Grande. Under this 1906 treaty there was required the construction of a storage dam upstream, the Elephant Butte Dam on the Rio Grande. And part of the cost of this Elephant Butte Dam was paid by the Federal Treasury, because it was used to fulfill a treaty obligation.

Mr. WHITE of Idaho. We are talking in terms of water and not in terms of money. We are talking about a resource that is available in a certain drainage area, in certain watersheds of the United States.

Mr. FRIEDKIN. Yes.

Mr. WHITE of Idaho. And not in terms of financing, but the ability of the United States to make available water in this area, are we not?

Mr. FRIEDKIN. I only want to make the point that at that time the Congress felt that a part of the cost of the dam was a national obligation, to assist in carrying out this treaty.

Mr. WHITE of Idaho. I do not quite see that analogy that you are making in respect to the cost of the works, specific water out of a specific drainage area to fulfill a treaty obligation—how you can transfer that to this other—I think that is what you are attempting to do—and I see no basis for so doing, because when you had a certain set of facts under the treaty which was entered into, that water was available from a certain area and the limitation was the drainage area, and there was water from that drainage area, and to extend it beyond that point is an extrapolation of the fact that I think is something that we are going way beyond our obligation on under the Mexican treaty. You may comment on that, sir, if you wish.

Mr. FRIEDKIN. No, sir. I do not think that I can add anything more.

Mr. WHITE of Idaho. Then you agree with the premise that I have stated?

Mr. FRIEDKIN. I think that the principle of national obligation is there in the case that I cite, of the 1906 treaty on the Rio Grande where the Federal Government thought that it was a national obligation to fulfill the treaty with Mexico.

Mr. WHITE of Idaho. Then you are making a direct analogy between money for construction of works to water availability?

Mr. FRIEDKIN. Yes, sir. And I am trying to make a point that the Federal Government did consider, and Congress did consider, servicing the treaty as a national obligation, in terms of money in that case.

Mr. WHITE of Idaho. And for the works?

Mr. FRIEDKIN. And for the works in this case.

Mr. UDALL. Will you yield?

Mr. WHITE of Idaho. All I can say, Mr. Chairman, is that I do take exception to making an analogy of the money with water as being a national obligation for the construction of those works, and attempting to construct a comparison of that as to water itself.

I think that just is an extrapolation that goes beyond the treaty obligations that we now have with them. In other words, if we do not have

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the water in the system drainage to do the things we are supposed to do, how will we get the water to do them because, as a matter of fact, at the time of the treaty it was all based on so much water being in that basin. It wasn't an act of God that we are speaking of here with respect to the flow of water in the Colorado River. I think that it would be a part of the obligation of Mexico, as well as that of the United States, to call for a reduction of the water in the river and the inability of the river water to supply that treaty.

There is one other last thing that I would like to say to you. You alluded to control, and hold it up as a possibility. My particular understanding at the present time that there has been no real breakthrough on that.

Mr. FRIEDKIN. That is a project of the Department of the Interior which I am not qualified to speak on.

Mr. WHITE of Idaho. How does it apply? It has not been accomplished, as I understand it.

Mr. FRIEDKIN. I do not know what you mean.

Mr. WHITE of Idaho. It has been done on a grand scale and it has not been accomplished, as I understand it.

Mr. FRIEDKIN. I do not know what you mean by "grand scale." We do it on the Rio Grande, and it can be done on the Colorado.

Mr. WHITE of Idaho. I will yield to the gentleman from Arizona.

Mr. UDALL. The United States has an obligation to deliver this 1,500,000 acre-feet of water. This is an obligation which the 48 States imposed on these 7 Colorado River Basin States in this treaty and said, in effect the 7 States in the basin must deliver that water. All we are trying to estbalish in the section of the bill under discussion this morning is that the obligation is simply a U.S. obligation of the 48 States, obligating the 7 States to deliver this water. We suggest that the 50 States now should assume the financial obligation of paying for the necessary water import works on a one-shot basis to relieve the 7 States of this burden which was imposed upon them for wartime national policy reasons under an optimistic and mistaken view of the water available. This is what we are talking about.

Mr. WHITE of Idaho. I have no argument with that, let me say, but when we are talking about a basic commodity itself, the water, then I will have to disagree with my good friend from Arizona. Thank you.

Mr. HALEY. The gentleman from Kansas.

Mr. SKUBITZ. No questions.

Mr. HALEY. The gentleman from California, Mr. Tunney.

Mr. TUNNEY. I am sorry that I came in late. It is my understanding from the testimony that you made today, that if we pass this bill with section 305 in it as it is, that this is going to take care of the problem in our relationship with Mexico. Correct?

Mr. ASPINALL. That question has been raised in the statement. There is no need in going over this again.

Mr. TUNNEY. Mr. Chairman, I came in late. I note that it states that he feels that section 305 should be put in, restored into the bill. The reason I asked the question is that I am trying to pinpoint just exactly what the objection of the Mexican Government is as to leaving it out.

Mr. ASPINALL. He has already put it in the record, Mr. Tunney.

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This is the reason why you should be here on time, so that we do not have repetitive questioning.

Mr. TUNNEY. We sometimes have other committee meetings.

Mr. ASPINALL. I understand that. I am not going to object. Go ahead and ask the question.

Mr. TUNNEY. If it is already in the record, I will yield.

Mr. ASPINALL. Thank you.

Mr. HALEY. You have no further questions?

Mr. TUNNEY. No.

Mr. HALEY. Mr. Wyatt.

Mr. WYATT. Were either of you gentlemen directly or indirectly involved in the 1944 Mexican Treaty which is under discussion here?

Mr. MARTIN. Mr. Friedkin was an employee of the Commission.

Mr. FRIEDKIN. I was not directly involved. I was an engineer, just before the treaty, with the Commission.

Mr. WYATT. You are generally familiar with the events leading up to the treaty?

Mr. FRIEDKIN. Yes.

Mr. WYATT. Do you know the amount of beneficial consumptive use of water by Mexico from the Colorado River prior to the year of the treaty—the annual consumption by Mexico prior to the treaty?

Mr. FRIEDKIN. It was about 1,500,000 acre-feet.

Mr. WYATT. In your view, was the treaty merely a codification of the rights that they already had, which was formalized by the treaty?

Mr. FRIEDKIN. The treaty was a matter of negotiation, and this was a principal point that was considered in the negotiations, the fact that Mexico was using about that amount of water at that time.

Mr. WYATT. In other words, the State Department and the U.S. Government, in effect, really did not give the Mexicans anything that they were not already receiving, is that a fair statement?

Mr. FRIEDKIN. Yes, sir; I think it is, in that respect.

Mr. WYATT. That is all. Thank you.

Mr. HALEY. The gentleman from Washington.

Mr. FOLEY. No questions.

Mr. HALEY. The gentleman from Texas.

Mr. WHITE of Texas. This was negotiated at a time when we had heavier runoffs and, also, at a time when we had a lesser population in this country. Do you think that it is feasible at this time to even approach Mexico for possibly a renegotiation on a more realistic basis, considering our present runoff?

Mr. MARTIN. I think that the two governments, for different reasons, would be very reluctant to consider any revision of the treaty.

Mr. WHITE of Texas. Why?

Mr. MARTIN. I would want to say only this, that you cannot revise a part of a treaty. If you open up a part to renegotiation, you open up the whole. And I am confident that there would be many objections on the part of many sectors of the public in the United States, and that our Government would be opposed to it.

Mr. WHITE of Texas. Will we some time come to this, perhaps?

Mr. MARTIN. I would not want to guess.

Mr. WHITE of Texas. May I ask this question. How long is this treaty for? Is it in perpetuity?

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Mr. MARTIN. Yes, sir; until terminated by another treaty.

Mr. WHITE of Texas. Thank you.

Mr. HALEY. The gentleman from Pennsylvania reserved his time. The gentleman is recognized.

Mr. SAYLOR. Can you furnish this committee information that was available to the State Department at the time that the Rio Grande, Colorado, Tijuana Treaty was entered into in 1944? All of the records for the users of water by Mexico?

Mr. MARTIN. Yes, sir.

Mr. SAYLOR. Is that available?

Mr. FRIEDKIN. You mean, from the Colorado River?

Mr. SAYLOR. From the Colorado River, from the Rio Grande and from the Tijuana River—all included in the same treaty.

Mr. FRIEDKIN. Yes, sir.

(A portion of the information above referred to, follows, and the remainder when received, will be found in the committee files.)

WATER USED IN MEXICO (FROM COLORADO RIVER)

Hoover Dam was closed, and began to store water and regulate the river, in 1935.

Prior to that, the acreage irrigated in Mexico was restricted by spring floods and summer drought. After that date, regulation of the river by Hoover Dam made possible a very large increase in water use in Mexico. The comparison is shown by the following table (from Hearings of the Senate Committee on Foreign Relations on the Water Treaty with Mexico, January 22–26, 1945, p. 953; data cited from the Mexican Section of the Interntaional Boundary and Water Commission):

Year	Acreage irrigated	Water diverted
1928	192,700	1,003,000
1929	166,800	1,007,000
1930	136,100	901,000
1931	106,300	672,000
1932	73,500	562,000
1933	137,100	696,000
1934	161,400	658,000
1935	205,200	1,102,000
1936	210,800	1,370,000
1937	211,600	1,327,000
1938	193,300	1,344,000
1939	198,900	1,373,000
1940	245,100	1,624,000
1941	310,200	1,569,000
1942	284,000	1,538,000
1943	293,100	1,805,000
1944	303,300	1,770,000

Mr. SAYLOR. I have scanned once again this treaty and have noted so far as the Colorado River is concerned, article 15 requires 1 million acre-feet to be delivered from the Davis Dam until January 1, 1980, and one-half million acre-feet be delivered to the All-American Canal until that date, specifically setting up the schedule by months to the flow of water. And I find absolutely nothing that deals with the quality of the water that is to be delivered. Would you furnish to this committee a memorandum dealing with the quality of the water as dealt with in the treaty?

Mr. FRIEDKIN. Yes, sir.

Mr. SAYLOR. Can that be furnished?

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Mr. FRIEDKIN. Yes, sir.

Mr. SAYLOR. Mr. Chairman, I ask unanimous consent that when that information is furnished, that it be made a part of the record at this point.

Mr. HALEY. Without objection, it is so ordered.

(The memorandum above referred to, when received, will be found in the committee files.)

Mr. SAYLOR. Now, your statement is that this treaty is a national obligation. Is that predicated upon the fact that all of the treaties entered into by the United States bind the entire country? Is that correct?

Mr. MARTIN. Yes, sir.

Mr. FRIEDKIN. Yes, sir.

Mr. SAYLOR. It is in this context that you state that this is a national obligation?

Mr. FRIEDKIN. Yes, sir.

Mr. SAYLOR. Can you tell this committee whether or not at the time negotiations were held in 1944, dealing with the establishment of this treaty, that there was ever contemplated by Mexico, or by the United States, that there should be any importation of water from any source whatsoever into any of the three rivers referred to in the treaty?

Mr. FRIEDKIN. The considerations at the time of the treaty related solely to the Colorado River Basin, to the Rio Grande Basin, and to the Tijuana Basin. As I say, at that time the records indicated that there was adequate water, adequate supplies to take care of the requirements.

Mr. SAYLOR. At the time this treaty was entered into the best information available to the State Department representing the nine States in its negotiations, was that the flow of the Colorado River had as an absolute minimum over a 10-year period on an average of 16½ million acre-feet?

Mr. FRIEDKIN. I cannot testify to the exact figures, sir, but at the time the records indicated—studies were made, and they indicated that there was sufficient water to take care of the needs.

Mr. SAYLOR. The reason they placed 16½ million acre-feet in the Colorado River compact, entered into in 1922, is that they divided the river at Lee Ferry, saying that 7½ million acre-feet would be used in the upper basin and 7½ million acre-feet would be used in the lower basin, and any addition should be divided between the upper and lower basin States, and at that time, the seven States felt from the best records they had, it indicated there was at least a 16½ million acre-feet average flow over a 10-year period in the river.

Mr. FRIEDKIN. I cannot testify to that specifically, sir.

Mr. SAYLOR. That is all, Mr. Chairman. I think with this information to be supplied it will be helpful to the committee.

Mr. UDALL. Is there evidence that there was not 1,500,000 acre-feet being used by Mexico at that time? That is my point. And I want to supply the precise figure.

Mr. FRIEDKIN. My understanding is that the use by Mexico prior to 1935 when Hoover Dam was completed, was about 750,000 acre-feet per year. Incident to the regulation effected by that dam, the uses in Mexico increased between 1935 and the time of the signature of the treaty in February 1944, to the total of about 1,500,000 acre-feet.

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Mr. HALEY. Thank you very much.

The next witness is Dr. Spencer M. Smith, Jr., secretary of the Citizens Committee on Natural Resources.

STATEMENT OF DR. SPENCER M. SMITH, JR., SECRETARY, CITIZENS COMMITTEE ON NATURAL RESOURCES

Dr. SMITH. Mr. Chairman, I have a very brief statement which I will summarize in the interests of the time of the committee.

Mr. HALEY. Do you want the statement included in the record as if read, and then summarize it?

Dr. SMITH. I will appreciate that, sir; yes.

Mr. HALEY. Without objection, your statement will be received and made a part of the record at this point in the proceedings as if read, and the gentleman may summarize it.

(The complete statement of Dr. Spencer M. Smith, Jr., above referred to, follows:)

STATEMENT OF DR. SPENCER M. SMITH, JR., SECRETARY, CITIZENS COMMITTEE ON NATURAL RESOURCES

Mr. Chairman and members of the committee, I am Dr. Spencer M. Smith, Jr., Secretary of the Citizens Committee on Natural Resources, a national conservation organization with offices in Washington, D.C.

My statement in regard to H.R. 4671 will be brief and summary in nature. It would not be helpful to the Committee to recite again the documentation of a number of studies, with which we concur, generally relating to the economic feasibility o fthe proposed Marble and Bridge Canyon Projects. We understand further that the changes in the original measure, as indicated in Committee Print No. 19, represent an accord among the seven affected Western States. The Committee Print considers a number of additional projects in the Upper Colorado and authorizes and directs the Secretary of the Interior to prepare planning and feasibility reports with the objective of importing water into the Colorado system from outside the natural drainage area of that system.

Perhaps it would serve the convenience of the Committee if we were to simply recite our effort to understand the problem and to analyze the policies that seek to remedy it.

The very basic concern of the Western States is the inability of the Colorado River System to supply the water required in the several States affected and a most egregious problem is evident in the State of Arizona. The water needs of this State cannot be satisfied without a general agreement upon water allocation relative to the rest of the States involved. We have found it difficult to relate the need for water in the case of the State of Arizona to the proposals for the Bridge and Marble Canyon structures. It is our understanding that the contention by the proponents is to the point that these structures are to finance the acquisition of water. We should like to be understood that we have not opposed, nor do we now, the several States from obtaining needed water, nor do we dismiss as insignificant the problem that these States now face in light of existing water shortages and the augury of even greater shortages in the future. We do find, however, that the means proposed to finance the increased availability of water are not the best of all the considered alternatives. As we have indicated previously, no one has ever contended that either dam will add to the water resources directly. It is readily admitted, however, that even with the expected revenues the proponents see resulting from these two proposals, the water needs will become more acute as the Upper Colorado area is developed along the lines indicated in Committee Print No. 19. Neither the bill nor the proponents thereof have suggested that the total solution is in sight. Possible new sources of water appear to stem from the weather modification of cloud seeding, accelerated efforts in the conversion of saline water to fresh, and the importation of waters from the Columbia River Basin.

The financial effort needed to defray the expenses involved has been responded to by a number of statements to the Committee as to the effect of the Bridge and

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Marble Canyon proposals on the Lower Colorado River Basin Development Fund and as to the comparative contribution to that Fund of the alternative means of nuclear power. As I indicated earlier, it should not be our task to attempt a definitive response to these questions except to say that it appears to us that the use of nuclear energy is no longer a possiblity for the future but is presently a competitor with other means of generating electrical energy. The increase in the demand for nuclear plants is evidenced by the increased orders for last year and the further acceleration of that demand in 1966. Since the recommendations of the Bureau plan to use Marble Canyon as a peaking power plant, due to the increased revenues such a sale would bring, it appears to us that a serious hazard is evident in projecting the future market potential for such peaking power. Two factors seem to impinge most heavily upon the projections made by the Bureau, though the demand for peaking power will be sustained, in our judgment, the competition on the supply side of the market is already evident and future rates will be affected. Nuclear plants will undoubtedly have an impact on both the market for baseload power as well as peaking power. While these are separate markets, they are not unrelated. Over time a falling baseload rate will inevitably have an effect upon peaking rates. A nuclear plant will, in our judgment, be a spirited competitor in both markets. If one then projects a reduced price the posture of the present programs as to surplus revenues would seem to be affected adversely.

The comparison between the Marble Canyon Project and the alternative of nuclear power has been the subject of a significant analytical paper by Drs. Alan Carlin and William E. Hoehn of the Rand Corporation. They propose the location of the nuclear alternative at or near a load center thus saving the transmission and cooling water costs. Their study further emphasizes "* * * the lack of a meaningful relationship between the Central Arizona Project and the Marble Canyon Project * * * as the Bureau plans to operate Marble Canyon as a peaking facility while the Central Arizona Project needs base loaded power * * *". It is their conclusion that a nuclear alternative can generate the same electrical power as that attributed to Marble Canyon at a lower cost and that the differentials in favor of the nuclear alternative are greater if the same plant generates the power to the Central Arizona Project.

In considering the contributions to the Lower Colorado River Basin Development Fund by Marble Canyon it is difficult to conclude that the addition of the structure alone would add significantly to the revenues. Since the decision to include the net operating revenues at the end of the payout period for Hoover Dam and the same for the Parker and Davis Dams, the Lower Colorado River Basin Development Fund is increased significantly. The indication of the Bureau's statistics, as to the increase in the revenues to the Fund, is that these revenues are increased significantly by the addition of the Marble Canyon Project. Marble Canyon, however, is not responsible for the increased revenues of the Fund, as first inspection might conclude. The significant increase in Fund revenues occurs because of the contributions of Hoover and Parker & Davis Dams that accrue after their payout periods. Unless evidence not now apparent is presented, it does not appear that the Marble Canyon Project adds significantly revenues to the Fund.

It therefore appears to us that the problem of competition and its effect upon peaking power rates, the lower cost nuclear alternative, and the rather minimal contribution to the Lower Colorado River Basin Development Fund by the Marble Canyon Project are sufficient to argue against the proposal and to cause immediate consideration of a more efficient alternative.

Dr. SMITH. Mr. Chairman, our principal objection before this committee is the financial effort of the two dams, especially, in the terms of the amended bill, that would assume to pay for the cost of the acquisition of the water. I think that my principal concern is with the assumed price for peaking power, or the demand for peaking power.

There are two factions that seem to impinge most heavily upon the projections that are made by the Bureau. It is my judgment that the demand for both base load and peaking power will be sustained, but in our judgment, competition on the supplying side of the market

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is pretty evident already and future rates, probably, are going to be affected downward.

There are two concerns which seem to argue for an increase in prices of this kind of power. In the first instance, perhaps, general inflationary tendency of all prices which would, in turn, affect in part, the prices with which we are dealing here.

And, secondly, in all probability, the price of the water is going to be increased in these areas; and, therefore, the relative price cost might be up.

However, it seems quite apparent in terms of the money that is being lent, in terms of the interest that is being received for it, and in terms of the readiness to lend money for these particular purposes, that technology in all probability will overcome by a good bit these few inflationary features and drive down the price of the power.

In terms of peaking and base-load power, in the long, run over any particular period of time, 10, 15, 20 years, one of the most significant aspects is going to be that the base-load power rates, driven down significantly, will of course, always affect peak load ratios in the long run, but might not be so in the immediate sense. We feel very definitely that the trend is for certain lower prices as a result of competition by nuclear plants which, in our judgment, will be a big competitor in both markets.

I see that we have approximately 27 plants now. The Atomic Energy Commission predicted in November 1962, that these nuclear plants would be producing 5 million kilowatts in 1970, 40 million kilowatts in 1980, and the later estimate was recently revised upward by the Federal Power Commission to 68 million kilowatts in 1980.

I do not think that anything is particularly sacrosanct, but I think there is no argument that it will have an impact on the rates and that there will be significant competition.

I do feel, and there has to be a way and a better way than proposed by the present bill to affect the financing of water for Arizona. It appears that when the compact—or, when the bill is fully involved and the rivers made whole, that everyone is reasonably well taken care of, providing that there is water in the river, with the exception of Arizona, and we are, certainly, sympathetic to trying to work out ways to finance and get the necessary water for Arizona. We do not take the position that this is not significant, because it is crucial. Our complaint, primarily, is the means by which this it to be financed. That is the burden of my statement.

Mr. HALEY. Does that complete your statement?

Dr. SMITH. Yes, sir.

Mr. HALEY. The gentlemen from Colorado.

Mr. ASPINALL. I thank you very much for your statement. With all of the imponderables and with all of the talent and the experience that you have, you argue very conclusively against it.

Dr. SMITH. I have done so.

Mr. ASPINALL. Would you not like to have a final solution to this question of infringing upon the beauties of the Grand Canyon?

Dr. SMITH. You mean you dam it up and that is the end of it?

Mr. ASPINALL. No, dam it a little down below and let the rest of it alone, and to have no more consideration of Federal dams of any

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kind, reclamation of power or anything else. In other words, associated with this problem as long as you have been, are you not willing to compromise now?

Dr. SMITH. I would say that that issue is about to come up. Commissioner Dominy made some speeches in the West that killed that when he said, "Do not worry."

Mr. ASPINALL. Commissioner Dominy can't kill anything in the West or in the East or in the South or in the North when he desires to do so.

Dr. SMITH. I am responding to the chairman in terms of my own people, the people who pay me, so far, sir. The implication that Bridge Canyon was not dead technically is perfectly correct. All that was recommended by the administration was that it be deferred.

Mr. ASPINALL. You do not love it any more than I do, being a lover of the river. Would you not rather have the upper reaches of that river preserved rather than to have the lower reaches of that river for your purposes which you have in mind?

Dr. SMITH. My apologies for being greedy, but we want them both.

Mr. ASPINALL. In these matters, I think, that we have to consider the right of the majority who are involved in these matters. And we have to try to resolve them in terms of the rights of the majoriy at this particular time. We have to thing, also, in terms of the prospective majority in the future. I think that we can settle this if we will just make it a national riverway, through the canyon, through the monument, through the park, and all the way to Lee Ferry and we will give to the people of the United States the opportunity to use this part of the river as they see fit, so few of them can, because this is an arduous task, you know.

Dr. SMITH. This is.

Mr. Chairman, I probably will never be able to get into many of the inaccessible areas of the canyon. I am perfectly aware of that. This is one of the subjective elements that is very hard to qualify and very hard to express your point of view on. The chairman is completely familiar with our efforts during the wilderness hearings. We are not monolithic in what we feel recreation consists of.

There is one very strong theme, I think, that there are relatively few unspoiled places, and there is a very strong effort to maintain these, and to break lances with people when we argue this, because they can point to other areas that have become accessible to one means or another and more people enjoy them—there is no question about it. And if you are arguing the sciences as we have been arguing them, this is purely a subjective argument.

Thank you, Mr. Chairman.

Mr. HALEY. The gentleman from Pennsylvania.

Mr. SAYLOR. Dr. Smith, I want to say that if the chairman of the subcommittee and the full committee will go along with the national scenic rivers bill that I introduced, and the bill extending the boundaries of the Grand Canyon, the national monument—if they will go along with these bills, we would have this thing licked in a hurry.

Mr. ASPINALL. The gentleman has stated his extreme version. Maybe we can get a compromise, and if we can, I will agree with the gentleman.

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Mr. SAYLOR. There is nothing in your statement which I read that says you or your organization were opposed to the State of Arizona being given the right by statute to beneficial consumptive use of the waters to which the Supreme Court says they are entitled in the Colorado River.

Dr. SMITH. We did not oppose that at any time.

Mr. SAYLOR. You were in the room the other day when the Commissioner of Reclamation indicated that the two dams which you oppose, known as the paying partner or the bank account, will actually pay to build the central Arizona project. So far as diversionary works for Arizona itself are concerned, there are sufficient funds available from the surplus in the Hoover and Parker Davis Dams to take care of all of these costs. In other words, as I read your statement, you would like to see Arizona get its water, to put it to beneficial consumptive use, and these other features that are included in the bill be deferred and studied in time to come, is that correct?

Dr. SMITH. Yes, sir. We are very hopeful, in fact, we think it is mandatory that Arizona achieve an amelioration of its water problems. I think the very able and distinguished Representative from Arizona, Mr. Udall, indicated that if something was not done reasonably quick that Arizona will dry up and blow away. We, certainly, are not suggesting that that is what we want. We want quite the contrary. We are not arguing that for Arizona. We are saying that a far better means of finding it has been proposed. That is essentially our position.

I have, Mr. Saylor, as the chairman has suggested, studied the other side of some of these things, too, in the past, and I can tell you that the one thing that has always scared me was when got a case and we had to build it on a peaking power market. This is when you get butterflies in your stomach. You start to projecting the hope that the firm market will stay with you for the suggested life of the payout. The difficulty with using hydro installations for peaking power is the fact that it is highly inefficient in and to itself. You are using it part time. You have a tremendous fixed charge. It can be amortized at reasonable low yields. The most difficult thing is to watch that market because the market for that power starts to fall and if it does, you are dead.

The other problem, which is just as bad, is if you happen to hit a river that ebbs and flows pretty badly, when you sell your peaking power, you have not the water in the river to produce the peaking power. I do not know that this is a problem. I am not suggesting that is a problem here. I am simply saying that whenever you think of hydroelectric plants and you say, "We are going to use it for peaking power," I have always found, in my experience, that you are in trouble. I was very much more comfortable on the other side than when I was arguing for it.

Mr. SAYLOR. The Bureau of Reclamation indicates in their most optimistic treatment that the two dams would have a 35 percent load factor.

Dr. SMITH. That is correct; that is correct.

Mr. SAYLOR. I would ask unanimous consent that a letter from Peter W. Nichols, of Boulder, Colo., be made a part of the record at this point, and that a petition containing the signatures of 1,376 persons, most of them from Colorado, be placed in the files of the committee.

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Mr. HALEY. Without objection, the letter will be received as a part of the record at this point.

(The letter dated May 15, 1966, above referred, to follows:)

MAY 15, 1966.

HON. JOHN SAYLOR,
House of Representatives,
Washington, D.C.

MY DEAR MR. SAYLOR: Enclosed is a petition containing the signatures of 1295 people from forty-one states, the District of Columbia, Puerto Rico, and six foreign countries (Australia, Brazil, England, Canada, Mexico, and North Ireland) who oppose the construction of the Bridge Canyon and Marble Gorge dams in Grand Canyon. Most of these signatures were collected by the University of Colorado Hiking Club at a table set up in the Student Union during World Affairs Week, April 20, 21, and 22 when there were people from all over the world on the University of Colorado campus. An attempt was made to get people to give home addresses, but this was not always successful.

In addition there is a petition signed by eight-one students at Baseline Junior High in Boulder, Colorado giving a total of 1376 signatures.

The response to this petition and the literature we gave out about these dams was overwhelmingly favorable.

Any use you can make of these petitions will be appreciated. Letters will be sent to President Johnson, Secretary of Interior Udall, Governor Love of Colorado and the entire Colorado Congressional Delegation informing them of this petition and your possession of it. Let us know if there is anything else we can do. Thank you.

Sincerely yours,

PETER W. NICHOLS,

BOULDER, COLO.

Mr. HALEY. The petition will be made a part of the files of the committee.

The petition above referred to will be found in the files of the subcommittee.)

Mr. SAYLOR. This is just in support of Dr. Smith's position, not opposing the project of allowing Arizona to use water in the Colorado River.

Mr. HALEY. The gentleman is recognized.

Mr. UDALL. I have enjoyed what Chairman Aspinall has said. I would insert one point for the record, Mr. Chairman. We have heard a lot of talk about water shortage and there has been mention made of how little water comes down the river. The Bureau of Reclamation released a report the other day which indicated very startling information. We had the foresight in 1956 to build Glen Canyon Dam.

Dr. SMITH. What?

Mr. UDALL. To build Glen Canyon Dam. And if that dam had not been in existence, 6 million acre-feet of water would have been spilled out of Lake Mead since Lake Powell began storage. I thought this was very interesting.

Mr. ASPINALL (presiding). Mr. Hosmer.

Mr. HOSMER. You make reference to "the people who pay you." Who are the people that pay you?

Dr. SMITH. Well, this is a committee of natural resources which employs me as secretary. This organization was organized in December of 1954. It was organized as a lobbying organization. In January 1955, we started to file quarterly statements on what we did, how much money, where we spent it, to whom we spent it, and we have since filed these quarterly statements and at no time

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have we ever indicated in our appeals for funds to the general public, except as provided by the Department's regulations, that we have to say in there that any money that you give us cannot be deducted from your income tax, that we are not tax deductible, and the people who pay us are those who send $5 here and there. This morning, as a result of our stand on Grand Canyon Dams, I got a dime contained inside of an envelope. We will not spend a nickel for answering that. That boy will grow up. This is on the basis that we will take anything that we can get.

Mr. HOSMER. From anybody you can get it from?

Dr. SMITH. Yes. Nobody is going to pay any money to us, unless they agree with what we are doing.

Mr. HOSMER. I will ask unanimous consent that the Citizens Committee on Natural Resources submit to the committee the same data that we have heretofore received on membership and allocations of money from other organizations.

Mr. SAYLOR. Reserving the right to object. In view of the fact that the gentleman from Arizona objected the other day when I asked that the proponents of this legislation submit that same information, I will have to object to it.

Mr. UDALL (presiding). The objection is noted.

Mr. HOSMER. Dr. Smith, had that information become available, if it had, the information as to individuals and corporations who finance your organization, I understand that it would show that money comes in from sporting arms and ammunition manufacturers from the woodsy wildlife set and from the Edison family in New Jersey in about equal proportions.

Dr. SMITH. That is not a completely correct statement, Mr. Hosmer. We do get money from all of those sources, but I do not think in the proportion you have indicated. That information, of course, is filed with the Clerk of the House.

Mr. HOSMER. Do you want to correct what the proportion is?

Dr. SMITH. I will be very happy to do so. I do not have it offhand. It will vary from year to year.

Mr. HOSMER. You have used the phrase in your testimony, the phrase, "in our judgment." Who do you refer to when you use that phrase?

Dr. SMITH. The board of directors, sir—this is on the front of my testimony.

Mr. HOSMER. The sporting arms ammunition people and the others mentioned are not economists and public utility people, are they?

Dr. SMITH. The sporting goods people are not even on our board of directors, sir.

Mr. HOSMER. Is anyone on your board of directors who are in the power business, may I ask?

Dr. SMITH. In the nuclear power business; no.

Mr. HOSMER. May I ask if there is anybody on your board of directors from the public utility business, the electric public utility business?

Dr. SMITH. Not at this time; no.

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Mr. HOSMER. Then, this judgment of your board of directors, relative to these matters of nuclear power and electrical economics, are laymen judgments?

Dr. SMITH. Not entirely, sir. Our board of directors, just like any other corporate board of directors, hire people who have some expert judgment in these fields. We have done it.

Mr. HOSMER. They hired you?

Dr. SMITH. Yes, sir.

Mr. HOSMER. And what is your doctorate in?

Dr. SMITH. Economics.

Mr. HOSMER. And who else do they hire to give them advice on this?

Dr. SMITH. Last summer we hired a hydrologist for a short period of time. I cannot remember his name at the moment. I will supply it. We have been in consultation with Dr. Raushenbush at great length, whom the committee will hear from later.

Mr. UDALL. He is scheduled to be heard this morning.

Dr. SMITH. He is scheduled to be the next witness, yes.

Mr. HOSMER. He is from the National Parks Association. I really do not see any expertness behind the judgment of the board of directors relative to the contention that the price of electric power will drop in the years to come, or the matter of the use of hydrodams for peaking power, which is becoming increasingly a practice of the utilities industry, despite what your testimony says.

Dr. SMITH. Yes, it is. I think that at the present time, Mr. Hosmer, that when you say there is an increasing reason, they are driven to that, because of the flow of the river, and I think it is accompanied with significant hazards. I think that the power department of the City Bank of New York reflects that very carefully in their loaning policies. I think one of the factors is that. I heard your colloquy with other witnesses. I think all your questions were appropriate. When I say nuclear energy, I am not suggesting that it will walk in, but I am saying that it will be of significant impact on the market.

Mr. HOSMER. Is it not a fact that there has not been and there is not under contemplation any nuclear electric plants by any public or private utility for peaking power?

Dr. SMITH. I did not get the word before "peaking power."

Mr. HOSMER. On any public or private utility system for the purpose of peaking power?

Dr. SMITH. There is none, to my knowledge.

Mr. HOSMER. They are all baseloads?

Dr. SMITH. They are all baseload plants, yes.

Mr. HOSMER. In suggesting that nuclear alternative, are you suggesting that the U.S. Government is going into the nuclear power business as a sideline to finance this particular project and others like it?

Dr. SMITH. No, I am not suggesting that. The purport of my argument——

Mr. HOSMER. Who would build these nuclear power plants that you have hypothesized?

Dr. SMITH. Unless an act of Congress—unless the act is changed, it would be my assumption that it would be built by private investors.

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Mr. HOSMER. And then, except only insofar as taxes on private investors would provide a flow of funds into the Treasury for these necessary particular projects, they would not be financed.

Dr. SMITH. I am not suggesting that.

Mr. HOSMER. Are you suggesting that it come from the Public Treasury?

Dr. SMITH. Unless it was a Government plan that you could reap any benefit out of. I'm simply saying that the presence of heavy investments in this particular area are going to have an impact on the market price, both baseload and peaking power prices.

Mr. HOSMER. The difficulty that I have with your testimony is that you say that "in our judgment" it is going to have an impact on the price of power, but you say that you canot qualify it. You do not come up with any projections as to the cost of nuclear power and other types of power over the next 100 years, with which to justify your statements. It is a horseback opinion that prices will go down. We have in the Joint Atomic Committee an indication that after 1970, there will be a drastic rise in the price of uranium, and that is going to be factored into the cost of nuclear power. Inevitably, that will be reflected in the cost of the installation of the plant. All of the basic information that this committee, which is expert in the field, has been able to accumulate, is against the theory that the price will go down.

Mr. SAYLOR. Will you yield at that point?

Mr. HOSMER. Yes.

Mr. SAYLOR. I just hope that the next time that we have a bill out of your committee on the floor of the Congress that you will make that same statement.

Mr. HOSMER. That statement is made in the context of all sorts of electricity—being subject inevitably to cost escalation or, conversely, inflationary forces.

Dr. SMITH. I am aware of that regarding inquiries in the prices for uranium. I should say, also, that one of the reasons that I have not documented this, in the first place I did not feel that the committee should necessarily be burdened with essentially the same information that it had previously had.

Secondly, I am engaged at the present time with Mr. Fosdick, who is consultant to the Atomic Energy Commission, in a nationwide study. I had hoped to have some preliminary data and statistics available for this hearing, but I have not, since Mr. Fosdick is now consulting with the Senate Interior Committee and he is a little bit tied up as to time that he can devote to this. We have had this underway for some period of time. I am somewhat persuaded to the extent that many of the banking firms and banking houses are supplying money at what, to me, in terms of rates of risk for installations of atomic nuclear power facilities, are favorable, it has been my reaction, generally, that bankers usually do not move into an area such as this unless they are reasonably confident that this thing will go and be significant. I feel, even though the cost of uranium is going up in terms of the total amount of fixed charges that would be involved, uranium prices could escalate considerably and still have a favorable end result of power delivered from a nuclear installation.

So I do not say that these are necessarily inconsistent.

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Mr. HOSMER. I say that your argument is not necessarily supported, inasmuch as the loans to utilities has always been one of the best places in which investment bankers have been putting money particularly, in terms of very high interest rates in which we find ourselves in today.

We want to get through, I understand, by noon. So, I will reserve the balance of my time.

Mr. UDALL. The gentleman reserves the balance of his time. The Chair recognizes the gentleman from Idaho.

Mr. WHITE of Idaho. I want to say that I am very much appreciative of your testimony. And I want to concur in the opinion of the full committee.

Mr. UDALL. The gentleman from California.

Mr. WYATT. I have no questions.

Mr. UDALL. Mr. Skubitz.

Mr. SKUBITZ. I have no questions.

Mr. UDALL. Mr. Foley.

Mr. FOLEY. No questions.

Mr. UDALL. Thank you very much, Dr. Smith, for your helpful articulate, constructive statement. [Laughter.]

The final witness scheduled today is Mr. Stephen Raushenbush, consultant, National Parks Association.

Mr. RAUSHENBUSH. May I ask that the statement that I submitted last week be incorporated in the record?

Mr. UDALL. You refer to the statement that you submitted last week. This is the one dated May 12, 13, 14, 1966, consisting of four pages, with several tables attached?

Mr. RAUSHENBUSH. Yes, sir.

Mr. UDALL. Without objection, this statement and the tables attached will appear in the record as if read, and Mr. Raushenbush, I recognize you to summarize your statement.

(The prepared statement of Stephen Raushenbush, above-referred to, follows:)

STATEMENT ON H.R. 4671 SUBMITTED ON INVITATION BY STEPHEN RAUSHENBUSH, CONSULTANT TO NATIONAL PARKS ASSOCIATION

My name is Stephen Raushenbush. I reside in Washington and am consultant to the National Parks Association, which has headquarters here. I had some years of experience in the review of river basin problems on the Columbia and Missouri and other rivers in the Office of the Secretary of the Interior, 1939–1948. I gained some knowledge of Bureau of Reclamation procedure, practice and payout studies at that time.

The National Parks Association requested me to accept the invitation of this Committee to present data bearing on conservation matters.

The National Parks Association is an independent, private, non-profit, public-service organization, educational and scientific in character, founded in 1919 by Stephen T. Mather, first Director of the National Park Service. It has a membership of over 33,000 persons throughout the United States and abroad. It publishes the monthly National Parks magazine, received by all members. Its responsibilities include the protection of the great national parks and monuments of America and the protection and restoration of the natural environment generally.

1. I wish to express strong awareness of the need of funds, a "cash register" for the Central Arizona project. I believe that the water users in that State and

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the Pacific Southwest need help badly. I do not enjoy seeing the conservation organizations being portrayed as ignoring their need for water or funds. They ignore neither one.

2. I wish to suggest to this Committee of the House and to the water users that the latter may be disappointed in the functioning of one cash register which has been proposed, Marble Canyon. They might get much more within 70 years out of a nuclear plant at load center.

I claim no particular competence in the field of nuclear economics. However, I have tried conscientiously to estimate all costs on the basis of known data and to examine the relative efficiency as a "cash register" of a nuclear plant at load center, un-burdened by an $81 million transmission investment, and Marble Canyon, in the event of a decline in peaking power prices.

The hope for Marble Canyon as a peaking power plant is that the 6 mill current rate will hold up, or something very close to it, over the 50 years in which it has the task of paying out its investment. But power rates change rapidly. The 4.2 mill firm power rate for Marble Canyon looked excellent to the Bureau two years ago, but now is labelled noncompetitive. The power technology is moving so rapidly that one agency believes the cost of power produced by nuclear plants will drop with their increased size by 23% within the single decade 1970–80. The potential of nuclear desalting plants with vast amounts of surplus energy to sell has brought an estimate from another agency that some power costs may drop 45.7% in that one decade.

What will happen to the hopes of the water users for a cash register if peaking power prices go down, even much more gently, over the first 30 years of the payout period? To answer that question I have assumed a price decline amounting to 22% over those 30 years, then a plateau for the next 40.

Under the expected investment and operation costs of Marble Canyon and those in the Carlin-Hoehn report for an equivalent 600,000 kw nuclear plant at load center, also used for peaking, the following results seem to be indicated: [1]

[1] Tables I and II are estimates of surplus. Tables III and IV give cost figures.

	Marble Canyon	Nuclear plant at load center	Difference
50-year surplus without interest	−$25, 520, 000	$93, 307, 000	$118, 827, 000
70-year surplus without interest	117, 234, 000	145, 957, 500	28, 723, 500

In case the LCRB Fund is permitted to accumulate interest on these contributions of the power users in the area, the plant which has the lowest charges for the 50 year pay out period and the highest surpluses for the earlier years will show a marked advantage. That comparison is as follows, including interest accumulated from the end of every period at 3%.

	Marble Canyon	Nuclear plant at load center	Difference
50-year surplus with interest	−$13, 799, 100	$188, 827, 800	$202, 626, 900
70-year surplus with interest	129, 955, 000	402, 540, 000	272, 585, 000

With and without interest, the figures indicate the possibility that, in case prices of peaking power drop in the early years, a nuclear plant would be much less vulnerable to that shock, and would produce more for the water users than Marble Canyon. Without interest on surplus they may have $28 million more at the end of 70 years, with interest $272 million more.

These figures present a prima facie case of a difference which should be exceedingly important to the water users of the area. They are not presented as definitive. The hope of the National Parks Association is that the Committee, which is interested in the welfare of the water users of the area, will call on the nuclear economists and physicists in the various government agencies, the AEC, the Office of Science and Technology, the TVA and Federal

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Power Commission to apply Bureau of Reclamation procedures to such a comparable nuclear plant at load center, and check these figures, given a 30 year decline in prices of peaking power which seems to them reasonable. This could be done in a matter of two months.

It may also be noted here that the nuclear plant at load center might be constructed and begin operation within three years, while Marble Canyon would not only take three years to construct but might take several more years to fill its reservoir, in case dry years occur at the time. The water users might obtain a two year advantage from this difference.

The findings by conservation groups regarding both Marble and Bridge Canyons have already been put into this Committee's record. It is not necessary to prove that this nuclear alternative is far more profitable than Marble Canyon; it is only necessary to show that it is an equally efficient cash register. The objections to Marble Canyon on conservation grounds should then be given the full weight which they deserve.

TABLE I.—*Cash register comparison "A" surplus without interest (years 1 to 70)* [1]

[Declining prices]

Period (years) (1)	Price (mills per kilowatt-hour) (2)	Cost per kilowatt-hour sold (mills) (3)	Difference (2—3) (mills) (4)	Amount sold (billion kilowatt-hours) (5)	Surplus or deficit excluding interest (period) (6)
	1. Marble Canyon surplus accumulation				
1 to 7	6.00	5.40	0.60	13.65	$8,190,000
8 to 14	5.64	5.40	.24	13.65	3,276,000
15 to 21	5.30	5.40	—.10	13.65	—1,365,000
22 to 28	4.98	5.40	—.42	13.65	—5,733,000
29 to 35	4.68	5.40	—.72	13.65	—9,828,000
36 to 50	4.68	5.40	—.72	29.25	—21,060,000
50-year deficit					—26,520,000
51 to 70	4.68	.994	3.686	39.00	143,754,000
70-year surplus					117,234,000
	2. Nuclear plant at load center, surplus accumulation				
1 to 7	6.00	4.12	1.88	13.65	$25,662,000
8 to 14	5.64	4.12	1.52	13.65	20,748,000
15 to 21	5.30	4.12	1.18	13.65	16,107,000
22 to 28	4.98	4.12	.86	13.65	11,739,000
29 to 35	4.68	4.12	.56	13.65	7,644,000
36 to 50	4.68	4.29	.39	29.25	11,407,000
50-year surplus					93,307,500
51 to 70	4.68	3.33	1.35	39.00	52,650,000
70-year surplus					145,957,500

[1] Estimates of annual capital charges and operating and maintenance and interim replacement costs on tables III and IV.

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TABLE II.—*Cash register comparison "B" surplus with interest accumulated by periods*[1] *(years 1 to 70)*

[Declining prices at 3 percent annually]

Period (years)	Surplus or deficit, end of period	Principal	Interest factor	Interest	Cumulative surplus	End year interest period
	1. Marble Canyon					
1 to 7	$8,190,000	$8,190,000	0.23	$1,887,700	$10,077,700	(14)
8 to 14	3,276,000	13,353,700	.23	3,070,300	16,424,000	(21)
15 to 21	−1,365,000	15,059,000	.23	3,463,600	18,522,600	(28)
22 to 28	−5,733,000	12,789,600	.23	2,941,600	15,731,200	(35)
29 to 35	−9,828,000	5,903,200	.23	1,357,700	7,260,900	(50)
36 to 50	−21,060,000	[2]−13,799,100				
50-year deficit					−13,799,100	
51 to 70	143,754,000				143,754,000	
70-year surplus					[3] 129,955,000	
	2. Nuclear plant at load center					
1 to 7	$25,662,000	$25,662,000	0.23	$5,902,200	$31,564,200	(14)
8 to 14	20,748,000	52,312,200	.23	12,031,800	64,344,000	(21)
15 to 21	16,107,000	80,451,000	.23	18,503,700	98,954,700	(28)
22 to 28	11,739,000	110,693,700	.23	25,459,500	136,153,200	(35)
29 to 35	7,644,000	143,797,200	.23	33,073,300	176,870,500	(50)
36 to 50	11,407,500	188,827,800	.80	151,062,200	349,890,000	(70)
50-year surplus					188,827,800	
51 to 70	52,650,000				52,650,000	
					349,890,000	
70-year surplus					402,540,000	

[1] The surplus calculated is based on the end of each period of years, not on each individual year in which part of it is earned.
[2] No penalty interest on this deficit is included.
[3] Rounded.

TABLE III.—*Marble Canyon costs per kilowatt-hour sold, years 1 to 70*

Plant: 600,000 kilowatts; 37 percent plant factor. Sales 1.95 billion kilowatt-hours annually.

Investment: $239 million in year 1, including transmission line investment of $81 million. No major replacements years 1 to 10.

Allocation estimate:

Interest bearing: 80 percent.
Noninterest bearing: 20 percent.
Annual capital charges: ($239,000,000[1]).

$191,200,000, 50-year repayment at 3.25 percent (4 percent)	$7,648,000
$47,800,000, 50-year repayment without interest	956,000
Total	8,604,000
Mills per kilowatt-hour sold	4.412
Annual operation, maintenance, replacement costs[2]	$1,939,000
Mills per kilowatt-hour sold	0.994
Total annual costs years 1 to 50	$10,539,000
Mills per kilowatt-hour sold (say 5.4)	5.406
Annual costs years 51 to 70[3]	$1,939,000
Mills per kilowatt-hour sold	0.994

[1] Excluding interest during construction, given as $20,174,000 on a reimbursable investment of $237,573,000 in Supplemental Information Report on Marble Canyon Project, Bureau of Reclamation, January 1964, p. 25.
[2] Given as $2,330,000, including $391,000 for purchased energy, or $1,939,000 without that purchase, in the same report, p. 20.
[3] Assuming no major replacements requiring additional funds in years 51 to 70.

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TABLE IV.—*Nuclear plant at load center, costs per kilowatt-hour sold, years 1 to 70*

Plant: 600,000 kilowatts; 37 percent plant factor. Sales 1.95 billion kilowatt-hours annually.

Investment:

$82,200,000[1] in year 1 ($137 per kilowatt) including interest during construction.

Major replacements: Year 36: $50 million (repayable years 36 to 50); year 50: $32,200,000 (repayable years 51 to 70).

Total 70-year investment: $164.4 million.

Annual capital charges by periods:	
(A) Year 1 to 35: New capital, $82,200,000:	
80 percent interest bearing: $65,760,000, 35-year repayment at 3.25 percent (4.83 percent)	$3,176,000
20 percent noninterest bearing: $16,440,000, 35-year repayment	470,000
Total	3,646,000
Mills per kilowatt-hour sold	1.870
(B) Year 36 to 50: New capital, $50,000,000:	
80 percent interest bearing: $40,000,000, 15-year repayment at 3.25 percent (8.53 percent)	3,312,000
20 percent noninterest bearing: $10,000,000, 15-year repayment	667,000
Total	3,979,000
Mills per kilowatt-hour sold	2.040
(C) Year 51 to 70: New capital, $32,200,000:	
80 percent interest bearing: $25,760,000, 20-year repayment at 3.25 percent (6.88 percent)	1,773,000
20 percent noninterest bearing: $6,440,000, 20-year repayment	322,000
Total	2,095,000
Mills per kilowatt-hour sold	1.074
Annual operation, maintenance, and replacement costs:[2]	
Fuel costs:	
Power production	2,675,000
Stinning reserve	355,000
Operation, maintenance, and replacement	1,050,000
Insurance	310,000
Total	4,390,000
Mills per kilowatt-hour sold	2.252

[1] The Carlin-Hoehn estimate is $81,200,000, "Is the Marble Canyon Project Economically Justified?" February 1966, table 1, p. 19.

[2] The Carlin-Hoehn estimates ranged between $4,080,000 and $4,700,000 for noncapital costs. An average of $4,390,000 has been adopted from that report, p. 22, table 3.

TOTAL COSTS PER KILOWATT-HOUR SOLD, BY PERIODS

[Mills]

Year	Capital	Operation, maintenance and replacement	Total	Rounded
1 to 35	1.870	2.252	4.122	4.12
36 to 50	2.040	2.252	4.292	4.29
50 to 70	1.074	2.252	3.236	3.33

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TABLE V.—*Official estimates*

(1) NUCLEAR FUEL COSTS [1]

	Mills per kilowatt-hour
1967	1.8–2.1
1970	1.5–1.9
1975	1.2–1.6
1980 [2]	1.0–1.4

(2) PROJECTED RANGE IN NUCLEAR GENERATION COSTS [3]

Year plant placed in service	1967	1970	1975	1980
Normal plant output, kilowatts	300,000	500,000	1,000,700	1,200,000
Range in generating cost (at busbar) mills per kilowatt-hour [4]	5.4–6.0	4.3–5.0	3.5–4.1	3.2–3.8

(3) POWER VALUE (*Cost of power for least cost alternatives*) [5 6 7]

[Mills per kilowatt-hour]

1970	1975	1980
5.6	4.3	3.5–2.8
5.6	3.6	3.1–2.8
5.2	3.8	3.1–2.8
5.4	4.0	3.1–2.8
----------	4.3	2.8–2.8

[1] National Power Survey, Federal Power Commission, 1964, part I, table 31, p. 88.
[2] The average of the ranges 1970–75–80 is 1.433.
[3] National Power Survey, Federal Power Commission, 1964, part I, table 32, p. 89.
[4] These decreases are 23 percent from 1970 to 1980 for the low part of the range and 24 percent for the high part.
[5] "Large Nuclear-Powered Sea Water Distillation Plants," Office of Science and Technology, March 1964, table IV, p. 10.
[6] The 10-year reduction in averages, 1970–98 is 45.7 percent. The figures cover various sizes and types of plants.
[7] Average 1970, 5.45; 1975, 4.00; 1980, 2.96.

STATEMENT OF STEPHEN RAUSHENBUSH, CONSULTANT, NATIONAL PARKS ASSOCIATION

Mr. RAUSHENBUSH. Mr. Chairman and members of the committee, I would like to say only five things to this committee at this late stage in these hearings.

In the first place, I claim not expertness in nuclear economics or engineering. I am only presenting a prima facie and comparison, based on data vouched for by others.

Secondly, Marble Canyon may not be a large revenue producer for the Lower California River Basin fund in case prices of peaking power go down considerably. Power prices, including peaking power prices, are expected to go down as larger nuclear plants come on stream. And my table 5 gives estimates on that. Since the payout had to be made over 50 years, such decreases are important. In my illustration of the effects of a 22-percent drop over 30 years, Marble Canyon shows a deficit of $26 million at the end of year 50. However, once it is written as capital charges, it shows a surplus of about $117 million in year 70. And that is after capital costs have been paid off.

And, third, a nuclear plant as comparable as possible shows a 50-year surplus; that is, as comparable as I have been able to make it,

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under the same declining power prices of $93 million, and a 70-year surplus of about $146 million. The figures, themselves, are less important than the contrast between the deficit in the one case, and the $93 million surplus in the other.

Fourth, the National Parks Association recognizes the burden thrust on the committee by the recent evidence concerning the lower costs of nuclear plants, and the statements that Bridge and Marble are uneconomic, because they can claim no competitive power benefits. But I think it was the gist of both the testimony of Mr. Carlin and Mr. Moss the other day.

The National Parks Association, consequently, urges the committee to call on the economists and experts in nuclear development in the Atomic Energy Commission, the Office of Science and Technology, the TVA, and the Federal Power Commission, to answer the questions raised in the record about the expected performance of a comparable nuclear plant at load center, unburdened by $81 million invested in transmission lines. We do not believe that they would take more than 2 months to do this.

The fifth point and, perhaps, the most important point, and this was added since listening to the testimony just last week, the testimony of Mr. Moss, a nuclear engineer, last Friday convinced me that a small nuclear plant, operated like Marble Canyon at 37 percent plant factor, was a most inefficient operation, although superior to Marble Canyon in contributions to the fund; that the unused 63 percent ought to be sold as secondary, or used for pumped storage. This gets into more plants than the Lower California River Basin fund needs, in order to accumulate its desired surplus by years 50 and 70. The Federal Power Commission estimates that a large plant can probably operate at 1.15 mill lower costs than a smaller one, the size we are talking about here. Here is already a difference of $136,250,000, on 50 years' sales of peaking power.

This does not allow for the increased revenue from a pumped storage plant using the secondary power from a nuclear plant, available when it is not peaking.

Under these circumstances, the National Parks Association suggests it may be desirable for the committee, which is interested in increasing the Lower California River Basin fund, to see whether the larger utilities in the Arizona-California area would not, under certain circumstances, be willing to enter into a contract with the Bureau of Reclamation or the fund to supply the fund with between 10 and 25 percent more revenues than could possibly come from Marble Canyon over either 50 or 70 years.

To obtain such an increase for the fund, the contract might properly include an interest-free loan of exactly the same amount as the Bureau of Reclamation would have obtained for Marble Canyon, repayable in 50 years. In my particular illustration, it is $48 million, which might be a little bit off if the Bureau wanted more interest for the money for that plant. The utilities are handicapped by an interest charge on borrowed funds higher than 2 percent than that of the Bureau. However, this would apply to only the remaining part of their investment. On the other hand, they would have going for them these factors:

(1) The probable drop in peaking price, which will reduce the expected surplus from Marble Canyon;

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(2) The current Westinghouse-General Electric guarantee of construction costs as low now as $100 per kilowatt for the Dresden III plant;

(3) The Federal Power Commission estimates that nuclear fuel costs will drop by seven- or eight-tenths of a mill between now and 1980—a matter of $68,250,000 on sales over 50 years;

(4) The increased efficiency of a larger plant already referred to over a 600,000-kilowatt plant; and

(5) The efficient use of off-peak power to pumped storage.

It seems possible that they could, under a contract, under certain conditions, guarantee to contribute between 10 to 25 percent more to the fund than Marble Canyon, and make an acceptable profit at the same time. Very probably the larger private utilities in the area, with their wider access to growing markets and their own long-distance transmission lines, could do better by the fund than others. No issue of reducing rates to consumers is involved here.

Incidentally, the Government investment, in the case of such a contract, would be about one-fifth of the Marble Canyon requirement, possibly less.

Thank you.

Mr. UDALL (presiding). Thank you, Mr. Raushenbush.

The gentleman from Idaho.

Mr. WHITE of Idaho. Thank you very much, Mr. Chairman.

Mr. Raushenbush, I would like to ask you a question similar to the one that Mr. Hosmer was directing to the previous witness. You said that you gained some information from the Bureau of Reclamation on payout studies at that time when you were reviewing river basin problems in the Columbia River and the Missouri River. What is your background, sir, in education?

Mr. RAUSHENBUSH. I do not have a degree outside of an B.A. I have done some postgraduate work. I have made myself, if you will, something of a statistician, something of an economist. I have written somewhat about the utility problems. I was appointed in 1939 in the Office of the Coal Division, then moved over to the Secretary's Office as Chief of a branch of economics.

Mr. WHITE of Idaho. It is quite evident from your testimony and your extemporaneous remarks, that you do have quite a background. I was wondering what your basic experience had been, and why you had testified in this matter with respect to the particular type of construction. Is this not, however, a secondary argument that you are developing with respect to the construction of these dams, and the basic reasons for this, more or less, on the conservation of park areas, rather than your knowledge of the cost of peaking production?

Mr. RAUSHENBUSH. Mr. White, we were told—we were instructed by the committee not to repeat testimony previously given, and at the last hearing, the fall hearing of committee, Mr. Anthony Wayne Smith, president of the National Parks Association, spoke at some length on the conservation element. At the same time, this organization is very aware of the need of Arizona for water and the need to provide a cash register of some sort and felt that it could obtain its other objectives of not having dams in the river if it could find some way of suggesting to the committee that there was some other alternative, in other words.

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Mr. WHITE of Idaho. And you feel that you have done so, and that you have the expertise in this area?

Mr. RAUSHENBUSH. I have some expertise in this, although it has been 18 years since I dealt with these matters.

Mr. WHITE of Idaho. You feel that you have some expertise in this matter?

Mr. RAUSHENBUSH. Yes, 18 years. I think that I have sufficient expertise to draw up a payout table, to equalize the two plants, to use them for rough illustration. I have not time to do the detailed payout with the interest accumulation every year, but I do think that I have the comparable, so that if you change any one figure on one, you can probably, by changing the equivalent figure on the other, would come out with about the same results.

Mr. WHITE of Idaho. This is to augment previous testimony of your association, more specifically to treat with the various factors as to power production and relative feasibilities and payouts, and so forth, on the river?

Mr. RAUSHENBUSH. Yes, sir; but, also, of a sincere interest. I have felt for some time now that Arizona has been the underdog in this matter. They have not gotten the water that they had a right to a long time ago. And now they are being held up for various reasons. And it seems important that I was not aware of the testimony that was cited this morning that Mr. Dominy said that money was not needed. I was going on the assumption that they needed it for the cash register. And, inasmuch as this thing came out of what I had suggested, at this point, came out of the Moss-Carlin testimony last week, I thought that it was, probably, something to consider.

Mr. WHITE of Idaho. What you are saying is that you feel that there is a need for the central Arizona project and the financing of that project, and you are suggesting that there are other ways of financing it?

Mr. RAUSHENBUSH. Yes, sir. Which we hope the committee will consider.

Mr. WHITE of Idaho. That we should consider the nuclear production of power for peaking loans, rather than hydro?

Mr. RAUSHENBUSH. The point that Mr. Moss has made, if you care to take a look at his testimony, was that the off-peak power on a plant that was basically dedicated to peaking power, could be used for pumped storage, and then create additional peaking power in a very efficient way, and it occurred to me that this was something that was too elebaroate for anything but private utilities, but I am convinced, sir, of the drop in power costs. Just look back 2 years ago when Mr. Dominy was here, in all sincerity, saying that firm power was all right for Marble Canyon, that the prices changed with the new technology, and now it cannot survive, at that, so that it switched over to a peaking plant. This looked to me as evidence of change.

Mr. WHITE of Idaho. Your motivation was to forestall the construction of the dams on the river?

Mr. RAUSHENBUSH. That is the basic thing.

Mr. WHITE of Idaho. I have no more questions.

Mr. UDALL (presiding). We have sufficient time to permit Mr. Saylor to ask some questions.

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Mr. SAYLOR. The other day I made a unanimous-consent request which the gentleman from Arizona objected to, and this morning, as a result of that, he found himself boxed in when he would like to get some information into the record. I will again make my unanimous-consent request, if the gentleman from Arizona with withdraw his objection, I am sure that I will withdraw mine.

Mr. UDALL (presiding). The chairman is unable to accommodate the gentleman's request and regrets it very much.

Mr. SAYLOR. It is just one of those situations of, what is sauce for the goose is sauce for the gander.

I just want to say that it is always good to see you. I am delighted to have you in front of us. For the benefit of the committee, in the room just a few minutes ago there were two gentlemen, Dr. Meredith Gourdine and Mr. Milton Packin, who happened to have just received a large contract by the Department of the Interior in the field of coal research, where they have now determined that it is perfectly feasible to make electricity right from coal without generating steam. This being the case, the Department of the Interior finds itself in a rather embarrassing position on the one hand, with the Bureau of Reclamation up here asking us to spend millions upon millions of dollars for hydroelectric plants and, at the same time, spending a large sum for coal research in an effort to produce electricity which, if Dr. Gourdine is successful, will produce power at a great deal lower rate than even the Bureau of Reclamation can dream of. This is rather anomalous situation that you should find yourself in the chair at a point where I have to call this situation to your attention.

Mr. UDALL (presiding). This is not the first anomalous situation that the gentleman from Arizona has been in. [Laughter.]

Mr. SAYLOR. Nor if he continues his present policies, will it be the last. [Laughter.]

There is nothing that the National Parks Association, or the group that you represent, either in your statement or in your own personal opinion, that would prevent or stand in the way of Arizona being given the right to take water from the Colorado River and put it to beneficial consumptive use in Arizona, so long as they do it without constructing these two dams?

Mr. RAUSHENBUSH. We, certainly, want to get that water to support their construction.

Mr. SAYLOR. The reason I asked that question is that there are a number of people in the West who have maintained that those of us who have taken any position except complete agreement with every provision in the bill are all in opposition to this bill and are opposed to Arizona getting its water. I am delighted to hear both you and Dr. Smith make that statement, because this is the position that I have taken over the years. I was one, who back in 1951, made the motion to send the case to the U.S. Supreme Court. And I am satisfied that Arizona is entitled to its water. I do not want to see them burdened with all of these other matters in an attempt to get water from the river.

Thank you.

Mr. RAUSHENBUSH. If I could, Mr. Saylor, just add one little comment to what you have said. I am impressed by this. I mentioned

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when you were out of the room, that I had not heard Mr. Dominy say this, that if you want a very simple way of doing all of this, once you are convinced, as I am, that prices are going to go down in Marble Canyon, that it is going to have a very tough time piling up a surplus and then the simplest way to get a large addition to the lower Colorado Basin fund is not even the one that I suggested to the private utilities in the area—it is simply to take the sum that the Bureau would give interest free for the construction of Marble Canyon, say, $50 million, and turn it over to the fund and let the fund put it in a savings account at 4 percent interest. And you know what that would be at the end of 50 years. That would be a fantastic sum. I can tell you exactly what it would be. If you took $50 million, it would be, at the end of 50 years, and you would deduct the payback, the $50 million, it would leave you with still $305 million. If you want to do it on a 70-year basis at 4 percent, that sum would be 2.19 times larger and you would have at the end of 70 years, $668 million. That is a very simple way of doing it. It breaks away somewhat from our past thinking that you have to have construction, but if you really want to get money into the fund, something in the neighborhood of $305 million more than the Marble Canyon can contribute, or $668 million at the end of 70 years, simply appropriate that one fund and put it out at compound interest.

Mr. SAYLOR. I will say, Mr. Raushenbush, that this idea of something new is completely unheard in the Bureau of Reclamation. They are so stereotyped that if anybody down there got a new idea they would immediately deny it, because it would cause the people down there to use the gray matter between their ears, and this is completely contrary to the rules and regulations.

Mr. UDALL (presiding). The Chair asks unanimous consent for the staff to insert at the appropriate place, a memorandum by Mr. Paul L. Billhymer, general counsel of the Upper Colorado River Commission, dated April 5, 1966. Is there any objection? Hearing none, it is so ordered.

(The information above referred to will be inserted in the record as stated. See page 1065.)

Mr. UDALL (presiding). The subcommittee will stand in recess until 9:45 tomorrow morning.

Whereupon, at 12:10 p.m., the above subcommittee adjourned, to reconvene at 9:45 a.m., Thursday, May 19, 1966.)

(Subsequent to completion of the hearings the following letters and telegram were determined to be appropriate for inclusion in the record:)

MAY 20, 1966.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs, Washington, D.C.

DEAR MR. ROGERS: I wish to offer further information on proposals for the Hooker Dam and Reservoir in New Mexico which has been recommended for construction by the Bureau of Reclamation as part of the Lower Colorado River Basin project. The Hooker project would be authorized by H.R. 4671 and related bills now being considered by the Subcommittee on Irrigation and Reclamation. We respectfully request that this letter be made part of the official printed record of the Subcommittee hearings on H.R. 4671 and related bills.

The Wilderness Society is a national conservation organization of some 35,000 members, maintaining headquarters at 729 15th Street, N.W., Washington, D.C.

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The broad purpose of the Society is to increase knowledge and appreciation of wilderness and to work through educational programs for its preservation and appropriate use.

I testified on behalf of the Society last September in opposition to the Hooker project and the Bridge Canyon and Marble Gorge Dams. I offer further testimony at this time because of new information on the Hooker project which has become available to the Society which we wish to bring to the Subcommittee's attention. I wish also to re-emphasize the Society's opposition to the Bridge Canyon and Marble Gorge projects because of their impact upon the natural features of the Colorado River and the Grand Canyon and the precedent which their construction would set for future violations of the National Park System.

HOOKER DAM

The Wilderness Society's interest in the proposed Hooker project stems from a long-standing concern for the protection of the Gila Wilderness Area and the Gila Primitive Area. Establishment of the Gila Wilderness in 1924 by the Forest Service marked the beginning of the National Forest Wilderness System. The leading advocate in this effort was Aldo Leopold. He was instrumental in bringing about the establishment of this unit which has become one of our Nation's most famous Wilderness Areas. As a great philosopher and authority on forestry, and wildlife, he is known to all who are familiar with conservation. As a pioneer in these fields and in wilderness preservation, he was the first to succeed in gaining the formal dedication of National Forest land as wilderness. In 1964, upon passage of the Wilderness Act, the Gila Wilderness Area became part of the National Wilderness Preservation System.

The Hooker project as presently proposed in the legislation before this Subcommittee would flood back into the Gila Wilderness Area. According to the Bureau of Reclamation, the exact site and full-pool elevation of the Hooker reservoir are yet to be determined, making impossible for the Subcommittee's consideration an evaluation of the project and of its impact upon the Gila Wilderness Area. We have proceeded, however, to develop a preliminary evaluation on the basis of incomplete data that are now available to us.

During 1965, alternate "high" and "low" dams were being considered for full-pool elevations of 4,988 feet and 4,882 feet, respectively. Recent indications are that the final decision may call for a reservoir intermediate between these proposals. Using the pool specifications of 4,988 and 4,882 feet, the reservoir would extend a distance of between 3.5 and 5.5 airline miles into the Gila Wilderness Area along the Gila River and between one-fourth and one-half mile into the Wilderness Area on Turkey Creek. The reservoir would extend through the Gila Primitive Area, which, in this section, is a narrow strip adjoining the Wilderness Area. The larger, full-pool outline is shown on the accompanying map (Exhibit A), which is herewith submitted for the Subcommittee file.

The Hooker Dam is currently justified as a multi-purpose structure. In its testimony before the Committee, the Department of the Interior described the four dams on the Gila as serving the purposes of "conservation, flood control, and additional river regulation."

NEED FOR FURTHER STUDY

Passage of the Wilderness Act in 1964 gave statutory protection to the Wilderness Areas previously established through administrative procedures within National Forests. By placing them in the National Wilderness Preservation System, Congress has expressed its intent that these areas be maintained in their wilderness condition "for the use and enjoyment of the American people . . . as wilderness . . ."

The current proposals for the Hooker Dam do not take into account the loss that this project would inflict upon the Gila Wilderness and the National Wilderness Preservation System. The decision to authorize this project should not be made in the absence of a definite proposal and adequate time for complete evaluation of this and alternative projects by appropriate Government agencies and by citizen groups. It is a matter of grave concern to conservationists throughout the Nation that the measures to authorize the Lower Colorado River Basin project contain provisions for this dam in the absence of such detailed information and the needed evaluations of its impact upon wilderness and other resources by appropriate State and Federal agencies.

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The proposal has not been offered in definite terms, nor has detailed study been made of its effects. Neither has there been opportunity for evaluation and discussion of alternate damsites. In a letter to Secretary Udall, dated June 2, 1964, Assistant Secretary of Agriculture, John A. Baker stated that the Hooker Dam would have serious effects on the Gila wilderness, but he went on to say that "Time has not permitted a detailed study of these impacts."

WILDERNESS VALUES

The Hooker Dam would hinder access to the southern one-third of the Gila wilderness. One of the major entranceways to the high peaks is the trail which runs up Turkey Creek. As we understand it, this trail would be flooded. The important trail leading up the Gila River would be inundated, and the stream fisheries in this part of the river would be destroyed. Richard E. Warner, a doctoral student at the Museum of Vertebrate Zoology, Berkeley, California, who has done zoological research in the area affected by the Hooker proposal, reports that natural values exist in this area which are not found elsewhere in the Gila Wilderness Area. The proposed Hooker Dam should not be authorized in the absence of complete studies to determine the possible losses that would be inflicted by the project.

ALTERNATE SITES

Other potential damsites have been located downstream from the Hooker site which conservationists have recommended as alternatives. These are shown on the accompanying map labeled "Exhibit B."

The Redrock Canyon, or Conner damsite, shown on the map labeled "Exhibit C," has been suggested as a site which would enable the dam to interrupt floodwaters from Mangas Creek and Duck Creek and from the tributary canyons in Redrock Canyon. Waters from these sources are reported to have caused serious damage to the communities of Virden and Redrock. In this respect, the Connor site appears to have an advantage over that of the present proposal.

Other sites which local conservationists have suggested are as follows:

1. "Canador" site, in Sec. 19, R. 19W, T19S, at river elevation 3,878 feet, shown on the map, Exhibit D.
2. "Cliff" site, in Sec. 33, R17W, T17S, at river elevation 4,240 feet, shown on the map, Exhibit E.

The Society strongly urges that alternative projects to the Hooker Dam be investigated and that water development facilities on the Gila River be constructed in a way that will prevent any encroachment upon the Gila Wilderness Area and the Gila Primitive Area.

Sincerely,

STEWART M. BRANDBORG, *Executive Director.*

(COMMITTEE NOTE.—The exhibitions may be found in the committee files.)

THE IZAAK WALTON LEAGUE OF AMERICA, INC.,
Glenview, Ill., May 12, 1966.

Subject: H.R. 4671.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, U.S. House of Representatives, Longworth House Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: The Izaak Walton League of America testified at the Committee hearings on the Lower Colorado River Basin Project held last summer. In that testimony we sought to summarize our opposition to the authorization of the Bridge Canyon and Marble Canyon dams. We supported in principle the right of Arizona to make use of its share of the Colorado River. We supported the employment of other Federal, non-hydroelectric sources of power to pump water into the Central Arizona region.

Study of H.R. 4671 as amended (Committee Print No. 19) has revealed no changes which would enable the League to revise its previously stated position—the legislation would still authorize construction of the Bridge Canyon and Marble Canyon dams in the Grand Canyon of the Colorado River and encroach on Grand Canyon National Park and Monument.

Rather than take up vaulable hearing time and burden the record with repetitive detail we ask that this brief letter be made part of the record.

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We respectfully urge that Bridge Canyon and Marble Canyon dams not be authorized, and that the Hooker dam on the Gila not be authorized at an elevation that would result in its reservoir encroaching on the Gila Wilderness Area.

The amended legislation envisions a magnitude of inter-region water transportation far exceeding anything that was conceivable when the original Reclamation law was enacted, or has seemed practicable and feasible during the half century or more since. Thus, Congress is seeking a "break through" of continental importance. Again, we would urge respectfully that Congress accept the fact that such a "break through", essential to western development, at some point will require a revision of the outdated tradition that thermal power cannot be a part of Federal development.

It is clear that approval of the use of thermal power, and so obviating the need for Bridge Canyon and Marble Canyon dams, would solve the immediate controversy and permit whole-hearted support of the project. Moreover, the dam sites and the vast investment in construction will not have been irrevocably committed prior to development of inter-regional development plans which the legislation calls for.

Sincerely yours,

J. W. PENFOLD,
Conservation Director.

FEATHER RIVER PROJECT ASSOCIATION,
Glendale, Calif., April 28, 1966.

Hon. WALTER ROGERS,
Chairman, House of Representatives Subcommittee of Irrigation and Reclamation, Committee on Interior and Insular Affairs, Washington, D.C.

DEAR MR. ROGERS: You will recall that this Association strongly supported the prinicples of HR–4671 et al and we appreciate your including our statement of August 17, 1965 (page 928) in your Committee's Hearing Report Number 17.

Last week (April 22, 1966) the FRPA Board of Directors strongly reaffirmed its position of August 17, 1965 and respectfully requests to be recorded in your hearing of May 9, 1966 in support of the following:

1. FRPA believes that completion of regional studies under Title II by *December 31, 1970* is indispensable to provide early solutions for serious deficiencies in Colorado River Basin water supplies.

We support amendments to HR–4671 which would provide:

Inclusion in Title II of provisions for investigation of alternative plans for importation of water up to a total of 8.5 million acre feet per year for use by the Upper and Lower Colorado River Basins, to service Mexican treaty obligations, and for areas which can be served enroute from the region of export to the Colorado River Basin.

2. The Association strongly supports the provisions of Title III for construction of both Bridge and Marble Canyon Dams. Both are essential to power generation to insure the sound financing of the program. The new recreational areas which these dams would open up would afford vast scenic and other benefits far outweighing minor detriments to a small portion of wild stream bed, as some have alleged.

Yours very truly,

E. F. DIBBLE, *President.*

NEW YORK, N.Y., *May 11. 1966.*

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
Washington, D.C.:

We are submitting by telegram a supplement to our earlier statement of August 30, 1965, presented by Charles H. Callison having reviewed the Committee Print 19 revising bill H.R. 4671. We find that the provisions in this new document in no way make the two proposed dams more acceptable. The National Audubon Society is still unalterably opposed to the proposed construction of two dams within the Grand Canyon of the Colorado. Bridge Canyon Dam downstream from the national park and national monument would create a reservoir extending the entire length of the inner gorge in Grand Canyon National Monument as well as 12 miles of the national park. Scientifically that section con-

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ains some of the canyons most unusual and varied geological features. We agree vith the Bureau of the Budget that this dam proposal should not now be approved. Marble Canyon Dam a few miles upstream from the national park would further reduce and regulate the flow of the Colorado River through the national park and would flood the length of one of the most beautiful sections of the canyon's inner gorge, an opinion recently expressed by former U.S. Senator from Arizona, Barry Goldwater.

We urge that all alternative ways of meeting the need for power generation and financing of the Pacific Southwest water plan be thoroughly studied and that a way be found to protect the great canyon in its entirety for all future generations to enjoy as nature created it.

We request that this supplementary statement be made part of the record of the current public hearings being conducted by your subcommittee.

Respectfully,

CARL W. BUCHHEISTER,
President, National Audubon Society.

MAY 11, 1966.

Congressman WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs, House Office Building, Washington, D.C.

DEAR MR. ROGERS: While today is the last day of the hearings on the Grand Canyon Dams, I hope the record will be kept open long enough to include this letter as well as those of many others who were informed too late to meet the deadline.

I am opposed to the construction of Bridge Canyon Dam, Marble Canyon, or any others proposed for this area. There is absolutely no need for the dams from the standpoint of water conservation. The present storage basins are not full and possibly never will be. More dams will mean greater evaporation loss and an unwarranted and the useless expenditure of tax payers money.

If power is the excuse to take care of the Arizona Project, there are other sources available including the burgeoning development of atomic power.

These dams if authorized would be a flagrant invasion of the National Park System. Conservationists across the nation are appalled.

I am very familiar with the entire Colorado, the history of the river, past constructions, as well as the reasons for the present proposals. As I study the record, I can see only another monumental blunder in the making.

Sincerely,

SIGURD F. OLSON,
Consultant to the Department of Interior, National Park Service, Izaak Walton League of America, and Wilderness Society.

THE UNIVERSITY OF TEXAS,
DEPARTMENT OF GEOLOGY,
Austin, Tex., May 4, 1966.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs, House Office Building, Washington, D.C.

DEAR SIR: May I submit the following statement for presentation at the hearings on H.R. 4671, The Lower Colorado River Basin Project (and related projects).

GEOLOGIC PROBLEMS OF THE PROPOSED GRAND CANYON RESERVOIR SITES

Both of the proposed reservoir sites in the Grand Canyon of Arizona have geological problems that should be of concern to legislators who are considering authorizing funds for the dams.

Within Bridge Canyon Reservoir are at least two very large landslides, one at mile-175, the other at mile-205 or 206. Deflection of the Colorado River by one of them indicates its present instability. Submerging the lower parts of these slides, with the resulting decrease in their weight and strength, may trigger the sudden movement of the entire masses into the reservoir. The devastation

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that can result from such an event has recently been demonstrated by (1) the Vaiont Reservoir (Italy) disaster of 1963, and (2) the Lituya Bay (Alaska) landslide and tidal wave of 1958.

Bedrock in the Marble Gorge Reservoir includes two limestone units, the Redwall and the Muav, which are notoriously cavernous. The caverns have the potential for allowing serious losses of reservoir water. The questions to be asked are: how much water might leak out of the reservoir, and where will it go? Neither question can be positively answered by existing information. Most ground water geologists seem to favor the belief that leakage-water will remain within the basin of the Colorado River and hence will not be lost. But most available data on ground water movement pertains to water-bearing units above the limestones; there is little definite information on movement within the two limestones. Because of this uncertainty it would seem prudent not to authorize Marble Gorge Dam at this time; the Bureau of Reclamation has already built one dam (Anchor Dam in Wyoming) whose reservoir has failed to hold water due to leakage into a cavernous limestone similar to the Redwall.

Respectfully submitted.

WILLIAM C. BRADLEY,
Associate Professor of Geology, University of Colorado
(On leave at the University of Texas).

c.c. Wayne N. Aspinall.

In addition to the non-reimbursability of all irrigation costs of the international dams being constructed on the Rio Grande pursuant to the treaty with Mexico of February 3, 1944, respecting utilization of the waters of the Colorado and Tijuana Rivers and of the Rio Grande (Treaty series 994; 59 Stat. 1219), precedent exists for declaring non-reimbursable the costs of facilities undertaken entirely within the United States in order to facilitate deliveries of treaty water to Mexico. There are several precedents in connection with the Rio Grande.

By the convention of May 31, 1906, between the United States and Mexico, which was ratified in Washington January 16, 1907, pursuant to the advice and consent of the Senate given on June 26, 1906, the United States agrees to deliver to Mexico annually 60,000 a.f. of water in the bed of the Rio Grande near Juarez, Mexico. By the Act of March 4, 1907, (34 Stat. 1295, 1357) Congress made a non-reimbursable appropriation of $1 million toward the construction of Elephant Butte dam to provide capacity for the storage of water necessary to fulfill the obligation of the United States under the 1906 convention. Elephant Butte dam is the storage facility of the Rio Grande federal reclamation project which was constructed by the Bureau of Reclamation pursuant to the Federal reclamation laws.

The Act of August 29, 1935 (49 Stat. 961), and the Act of June 4, 1936 (49 Stat. 1463), authorized, respectively, the construction of a diversion dam in the Rio Grande wholly in the United States and works for the canalization of the Rio Grande both on a non-reimbursible basis, in order to facilitate compliance with the 1906 convention.

Returning to the Colorado, public laws 88–511 and 89–299 appropriated funds on a non-reimbursable basis for the construction of the recently completed 13-mile, 350 cfs Welton Mohawk drainage canal extension near Yuma, Arizona, to service deliveries of water to Mexico under the 1944 treaty.

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